A Study of Approaches and Methods in Early Intervention in Autism and Other Developmental Disorders

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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DECLARATION

I certify that except where due acknowledge has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and ethics procedures and guidelines have been followed.

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ABSTRACT

The present project studied the approaches and methods of practice of early intervention for young children aged 3 to 6 years with autism and other developmental disorders in Victoria. The project commenced in November 1998. It consisted of three studies – a survey of centre-based early intervention (EI) programs and home-based home-based applied behaviour analysis (ABA) programs in 1998, a six-year follow-up survey in 2004 and a 12-month longitudinal study of children with autism in centre-based EI programs or home-based ABA programs from 2000 to 2005. At the time when the studies commenced, young children with autism in Victoria generally entered one of the following types of EI program: (1) centres that cater for young children with varying types and degrees of developmental delay; (2) centres specifically for children with autism; and/or (3) home-based ABA programs. The home-based ABA program, an intensive form of behavioural intervention for young children with autism spectrum disorder (ASD) based on the principles of ABA (Lovaas, 1987), had been the focus of attention for both parents and professionals for the past decade in the United States. In Victoria, the first ABA home-based programs had been established for just over two years at the time of commencement of this project. The present investigation was designed to examine the approaches and methods of practice of EI in Victoria with a view to identifying any relationships among program variables, child variables, family variables, and treatment outcomes. The investigation was conducted via a questionnaire survey delivered to centre-based EI and home-based ABA programs in Victoria. As there were changes in the EI services since the questionnaire was first conducted in late 1998, a six-year follow-up questionnaire survey was administered to ascertain whether any changes would affect treatment outcomes of EI. A longitudinal study was further designed and commenced in 2000 to follow up a group of preschool children with autism participating in either or both centre-based and ABA home-based EI programs in Victoria over a period of 12 months. Program outcomes were measured with respect to intellectual functioning, language abilities, interpersonal relationships and play, pre- and post-intervention. Child characteristics such as the age of commencement at EI, cognitive and
language abilities, severity of autism of the child; and parental coping strategies were studied in relation to developmental outcomes.

The combined results of the surveys in 1998 and 2004 showed that firstly, there were some major changes in the profile of centre-based EI programs over time. Compared to 1998, in 2004 (1) there was an increase intake of children by EI centres, in particular, children with autism; (2) a drop of 48% in intensity of services in terms of hours per week provided to children with autism and other developmental needs; and (3) a greater emphasis on documenting individualised goals for the child in the program and a plan for family support. Whereas in home-based ABA programs, the profile remained unchanged over time in that (1) families engaged in ABA programs were from a higher socio-economic status; and (2) the home-based program adopted a discrete trial training approach. However, a greater range of program hours per week was reported in home-based ABA programs in 1998, from 3 to 39 hours, whereas in 2004, the range of program hours per week was from 8 to 25 hours.

Secondly, overall, children consistently either maintained their skills or showed improvements in the developmental outcomes from either the centre-based or the home-based programs. However, there were differential developmental outcomes in children depending on which type of EI they attended: (1) The centre-based EI programs demonstrated consistent positive outcomes in helping children with autism and other developmental disorders to achieve a higher level of social competence after a 24-month period; whereas (2) the home-based ABA programs demonstrated consistent positive outcomes in helping children with autism and other developmental disorders to achieve a higher level of self-help skills within the program. In addition, autism-specific EI centres reported better outcomes than the generic EI centres in the areas of social competence and language abilities.

The longitudinal study revealed that overall, there were no significant differences between baseline and review assessment scores in nonverbal cognitive abilities, language, interpersonal relationships, play and leisure skills and autism severity as rated by parents when the age of start in EI or the IQ at baseline was controlled. However, a significant pre- and post- intervention difference in autism severity as rated by observation in real life settings remained when age was partialled out, showing that children reduced their
autism related behaviours after 8- to 12- months EI treatment. Moreover, there were specific trends in development identified that were related to earlier age of start. Firstly, significant trends of (1) the lower the age, the larger the IQ gains; (2) the lower the age, the larger the expressive language gains, and (3) the lower the age of start in EI, the more reduction of autism-related behaviour was observed in natural settings (i.e., home, childcare/preschool and /or EI settings) after a 8- to 12-month period of EI. These results suggested that the age of commencement at EI is crucial to the gains that the children can make under EI treatment. Other patterns identified in the longitudinal study were : (1) a trend for higher gains in IQ in younger children in ABA home-based program and autism specific centre-based program; and (2) a trend for higher gains in interpersonal relationships and language in older children in home-based ABA program and whole-day autism specific centre-based program. Although group comparisons among the EI placements were not possible because of the small sample size, the patterns depicted from the profile of results showed that: children did well in home-based ABA programs and in autism-specific centre-based programs. Similar to results in the survey studies, autism-specific centre-based programs seem to generate better outcomes than the more generic centre-based programs in fostering gains in social development as measured in the area of interpersonal relationships.

For parents, there were no significant differences in the pre- and post-intervention measures for parental coping strategies over the 8-12 months during which their children were in EI. However, there was some evidence that the parents did more reappraisal, adopted more confrontive strategies and less distancing strategies when their children were older i.e., near school age. Also there were trends that (1) the higher the IQ of the child at baseline, the less the parent would use accepting responsibility as a coping strategy; (2) the better the receptive, expressive and total language abilities of the child at baseline, the more confrontive coping strategies the parents adopted; and (3) parents adopted more confrontive coping and positive reappraisal when their children make less IQ gains while parents adopted more distancing when their children make more IQ gains.

The combined results of the findings from the surveys and the longitudinal study revealed a differential rate of improvement in EI programs. For home-based ABA programs, there was no simple linear relationship between program hours per week and
the length of time the program has been running that would indicate optimal child outcomes in the 1998 survey study. There was a general trend of more hours per week being associated with more effective developmental outcomes, however, there were critical time intervals (7 to 12 months and 19 to 24 months) in which more hours per week did not produce more effective developmental outcomes. A significant finding in the longitudinal study was that children after attending EI for six months demonstrated a larger reduction of autism related behaviours than the reduction of similar behaviours in the following six months and the effect appeared to be more prominent in an EI setting in the first six months than in the preschool setting.

However, it is difficult to draw definite conclusions from the three studies because of the small sample size. Further investigations with larger, multi-site studies that are standardised with respect to participating children with autism, intervention procedures and measures are necessary to further investigate the type of intervention as an important factor that interacts with other key variables such as the child’s age, the intensity of treatment hours, the pre-intervention cognitive and language levels in effecting the differential developmental outcomes for young children with autism. In recent years, important evidence of the benefits of early intervention for families has been identified. Parental coping strategies with a child with autism should also be studied within the measure of family outcomes by what was defined as benefits experienced by families as a result of services received.
CHAPTER 1
EARLY CHILDHOOD INTERVENTION

This chapter begins with an overview of the framework of contemporary early childhood intervention (ECI) for young children who have identifiable disabilities, including its philosophy, themes and goals. This is followed by a literature review which discusses several of the established criteria for evaluating empirically supported intervention treatments and their implications for ECI research. Child characteristics, family characteristics and program features are identified as specific components that may interact to either optimise or hinder outcomes within the framework of contemporary ECI services. Methodological and statistical issues are also highlighted as significant factors that affect both the efficacy and the effectiveness of treatments in early intervention.

1.1 Overall framework

The overall framework of contemporary ECI has evolved from multiple sources. Early childhood education, maternal and child health, special education, and child development research have helped lay a foundation for both the philosophical and pragmatic aspects of ECI over the past 40 years (Talbot, 1964; Lesser, 1985; Peterson, 1987; Shonkoff & Meisels, 2000). Consistent themes have emerged and consensus has been achieved concerning a set of values for ECI. These themes and values are: (a) a belief shared among most professionals, parents, advocates and policy makers in society’s responsibility to provide care and protection for young children; (b) a commitment to the special needs of children who are particularly vulnerable as a result of established disabilities; (c) a sense that prevention is better than treatment and that earlier treatment is better than later remediation; and (d) that the early years provide a unique opportunity to influence child development, through supporting families and maximising the long-term benefits for all concerned (Guralnick, 1999; Shonkoff & Meisels, 2000).

Specifically, early childhood education and early childhood special education programs, if designed and implemented well, can lead to significant cognitive, academic,
fiscal and social-emotional benefits for children and their families (Guralnick, 1997; Ramey & Ramey, 2004; Heckman, 2006). ECI comprises a set of supports, services and experiences aimed at preventing or minimising long-term problems as early as possible (Dunst & Trivette, 1997; Guralnick, 1997). Contemporary ECI programs for children at risk and for those with established disabilities reveal a consistent pattern of effectiveness. Research has demonstrated that the magnitude of these effects is of potential developmental significance, with effect sizes averaging .50 to .75 standard deviations (SDs) for developmental outcomes in areas of cognition, language abilities, and adaptive behavioural skills, depending on the group’s risk or disability status (Shonkoff & Hauser-Cram, 1987; Gibson & Harris, 1988; Guralnick, 1998). Recent research into ECI advocates a family-systems model for implementing early childhood intervention with emphases on building on strengths and needs of families (Dunst & Trivette, 2009). Researchers proposed family outcomes (e.g., families’ understanding of their child’s strengths and abilities; families helping their child to develop and learn; families having support systems) should be documented as ECI program effectiveness in evaluation (Bailey et al., 2006).

1.2 Effectiveness of early intervention

1.2.1 Efficacy and effectiveness as criteria for empirically supported treatments

There are well-established guidelines and standards for determining the extent to which any given treatment has empirical support for producing beneficial treatment outcomes. The efficacy of a psychosocial treatment is demonstrated when the outcome of the treatment group, including symptoms and functioning of the participants, is improved beyond that of the waiting list control group under tightly controlled conditions, which include: random assignment of children to treatments, checks on procedural integrity, use of treatment manuals, and a clear description of sample characteristics in at least two between-group experiments using different investigators (Chambless & Ollendick, 2001; Lonigan, Elbert, & Johnson, 1998). Apart from between-group comparison, treatment efficacy can also be demonstrated through a large series of single-case experimental designs using sound experimental design, comparison of intervention to another
treatment, clear treatment manuals and at least two different investigators or teams. In probably efficacious treatments, there is no random assignment of subjects and only one team of investigators is employed for between-group designs, or a small series of single-case experimental designs which meet well-established treatment criteria. Experimental treatments are those not yet tested in trials to meet taskforce criteria for methodology (Chambless & Ollendick, 2001).

Researchers often make a distinction between a treatment’s efficacy and a treatment’s effectiveness or clinical utility (Lonigan et al., 1998). As outlined above, studies that demonstrate treatment efficacy focus on whether a treatment reduces symptoms and increases functioning, and is conducted under highly controlled conditions involving random assignment, control groups and periodic checks on procedural integrity. A treatment’s effectiveness, also referred to as its external validity, is demonstrated by measuring the extent to which findings from an investigation can be generalised to other settings and situations, to other children with the same disorder, and by therapists/experimenters other than the researcher (Gresham, Beebe-Frankenberger, & MacMillan, 1999; Gresham, Quinn, & Restori, 1999).

1.2.2 Implications of efficacy and effectiveness for ECI approaches

Guralnick (1993) divided the previous three decades into two generations of ECI development. He referred to ECI research prior to 1986 as first generation research on ECI which was primarily concerned with overall analyses of efficacy and effectiveness. The meta-analyses of these studies (White & Casto, 1985; Casto & Mastropieri, 1986; Shonkoff & Hauser-Cram, 1987) and more traditional efficacy analyses (Guralnick & Bennett, 1987) have determined that ECI is effective across many different types of interventions, various subgroups of children, and a number of outcome measures. In ECI efficacy and effectiveness studies, a consensus has been reached that ECI makes a difference to a child’s developmental outcomes. Although efficacy has thus been established for ECI, Provence (1985) has commented that the lack of comprehensive approaches to both intervention and evaluation in most of the studies limits the conclusions that can be drawn about the duration of the effect, and about which types of programs are most effective with which types of children and families. The conclusions
on global effectiveness derived from the research conducted prior to 1986 are primarily based on comparisons of children and families receiving newly developed early intervention services and supports with children and families receiving essentially no services or supports (Provence, 1985; Guralnick, 1997).

The passage of Public Law 99-457 in 1986 in the United States of America was seen by researchers as marking the end of first generation research and signalling profound changes in approaches to research and also within the community in terms of the provision of services and support to families (Guralnick, 1993; Gallagher, 1996). The ECI system since 1986 has been increasingly guided by sophisticated, developmentally sound and validated materials implemented by well-trained professionals. It has also encouraged the development of new resources and the creation and coordination of family supports. Guralnick (1993) has asserted that it is within this context of greater knowledge and new levels of support that the second generation of investigations should be conducted. Guralnick (1993, 1998) has stated that research should address questions of greater specificity—identifying the child characteristics, the family characteristics, and the program features that interact to optimise outcomes within the framework of contemporary ECI services.

1.2.3 Child’s disability and family characteristics

The child’s type and severity of disability or at-risk status; family resources and adaptability; need for social supports; and related demographic factors may have impact upon the treatment outcomes of ECI. The developmental characteristics of children with different types of disabilities such as Down syndrome (Cicchetti & Beeghly, 1990), autism (Cohen & Donnellan, 1987; Dawson, 1989) or communication disorders (Johnston, 1988), and the emergence of aetiology-specific research strategies (Hodapp, Burack, & Zigler, 1990; Hodapp & Dykens, 1991), have suggested that various ECI program features are differentially effective for children with different types of disabilities.

Research reveals that disability severity also exerts stress on families, causes family distress and impacts on family interaction patterns (Bricker & Dow, 1980; Dunst & Trivette, 1986; Palmer et al., 1988; Shonkoff, Hauser-Cram, Krauss, & Upshur, 1992;
Guralnick, 1998). Previous researchers have reported higher levels of stress among families of children with disabilities than among comparison groups of families of typically developing children (Bailey & Smith, 2000; Kazak & Marvin, 1984). Difficulties encountered by parents coping with a child with a disability have been cited as a source of anxiety, overprotection, rigidity, and a greater emphasis on control within the family (Lardieri, Blacher, & Swanson, 2000). Bailey et al. (2006) claim that family members can be affected by having a child with a disability. In cases when family members experienced depression and feelings of hopelessness, family members’ ability to provide appropriate care might be compromised and could result in negative outcomes for children with a disability (Goodman & Gottlieb, 2002; Hernandez-Reif, Field, Del-Pino, & Diego, 2000; Jones, Fields, & Davalos, 2000). A recent study by Paster, Brandwein, and Walsh (2009) suggests that parents of children with disabilities tended to use the “seeking social support” coping strategy and the “escape avoidance” strategy more often than parents of children without disabilities. Sivberg (2002) studied strain on the family system and found that the parents with a child with an autism spectrum disorder (ASD) scored higher in coping behaviours of distancing and escape, than parents with non-ASD children. A previous study by Dunn et al. (2001) also suggests that firstly, parents of children with disabilities reported less stress and fewer depression symptoms when they had access to social support; and parents who adopted “planned problem solving” coping strategy when dealing with their child were able to cope with the situation more effectively.

Family cohesion or the adaptability and problem-solving abilities of families are important mediating factors in their children’s developmental outcomes (Guralnick, 1997). Gavidia-Payne and Stoneman (1997) found that maternal and paternal perceptions of family processes, dyadic relationships and wellbeing influenced the extent to which mothers and fathers became involved in their children’s ECI programs. Mothers who experienced less stress and who consistently employed a variety of coping strategies tended to be more involved. Through the use of problem-focused strategies, these mothers initiated and planned direct actions that eventually led them to take an active role in their children’s programs. In relation to paternal involvement, findings reveal that fathers who actively employed coping strategies such as seeking instrumental and social
supports and who coped by turning to religion or displaying an absence of denial became more involved in their children’s programs.

The child’s needs often cannot easily be isolated from his or her family context (Carpenter, 2001). Research suggests that the extent to which families have adequate formal and informal support systems is highly associated with successful adaptation (Crnic & Stormshak, 1997; Dunst, Trivette, & Deal, 1994; Hauser-Cram, Warfield, Shonkoff, & Krauss, 2001). Bailey et al. (2006) have stated that ECI services ought to promote positive adaptation and reduce potential negative impacts. The literature in ECI has identified and recommended guidelines and strategies for implementing intervention services for children with disabilities within a family-centred framework (Sandall, Hemmeter, Smith, & McLean, 2005). Although the construct of ‘family-centred practices’ has been used broadly with various interpretations, making it a challenge to evaluate (McWilliam, Snyder, Harbin, Porter, & Munn, 2000), there appears to be general consensus that programs which utilise family-centred practices view parents as partners, provide supports to families, respect diversity among families, and work to empower families to be key decision makers in their children’s educational programs (Bailey et al., 1986; Dunst, 2002; Dunst, Trivette, & Deal, 1988; McBride, Brotherson, Joanning, Whiddon, & Demmitt, 1993; Moore, 2000). Dunst and Trivette (2009) advocated a family-based model which is needs-based and strength-based, provides social support and includes capacity-building, help-giving intervention and practices.

Other family characteristics such as socioeconomic status (SES) and family distress also account for differential developmental outcomes in children. Relatively well-educated families of premature babies were able to prevent major declines in their child’s development when ECI support was provided for them (Brooks-Gunn et al., 1992; Infant Health and Development Program (IHDP), 1990). Further, more educated and financially secure fathers were more involved in their children’s programs (Gavidia-Payne & Stoneman, 1997). When community-based ECI programs are in place to mitigate family stressors such as interpersonal and family distress or resource needs, decline in intellectual development observed for children with developmental delays during the first few years of life is either prevented entirely or substantially reduced (Guralnick, 1998; Guralnick & Bricker, 1987). Bakemans-Kranenburg, Ijzendoom, and Bradley (2005)
conducted a meta-analysis of a set of intervention studies using HOME—an instrument designed to measure the quality and quantity of stimulation and support available to a child in the home environment. Bakemans-Kranenburg et al. traced 48 published articles which presented 56 intervention effects ($N = 7,350$). Their results indicated that interventions with middle-class, non-adolescent parents resulted in higher effect sizes than interventions with low-SES or adolescent samples. The findings also revealed that families in better living conditions profited more from parent education.

The child’s disability need to be addressed within the context of his/her family. The SES of the family may have direct or indirect impact on the treatment outcomes of the child. This aspect will be examined in the current research in relation to home-based ABA programs. The running of a home-based ABA program requires substantial financial commitment of the family. Current studies have identified the characteristic coping style of parents with children with disabilities including autism. Few studies have looked at the impact of the child’s treatment upon the parents’ coping behaviour.

### 1.2.4 Program features

Guralnick (1993) suggests that features of optimal early childhood intervention programs should take into account the duration and intensity; the timing (e.g., age of start); the level and nature of family involvement; and the curricular or developmental approach that is adopted. In the early 1990s, research had started to identify specific program features that were associated with optimal outcomes for children and families.

A general consensus is that the instructional model is an important program feature that affects program outcomes for children. Early studies such as that of Strain (1988) pointed out the potential dangers of borrowing an instructional model that was developed for and validated with only one group of children (e.g., children from low-income families) and of applying that model to children who may differ in many ways from the group for whom the model was developed (e.g., children with Down syndrome). Later studies by Rogers (1991, 1998) revealed that a developmentally based instructional model promoted gains in children with developmental disorders. He compared the progress made by two different groups of preschool children—one group with autism or related disorders, and another with other emotional/behavioural and developmental
disorders such as speech disorders, in a developmentally based instructional model. The model was built on the basis of Piaget’s theory of cognitive development, pragmatics theory of language development (Weiss, 1981), and Mahler’s theory of development of interpersonal relationships (Mahler, Pine, & Bergman, 1975). The results revealed that the instructional model promoted developmental gains in cognitive, social and communication functioning in both groups of children and the approach resulted in impressive gains in language acquisition.

Other researchers have stated that treatment intensity may be a key variable to optimising intervention effects (Guralnick, 1993, 1998; Warren, Fey, & Yoder, 2007). A review of early literature shows that some researchers and program administrators assumed that a greater intensity of EI services would result in better child outcomes than less intensive interventions (White, Bush, & Casto, 1985–1986; Bryant & Ramey, 1987; Dunst, Snyder, & Mankinen, 1989). Innocenti and White (1993) conducted an extensive review of studies on how intensity affects EI program outcomes. Their results revealed that ‘intensity’ is mostly defined in terms of number of sessions per week, minutes of intervention per session, amount of one-to-one intervention, amount of engaged learning time or hours of intervention per week. Most studies have not found substantial advantages associated with more intensive interventions for either home-based or centre-based programs, except for Lovaas’s (1987) study in relation to treatment of young children with autism. This study compared a treatment group ($N = 19$) that received 40 hours per week of one-to-one intervention (a therapist for each child diagnosed with autism) mainly in the child’s home and occasionally in the child’s community preschool, with a control group receiving 10 hours per week of small group interventions for children diagnosed with autism. The results indicated that up to 47% of participants in the treatment group attained ‘normal intelligence’ after two to three years of intervention. Another study (Hill et al., 2003) involved measuring the effects of high participation (full-day care, 50 weeks per year for two years) in an infant health and development program for low-birth-weight premature infants ($N = 1,082$) against a control group. The results revealed gains of between 8 and 14 IQ points in the treatment group on the full scale of Wechsler Intelligence Scale for Children at the age of eight. Shonkoff and Meisels (2000) have commented that the Lovaas intensive EI programs are the exception
and that most programs for young children with disabilities or young children at risk are not that intense.

There are other studies that have failed to identify intensity as a factor affecting developmental outcomes. In a longitudinal, five-year study in which young children with disabilities were randomly assigned to receive either one or three hours per week of ECI services, measures of child and family outcomes over the subsequent five-year period demonstrated no consistent benefits associated with increasing the hours of intervention (Taylor, White, & Kusmierek, 1993). Other findings have suggested that an intervention program can yield positive results even when it is administered with relatively low intensity. A one-hour-per-week intensity of direct child intervention (a 20-minute teaching session, with a frequency of three to four weekly sessions, over a six-month period) of pre-linguistic milieu teaching (PMT), was moderately efficacious in facilitating early communication and language development in young children with mild-to-moderate intellectual disability (Yoder & Warren, 2001, 2002; Fey et al., 2006). This study suggested that the interaction effect of intensity and other factors such as teaching materials or teaching session frequencies may yield positive effects even if the intensity of the intervention is relatively low.

The research outlined above addresses the issue of needing to accommodate greater specificity of child and family characteristics, and program characteristics of ECI raised by Guralnick (1993). A range of child variables such as the developmental characteristics of children with different types of disabilities, the severity of the disability, family stress associated with having a child with a disability, as well as the SES of the family, and the adaptability and coping abilities of families in connection with their child’s development are important factors in children’s developmental outcomes. Treatment intensity as a program feature that can optimise intervention effectiveness has been extensively researched as a key variable in child outcomes. However, studies have not reported consistent and positive results that higher intensity yields more effective intervention in child outcomes.

There is a group of early childhood practitioners who believe in natural environment interventions. They perceive that everyday learning opportunities in family and community activity settings are a primary source of learning. (Dunst & Bruder,
However, practitioners have different views on what constitute natural environments, how they should be used as contexts for child learning, and the roles of practitioners play in natural environment interventions (Dunst, Trivette, et al., 2001, Shelden & Rush, 2001). As natural learning opportunities are diverse, researchers have seen the importance to provide a framework for defining evidence-based practices to inform and evaluate ECI. Researchers advocating natural environment interventions are advocating a framework in examining the characteristics and consequences of a planned or naturally occurring experience or opportunity that are related to or have observed effects and outcomes (Bronfenbrenner, 1993, Dunst, 2007, Dunst & Trivette, 2009). Dunst & Trivette (2009) conducted a literature review and identified contingency learning and caregiver responsiveness as associated with optimal or positive child consequences. Further research into the naturalistic environments is required to disentangle a naturalistic intervention to isolate a characteristic or set of characteristics of a practice that stand out as being the important feature(s) that effect optimal or positive outcome for the child.

1.2.5 Outcomes

Measures in developmental areas such as the adaptive skills, cognitive skills, language skills and social skills of a child are typically used as child outcome measures for an ECI program. The literature reports IQ gains, language gains, improved social behaviour and decreased symptoms of autism, as measured by standardised tests and professional observations, resulting from several ECI practices (Rogers, 1996). Outcomes reported via standardised measures such as IQ scores or language gains are usually obtained through clinic or controlled classroom/home settings (Lovaas, 1987; Ozonoff & Cathcart, 1998; Smith, Buch, & Gamby, 2000).

Downs and Strand (2006) comment that a critical component of an effective, individualised preschool education is assessing child learning in response to intervention efforts and modifying those efforts when learning does not follow. The most common approach to assessment in early childhood education including ECI has been through the use of norm-referenced, standardised performance tests and teacher ratings. Downs and
Strand argue that while the major strength of the standardised testing approach is that such tests allow comparison with a normative sample, thus providing information regarding where an individual child’s development stands in relation to same age peers, its main weakness is that such tests provide very little information that can be used by educators to increase intervention effectiveness (Bagnato, 2005; Macy, Bricker, & Squires, 2005; Neisworth & Bagnato, 1992, 2004).

Other researchers have worked to develop curriculum-based measurements that allow for frequent measurement across time and can be used to measure the effect of intervention on child performance (Fuchs & Deno, 1991; Shinn & Barmonto, 1998). Curriculum-based measurement can be used formatively to enhance instruction that reflects functional and meaningful outcomes. VanDerHeyden (2005) states that a key challenge for linked, assessment-intervention models in early childhood special education has been identifying adequate indicators of progress that are linked to important functional outcomes. With preschoolers, efforts have been made towards identifying indicators of language development (Hart & Risley, 1995, 1999; Luze et al., 2001), social interaction (Carta, Greenwood, Luze, Cline, & Kuntz, 2004), motor development (Greenwood, Luze, Cline, Kuntz, & Leitschuh, 2002), and numeracy skills (VanDerHeyden et al., 2004). These curriculum-based measurements and indicators of progress merit further scrutiny to determine their utility for tracking and guiding intervention efforts, and judging outcomes in early intervention.

As mentioned above, most evaluations of the effectiveness of early intervention and preschool programs have focused upon child outcomes in the areas of cognition, language skills, play skills and social skills. Research consistently indicates both short- and long-term benefits for children (e.g. Anderson et al., 2003; Gorey, 2001; Guralnick, 1998; Ramey & Ramey, 1998). In the last decade, important evidence of the benefits of early intervention for families has been identified. Bailey et al. (2006) advocates measuring family outcomes by what they define as benefits experienced by families as a result of services received. Bailey et al. assert that family outcomes might not be developmental in nature in that there might not be a natural progression of change over time, and family challenges and adaptation can be cyclical in nature at different points in
the child’s or family’s development. Furthermore, few family measures have extensive normative data or growth curves that could be used as a reference point for evaluating change.

There have been studies which outline that family outcomes should include: (1) positive family interaction; (2) families being knowledgeable about the needs of their children; (3) children and families receiving appropriate supports and services that are coordinated; (4) effective and individualised to their needs, and (5) families acquiring and/or maintaining a quality of life that enhances their wellbeing (Park et al., 2003; Bruder, 2005). However, much work is still required in identifying measurement strategies to determine the extent to which these outcomes are achieved and documented.

1.3 Conclusions

Research has revealed that family-related measures such as family adaptability and problem-solving abilities of families are important mediating factors in a child’s development. Understanding the relationship between child or family factors, program factors that define the interventions and types of program outcomes for the child is vital for research. The literature review also supports the direction that research studies should use experimental designs that compare various treatment approaches. Standard treatment protocols should be used in which a wide range of behaviours and skills in both laboratory and naturalistic settings are assessed to establish not only the efficacy but also the effectiveness of treatments. Longitudinal designs should be employed in which the immediate, intermediate and long-term effects of various treatments in ECI are assessed at different points in time.

More recently, family outcomes such as positive family interaction, families being knowledgeable about the needs of their children, and children and families receiving appropriate supports have been viewed by researchers as important indices for measuring the effectiveness of ECI. This area of study is worth pursuing as families play a critical role in their child’s development and helping families impacts on the extent to which children benefit from services. However, documenting family outcomes requires much
work in quantifying the aspects of change in evaluation. The relationship between parental coping behaviour and the child’s treatment outcome is not yet well researched in disabilities studies.
CHAPTER 2
AUTISM SPECTRUM DISORDERS

Research has demonstrated that early childhood education intervention can lead to significant cognitive, academic and social-emotional benefits for children with developmental disabilities and their families and that early intervention (EI) program features are differentially effective for children with different types of disabilities including autism spectrum disorders (ASDs). A thorough understanding of the core features of autism is important for designing, implementing and evaluating EI programs that cater for children with ASDs. This chapter provides an overview of contemporary views of ASDs, and presents information on the incidence and prevalence. The three psychological theories—namely, theory of mind (ToM), executive dysfunction and weak central coherence (WCC)—that explain the core features of ASDs are reviewed; and the extent to which these theories explain the core features is also discussed.

2.1 Nature of autism

Autism is a neurobiological disorder characterised by severe and sustained impairment in social interaction; deviance and delay in communication; and patterns of behaviour and interests that are restricted, stereotyped, or both. The first signs of dysfunction are often observable in infancy (Gillberg & Coleman, 1992). Although characteristics of autism can be seen in the first month of life, the condition is typically not diagnosed prior to two to three years of age in the 1990s (Freeman, 1997) in the United States. In recent years, the American College of Paediatrics recommended that autism-specific screening tools should be applied at 18 months and repeated at 24 months to detect autism concerns (Gupta, Hyman & Johnson, 2007). Autism is a predominantly genetic disorder and probably arises as a result of multiple genes (Volkmar, 2003). In Australia, a community based study is currently in place to identify autism in infancy, involving 241 Maternal and Child Health Nurses trained on developmental markers of ASDs in infancy to monitored 22,168 children on key items during routine check-ups (8-, 12-, 18- and 24-months of age) at their local MCH centre. A current ascertainment rate of
81% of referred infants/toddlers was found to meet criteria for an ASD at age 2-years (Barbaro & Dissanayake, 2009).

Kanner (1943) was the first to describe autism as an inborn disorder of ‘affective contact’. His original paper emphasised that children with autism were born without the usual predisposition to be social. Kanner highlighted two features: the ‘autism’, and a group of unusual behaviours he subsumed under the terms ‘insistence of sameness’ or ‘resistance to change’. The latter includes unusual movements and mannerisms as well as difficulty in dealing with novelty and the former includes non-social behaviour. Early controversies about the validity of autism, such as whether it was distinct from childhood schizophrenia, were resolved over time. By the 1980s, autism was officially recognised and included in a new class of disorder, Pervasive Developmental Disorder (PDD), as set out in the *Diagnostic and Statistical Manual of Mental Disorders-3rd Edition* (DSM-III) (American Psychiatric Association, 1981). PDD is marked by abnormal or impaired development in social interaction and communication combined with a restricted repertoire of activities and interests, and the DSM-IV-TR (American Psychiatric Association (APA), 2000) includes five categories of PDD: Autistic disorder; Asperger’s disorder; Rett’s disorder; Childhood disintegrative disorder; and Pervasive Developmental Disorder–Not Otherwise Specified (PDD-NOS).

### 2.2 Diagnostic classifications in autism

Rutter’s approach was highly influential on the definition of autism that appeared in the DSM-III (APA, 1980). Rutter (1978(a)) emphasised the early onset of the disorder and the characteristic problems in social development and communication (not simply due to associated intellectual disability), along with the presence of unusual behaviours of the type Kanner (1943) had conceptualised as ‘insistence on sameness’.

Over the years, various changes and modifications have been made in the DSM. The DSM-IV (APA, 1994) was developed based on an international study undertaken in collaboration with the developers of the *International Statistical Classification of Diseases and Related Health Problems 10th edition* (ICD-10) (International Classification of Diseases (ICD); World Health Organization (WHO), 1992). The ICD-
10 and the DSM-IV include ‘childhood autism’ (ICD-10) and ‘autistic disorder’ (DSM-IV) in a broad category of ‘pervasive developmental disorders’ (PDDs). Both classification systems also broadened the diagnostic criteria to include ‘Asperger Disorder’ in cases where intelligence and language development are normal but there are social interaction and behavioural problems, and ‘atypical autism’, ‘other PDD’ and ‘PDD unspecified’ (ICD-10), and PDD-NOS (DSM-IV) when symptoms are insufficient for autistic disorder or Asperger disorder. The current definition of autism is historically continuous with Kanner’s original work and with Rutter’s (1978b) subsequent modifications (Volkmar et al., 2005). Major changes were made to the PDD category in the DSM-IV which were based in part on a large, multi-site, international field trial. The final classification of the PDD-NOS was made in the DSM-IV-TR (2000).

2.3 Incidence, prevalence and sex ratio

The prevalence rate of autism refers to the number of people with autism in a particular age range living in a defined area. It is not possible to establish birth prevalence of autism because, unlike other syndromes such as Down syndrome, autism cannot be diagnosed at birth (Williams, 2003). The incidence rate of autism refers to the number of new cases in a specified time in a specified population (Wing, 1996).

Brereton and Tonge (2005) commented that prevalence estimates for autism have been gathered for over 30 years, and that from 1966 to 1997, over 20 prevalence studies were reported in the literature. These studies used varying diagnostic criteria as definitions of autism have changed over time, and their population samples varied in size and type. In the mid 1960s and mid 1970s, studies applied Kanner’s criteria or Rutter’s diagnostic criteria and the results yielded an estimation of the prevalence rate of autism to be between 1.9 and 5.6 per 10,000 (Wing, 1993; Howlin, 2002; Fombonne, 2005). Since that time, the number of studies on autism has increased dramatically, as has the prevalence rate of autism. During the 1990s, the prevalence of autism was estimated at anywhere between 7.1 per 10,000 of typical autism to 60 per 10,000 for all PDDs (Fombonne, 2003, 2005; Williams et al., 2005; Williams et al., 2006). This increase in prevalence cannot be interpreted as a secular change in the incidence or an epidemic of autism. Researchers have identified factors such as change in the diagnostic criteria and
increased awareness and recognition of ASDs as contributing to the prevalence rates (Fombonne, 2003; Wing & Potter, 2002).

Within Australia, formal studies on the prevalence rate of ASD were few until fairly recently. In Victoria, the prevalence rate of ASD in 2002 was estimated at 27 per 10,000 children aged 0–6, and of these 10% were reported to be High Functioning autism, or Asperger Disorder. People with high functioning autism are affected by the triad of impairments, of average or above average intelligence but do not develop language typically (Crewther et al., 2003). The incidence of autistic disorder in the 0–4 years age group was 5.5 per 10,000 in Western Australia and 4.3 per 10,000 in New South Wales (Williams et al., 2005). The current national prevalence for ASDs for children across the Australian population is estimated at 62.5 per 10,000 for 6-12-year-old children, which means 1 in every 160 children in this age group (Williams et al., 2008). A study released in February 2007 by the Centers for Disease Control and Prevention in the United States reported a similar prevalence rate of 1 in 150, i.e., 66.5 per 10,000 children among 8-year-old children. These prevalence rates provide critical information to help policy makers and service providers plan and subsequently provide services for children with ASDs and their families.

Children with autism show a sex ratio of 4:1 (male to female) across the full IQ range (Rutter, 1978; Fombonne, 2003), which rises to 9:1 among children with Asperger Disorder (Wing, 1981). However, many epidemiological studies show that the sex ratio approaches equality at the level of severe intellectual disability and becomes more extreme (biased towards boys) in the normal IQ range (Bryson, Clark, & Smith, 1988; Wing, 1981; Yeargin-Allsopp et al., 2003). It is also often stated that when females are affected by autism they exhibit a more ‘severe’ form of the disorder, at least when severity is defined in terms of lower IQ, or a greater number of impairments in adaptive functioning (Volkmar, Szatmari, & Sparrow, 1993) or autistic symptoms (Tsai & Beisler, 1983). However, the specific reasons underlying male predominance and sex-related phenotypic differences in autism are still unknown.
2.4 Theories of aetiology

Research over the past 40 years has clarified a number of issues about the causes of autism. The psychogenic causation theory of the 1950s which placed the blame of autism upon the parents’ deviant parenting was found to be lacking in evidence and has therefore been dismissed (Brereton & Tonge, 2005). Research has provided evidence that autism is a neurodevelopmental disorder involving deficits in basic cognitive and information processing, affect, communication and social skills (Gillberg & Peeters, 1999). There is a genetic component to autism and the evidence for this comes from twin and family studies. Concordance rates for monozygotic twins are significantly higher than those for dizygotic twins, and heritability may be more than 90% (Folstein & Rutter, 1977; Steffenburg, Gillberg, & Hellgren, 1989; Bailey, Le Couteur, & Gottesman, 1995). Family studies have consistently shown that, although the actual recurrence risks are low (2–7%), the relative risk is 50–200 times higher than the population prevalence (Bolton, MacDonald, & Pickles, 1994; Szatmari et al., 1993; Bailey, Phillips, & Rutter, 1996).

Subsequent studies point to the likelihood that a number of genes are involved in creating the biological basis for autism. Evidence suggests that the region on chromosome 15q11-13 contains a gene or genes relevant to autism (Gillberg, Steffenburg, & Walhstrom, 1991; Baker, Piven, Schwartz, & Patil, 1994; Bundey, Hardy, Vickers, Kilpatrick, & Corbett, 1994; Cook, Courchesne, & Cox, 1998).

Muhle, Trentacoste, and Rapin (2004) studied data from whole-genome screens in multiplex families suggest interactions of at least 10 genes in the causation of autism. Thus far, a putative speech and language region at 7q31-q33 seems most strongly linked to autism, with linkages to multiple other loci under investigation. Cytogenetic abnormalities at the 15q11-q13 locus are fairly frequent in people with autism, and a “chromosome 15 phenotype” was described in individuals with chromosome 15 duplications. Although many genes have been implicated as causes of autism, few significant genetic linkages to autism have been identified and too little is known about their functions or their role in brain development to generate a hypothesis about the brain dysfunctions that underlie autism.
Psychological theories

The causes of ASD have been researched at the cognitive and behavioural levels. This section reviews the current major psychological theoretical approaches to autism. There are a number of psychological models which have been presented as capable of explaining the symptoms of autism, each of which has its proponents and detractors. In recent years, three key cognitive theories have been investigated to identify the link between the brain and behaviour in autism. The first is the theory of mind (ToM), which posits that the inability to attribute mental states, such as thoughts, intentions and beliefs to others and to use these mental states to predict and explain the behaviour of others is a very important and characteristic deficit in individuals with PDD (Baron-Cohen, Leslie, & Frith, 1985; Serra, Loth, van Geert, Hurkens, & Minderaa, 2002). The second theory proposes that executive dysfunctions underlie the social and communicative problems in people with PDD (Ozonoff, Pennington, & Rogers, 1991; Hughes, 1993, 1994, 1996). Executive function (EF) covers a range of higher-level capacities necessary for the control of action, especially in novel contexts. The third theory—the weak central coherence theory (Frith & Happé, 1994; Frith, 1989; Happé, 1999)—assumes that people with autism have a cognitive style biased towards local rather than global information processing, that is, weak central coherence. As a result, individuals with autism focus more on the constituent parts rather than on the whole to extract meaning from information or external stimuli. In the following, the three theories are reviewed in terms of their potential to explain the causation of autism.

Theory of mind deficit

ToM posits the understanding that persons have mental states, such as thoughts, desires and beliefs, that can represent or misrepresent the world, and that normally we have the ability to use these mental states to predict and explain people’s behaviour (Baron-Cohen, Leslie, & Frith, 1985). Studies have shown that by the age of three children are beginning to acquire a broader understanding of mental states and of the difference between their own mental states and those of others (Dunn, 1999; Taylor, 1996). Research also indicate that three-year-olds’ understanding of mental states seems
to be restricted by reality. Three-year-olds consider perceptions, desires and beliefs to reflect reality, and therefore have difficulty understanding beliefs that do not reflect reality, that is, false beliefs. Four-year-olds can begin to understand the distinction between appearance and reality, and are thus able to comprehend false beliefs (Gopnik, 1993; Mitchell, 1997). From around four years old, children can also attribute mistaken beliefs to themselves and to others, display new and advanced forms of social interaction, including tricks, jokes and deception, and can appreciate the difference between the word ‘know’ which expresses the certainty of the speaker and the words ‘think’ or ‘guess’ (Flavell & Miller, 1998; Montgomery, 1992; Perner, 1991; Taylor, 1996). These results suggest that four-year-olds are more sophisticated social partners than three-year-olds. Research also reveals that false belief comprehension is associated with shared pretence (Hughes & Dunn, 1997; Youngblade & Dunn, 1995), communication (Slomkowski & Dunn, 1996), sensitivity to criticism (Cutting & Dunn, 2002; Dunn, 1995) and understanding and predicting other people’s emotions (Serra et al., 2002).

Thus, since its inception, theorists who advocate ToM (Dennett, 1978; Baron-Cohen, 1988; Wellman, 1990) have viewed ToM as a prerequisite for social interaction and social relationships. Research in ToM reveals that individuals with autism have a ToM deficit (Baron-Cohen et al., 1985; Pilowsky, Yirmiya, Arbelle, & Mozes, 2000). Autistic children’s failure on false belief tasks was first observed in studies demonstrated by Baron-Cohen et al. (1985). This classic false belief task requires understanding of the fact that an individual will search for an object in a location where he or she falsely believes it to be, rather than where an observer knows it to be. In this task the participant watches a sequence of events, usually enacted by dolls. The sequence involves one doll having a belief about the location of an object that is incongruous with its real location. The participant then makes a judgement about where the doll will look. By doing so, he/she has to infer the mental state of the doll (I think he thinks) (Wimmer & Perner, 1983). The majority of research in this area has reported failure rates of above 70% for individuals with autism (Happé, 1995). Other research has demonstrated that children with autism are significantly impaired in their ToM development in comparison to the performance of children with Down syndrome (Baron-Cohen et al., 1985), intellectual
disability (Baron-Cohen, 1989), emotional disturbance (Frith, Happé, & Siddons, 1994), and specific language impairment (Leslie & Frith, 1988). These findings suggest that ToM is a core deficit of autism and children with autism are more specifically impaired in their ability to represent mental states than typically developing children (Ziatas, Durkin, & Pratt, 1998).

However, Happé (1994a) stated that it was problematic for the ToM theory that there were autistic individuals who actually passed tests of false belief and so the deficit seemed not to be universal. Further studies have also revealed that high-functioning children with autism can pass ToM tasks (Happé & Frith, 1995) and studies on the ToM abilities of high-functioning children with autism or adolescents with Asperger Disorder have not found any significant differences between children or adolescents with high functioning autism or with Asperger Disorder and normal and psychiatric control groups (Prior, Dahlstrom, & Squires, 1990; Ozonoff, Rogers, & Pennington, 1991b; Bowler, 1992). Bauminger and Kasari (1999) studied the association between cognitive abilities and performance on second-order false belief tasks—that is, tasks requiring that one takes into account what people think about other people’s thoughts. Their results suggest that, like typical children, high-functioning children with autism can provide correct answers on a test of false belief and justify their answers at similar levels of complexity. Hughes and Leekam (2004) reviewed research into children with autism and found that children who have milder diagnostic symptoms generally pass the tests of false belief comprehension (Frith, Happé, & Siddons, 1994; Hughes & Dunn, 1997; Prior et al., 1998). These results indicate that ToM deficits may not be specific to autism, and that it is possible that there is a spectrum of ToM ability (Peterson & Siegel, 1995; Yirmiya, Erel, Shaked, & Solomonica-Levy, 1998).

Hughes and Leekam (2004) further suggest that language appears to be a powerful mechanism for acquiring theory of mind skills in children with autism. Studies have found a positive link between cognitive abilities (mainly verbal IQ or verbal mental age) and performance on false belief tasks. In other words, a higher verbal IQ is correlated with correct performance on false belief tasks (Happé, 1994a, 1995; Yirmiya, Solomonica-Levi, Shulman, & Pilowsky, 1996). Happé (1995) discovered that the
threshold of language ability for passing false belief tasks is much higher in children with autism than in typically developing children. Participants with a verbal mental age of 12 years and above were almost certain to pass a false belief task. This represents a significant delay compared to typically developing children, who pass the task at the age of four (Wellman, Cross, & Watson, 2001). Performance on ToM tasks in children with autism is also significantly related to both lexical knowledge (Dahlgren & Trillingsgaard, 1996; Happé, 1995; Sparrevohn & Howie, 1995) and syntactic knowledge (Tager-Flusberg, 2000; Tager-Flusberg & Sullivan, 1994). Possessing more advanced language skills appears to assist children with autism to pass false belief tasks. Happé (1995) has proposed that children with autism may rely more on language than other children for problem-solving, in the absence of the cognitive routes usually adopted by typically developing children. However, the specifics of the route that children with autism might take from language to ToM are not yet known (Hughes & Leekam, 2004).

More advanced tests of theory of mind including the Eyes Test (Baron-Cohen, Jolliffe, Mortimore, & Robertson, 1997; Baron-Cohen, Wheelwright, Scahill, Lawson, & Spong, 2001), and the Strange Stories test (Happé, 1994(a); Jolliffe & Baron-Cohen, 1999(a)), have shifted away from Wimmer and Perner’s tasks and moved into the different territory of language and face processing in autism. Happé (1994(a)) and Jolliffe and Baron-Cohen (1999a) found that individuals with autism had difficulty comprehending nonliteral language in the Strange Stories tasks although they passed the second-order tests of false belief in ToM. They proposed that the relationship between social competence and ToM impairment is dimensional rather than categorical. This is a shift away from the original thinking of ToM as either being absent or present. In face-processing tasks in autism, Baron-Cohen et al. (1997) claims that in the Eye Test, individuals with autism have a specific impairment in reading mentalistic information from the region of the eyes. However, this claim has recently been challenged. In reviewing the ToM theory, Rajendran and Mitchell (2007) were of the view that advanced tests of ToM seem to lack an ingredient of the theory – not testing a person’s understanding of the causal relation between informational access and the consequent
state of belief. They have argued that in order to avoid the requirement for this causal relation in theory of mind tasks, the condition was named as “mindblindness”.

The definition of ToM and its theoretical underpinning remain to be agreed upon by researchers. However, there seems to have enough evidence to support that individuals with ASDs have difficulties understanding both their own and others’ mind.

Executive function deficits
The theory of executive dysfunction in autism makes a link between frontal lobe failure in this disorder and frontal lobe injury of neuropsychological patients who have impaired executive function (Rumsey, 1985). Its inception came from researchers who noted that some symptoms of autism were similar to those associated with specific brain injury. Executive function (EF) is traditionally defined as including functions such as planning, working memory, impulse control, inhibition and shifting set, as well as the initiation and monitoring of action (Roberts, Robbins, & Weiskrantz, 1998; Stuss & Knight, 2002). These functions share the need to disengage from the immediate environment and guide behaviour instead by internal mental representations such as plans, goals or scripts (Ozonoff et al., 1991; Hughes, 1993, 1994, 1996). It is thus argued that EF is closely related to ‘fluid intelligence’ and the ability to succeed at tasks which require flexible thinking and novel problem-solving skills (for example, see Duncan, 1995). On this view, executive dysfunction is thought to underlie many of the key characteristics of autism, both in the social and non-social domains. These characteristics include rigidity and perseveration; an inability to initiate new, non-routine actions and the tendency to be stuck in a given task set; and a strong liking for repetitive behaviour and sometimes elaborate rituals (Hill, 2004). Research has demonstrated that deficits in EF are a robust correlate of autism. People with autism, including children and adolescents, have more impaired EFs than do people with other developmental disabilities, or people of normal intelligence in studies that were matched on age, verbal IQ, sex, race and socioeconomic status (Ozonoff, Pennington, & Rogers, 1991; Pennington & Ozonoff, 1996; Pennington et al., 1997).
EFs describe brain-based skills that begin to develop in the first years of life (Diamond & Doar, 1989; Diamond & Gilbert, 1989; Gerstadt et al., 1994; Hughes, 1998a, 1998b). However, the results of studies conducted with very young children with autism differ as to whether executive dysfunction occurs in the early years of life in this disorder. Dawson, Meltzoff, Osterling and Rinaldi’s 1998 study revealed EF deficits in young children with autism (mean age = 5.4 years), yet other studies have not found similar results. Research conducted by McEvoy, Rogers and Pennington (1993) compared a group of young children with autism (also mean age = 5.4 years) to two matched control groups on four EF tasks, identifying few significant results. Research undertaken by Griffith et al. (1999) also did not support the hypothesis that children with autism perform significantly worse than the control groups in EF tasks. Furthermore, in studies which involve older children, adolescents and adults, about 10% of individuals with autism display no impairment on tests of EF (Ozonoff et al., 1991) and intact performance on tests of EF has been found in individuals with autism who have an average IQ (Minshew et al., 1992). The results of these studies therefore pose a challenge to the executive dysfunction hypothesis of autism.

The notion of EF historically comes from the analysis of the damage to the prefrontal cortex. From the 1990s, EF research suggests that EF is not the same as prefrontal cortex function. EF studies reveal that some individuals with prefrontal cortex damage do not show impairments in EF (Shallice & Burgess, 1991) while some people with damage outside the prefrontal cortex do show impairments (Levisohn, Cronin-Golomb, & Schmahmann, 2000). Ozonoff et al. (1991) have commented that it would be simplistic to assume that all cases of autism can be explained by prefrontal impairment, and rather that multiple primary deficits are necessary to cause autism. Furthermore, executive dysfunctions are found in other clinical neurodevelopmental disorders including attention deficit hyperactivity disorder (ADHD), obsessive compulsive disorder, Tourette syndrome, phenylketonuria, schizophrenia, and in patients with acquired damage to the frontal lobes as well as in Asperger Disorder and PDD-NOS (Ricco, 1993; Hill, 2004). These findings limit the potential of executive dysfunction as a diagnostic marker for autism.
The EF hypothesis can explain many of the features of autism. However, it does not explain adequately the reasons why not all individuals with autism show executive problems. Furthermore, Rajendran and Mitchell (2007) comment that most studies determining the prevalence of executive deficits in autism focus on group differences, without reporting individual variations. Future research from detailed longitudinal research across the life span would help in determining the EF profiles of individuals with autism. This may help to identify a distinct EF profile distinguishing autism from other neurodevelopmental disorders as suggested in Hill’s review in 2004.

*Weak central coherence*

One cognitive theory that has specifically sought to address both deficits and assets in ASD is the ‘weak central coherence’ (WCC) account. The concept of WCC (Frith, 1989; Happé, 1996) refers to an abnormally weak ability to bind local details to global percepts. The general pattern is one of stronger-than-normal ability to segment stimuli and enhanced attention to detail in perceiving stimuli. It is argued that this pattern results from a predominantly piecemeal processing style in which there is a tendency to perceive and construe complex stimuli as a disparate collection of parts rather than as forming coherent and meaningful wholes (Joseph, 1999). Individuals with ASDs are hypothesised to display WCC, a processing bias for featural and local information, and a relative failure to ‘see the big picture’ in everyday life. The theory of WCC is also used to explain restricted and repetitive interests and behaviours such as focusing on parts of play objects, and unusual or intense preoccupations with objects or trivial things in the environment (Turner, 1997; Lord, Rutter, & Le Couteur, 1994). Such behaviours are argued to be manifestations of a weak ‘drive’ for central coherence.

The central coherence theory also provides an explanation for the marked inconsistency that exists among different cognitive skills, particularly the splinter skills that often appear in the midst of otherwise limited intelligence. Weak central coherence in autism has been demonstrated in the context of superior performance on visuomotor tasks such as the Embedded Figures Test (EFT) (Jolliffe & Baron-Cohen, 1997, Shah & Frith, 1983); the Wechsler Block Design subtest (Shah & Frith, 1993); tasks of visual
discrimination (Plaisted et al., 1998a) and visual search (Plaisted et al., 1998b; O’Riordan et al., 2001); and impaired performance on more abstract tasks such as arranging sentences to form a coherent whole (Jolliffe & Baron-Cohen, 2000). A peak in Block Design performance relative to performance on other Wechsler subtests has been found to be reliable among both low- and high-functioning individuals with autism. (see Shah & Frith, 1993; Happé, 1994; Yirmiya et al., 1996). Shah and Frith (1993) suggested that participants with autism perceptually segmented the block designs to reproduce the designs faster than the learning disabled and neurotypical controls. Additional support for WCC in autism was sought from visual illusion tasks. Happé (1996) found that participants with autism were less likely to succumb to visual illusions such as the Tichener illusion, than control groups, arguing that individuals with autism processed parts of illusions in a piecemeal manner without integrating the comparison features with the inducing context. However, Ropar and Mitchell (1999, 2001) found that participants with autism were susceptible to visual illusions to the same degree as participants without autism.

Frith (1989, 2003) argues that individuals with autism show better performance on these visuospatial constructional coherence tasks because they lack a cognitive drive to attend to global; that is, they have weak central coherence.

On the linguistic level, individuals with autism and Asperger Disorder also have specific problems with integration of diverse information at many levels, which impairs their ability to construct higher-level meanings in context—that is, ‘central coherence’ (Frith, 1989; Happé, 1997). Given that a universal feature of language use is its reliance on context (Prutting, 1982), language should be one of the first cognitive systems to suffer as a result of WCC (Martin & McDonald, 2004). Jolliffe and Baron-Cohen (2000) examined the ability to integrate linguistic information globally in order to construct comprehensive meaning and confirmed the existence of impairment in coherence in individuals with high-functioning autism and Asperger syndrome, with the autism group showing a greater deficit. However, children with autism may be superior in recalling random information that is not embedded in a meaningful whole. They are superior at recalling and processing information, that to normal children appears random and
meaningless (Tager-Flusberg, 1991). Several studies using homographs (words with one spelling, but two pronunciations and two meanings) discovered that individuals with autism failed to use the correct pronunciation and, presumably did not use the preceding sentence to determine correct pronunciation and therefore meaning (Frith & Snowling, 1983; Happé, 1997; Jolliffe & Baron-Cohen, 1999b; Lopez & Leekam, 2003; Snowling & Frith, 1986). Researchers in these studies argue that the failure of individuals with autism to read between the lines explain some of the social difficulties seen in autism such as lacking understanding communicational intention beyond the surface structure of language. Furthermore, Mottron, Dawson, Soulieres, Hubert, and Burack (2006) make a link between linguistic difficulties and global processing in individuals with autism. They raised the possibility that whether or not global processing is triggered depends on the wording of the instruction or question. Bronsnan, Scott, Fox, and Pye (2004) reported that individuals with ASDs succumb to visual illusions (e.g., the Muller-Lyer illusion) when asked “which line looks longer”, but not when asked “which line is longer.”

Another area of interest is reviewing research relating to WCC theory in young children with autism. Studies examining central coherence in relation to joint attention skills in children with autism under the age of five years found evidence for a preference for a local versus global processing style (Jarrold et al., 2000). However, some findings did not support the WCC theory as universal markers for autism from a young age. One report on joint attention and central coherence in children with autism and a comparison sample with developmental delay did not find evidence for a link between joint attention and central coherence (Morgan, Maybery, & Durkin, 2003). The mixed results from the many studies present the limitations of the WCC theory as a possible marker for autism. However, the theory helps to explain some of the marked inconsistency that exists among different cognitive skills, a preference for a local processing style, and restricted and repetitive interests and behaviours, which are argued to be manifestations of a weak ‘drive’ for central coherence in people with ASDs.

The WCC theory of autism also has its weakness in determining whether and how these wide-ranging processing abnormalities are related at either the neuropsychological or the neuroanatomical level. Happé and Frith (2006) have stated that a major limitation
of the coherence account is the lack of specification of the mechanism, at both the cognitive and neural levels, that underlies detail-focused processing bias among people with ASD. The precise cognitive and neurological mechanisms underlying weak central coherence are not yet known.

*Links between theory of mind, executive function and weak central coherence*

Advancement in ToM has been shown to be closely tied to improvement in EF in typically developing children. Studies have shown strong associations between individual differences in ToM (typically, through false belief prediction tasks) and individual differences in EF independent of age and IQ in typically developing preschoolers (Carlson, Mandell, & Williams, 2004; Carlson, Moses, & Breton, 2002; Carlson, Moses, & Claxton, 2004). In the population with autism, ToM and EF as discussed above are considered to be causally implicated in the development of the disorder. Ozonoff et al. (1991) tested high-functioning children with autism and comparison children and found that impairments in EF was almost universal in the autism group (96%), whereas only half of the group (52%) displayed deficits in first-order ToM. Ozonoff et al. concluded that executive deficits were primary in autism, though not causally related to ToM impairments as the two deficits did not always co-occur. However, further studies (Joseph & Tager-Flusberg, 2004; Zelazo, Jacques, Burack, & Frye, 2002; Pellicano, 2007) of young children with autism support that executive deficits present early in life may seriously limit the ability of a child with autism to reason about the mental state of others. The evidence seems to be moving towards EF. However, recent studies have not made claims concerning the developmental primacy of either ToM or EF.

Some studies have also found that ToM and WCC impairments are related in autism. Ferstl and von Cramon (2001) suggest that medial frontal processes may be involved in the problem-solving required to integrate contextual and background information that is common to both central coherence and ToM task performance. Mundy (2003) undertook a review of imaging studies of ToM-related abilities and suggested that ToM skills may also involve similar frontal medial functions that are common to central coherence tasks. The relationships between ToM, EF and WCC in autism are complex.
and multifactorial and require continued definitive research into the connections among all three and symptom presentation in autism.

*Multiple-deficit accounts*

Rajendran and Mitchell (2007) commented that multiple-deficit accounts lie at the opposite end of the theoretical continuum to accounts in which the theoretical proposals posit that autism can be explained as a specific deficit. Some researchers (Baron-Cohen & Swettenham, 1997; Joseph, Tagerflusberg, & Lord, 2002) proposed that individuals with autism can be affected in three possibly developmental domains which are explained by three psychological theories, impaired ToM, WCC and executive dysfunction. Pellicano et al. (2006) further discovered that when age, verbal ability and non-verbal ability were controlled and partialled out, the domains of TOM, EF and WCC seemed unrelated to each other. These researches are arguing for a multiple-deficits accounts for autism than a theoretical continuum of an autism condition.

**2.5 Conclusion**

In a disorder as complex and severe as autism, there may not be a primary deficit capable of accounting for all manifestations of the syndrome. Researchers are keen to examine whether a combination or configuration of deficits is primary to autism (Goodman, 1989; Ozonoff et al., 1999; Rajendran & Mitchell, 2007; Pellicano et al., 2006). ToM, EF deficits and the WCC theory have helped to shed light on the triad of behavioural abnormalities in social function, communication, and restricted and repetitive behaviours and interests in autism. At present, it appears most plausible to consider autism as the result of anomalies affecting a number of core cognitive processes (Happé, 2003), including global–local processing, social cognition (e.g. TOM), and executive functions (Happé & Frith, 2006). This orientation has implications for treatment in that what may be effective in people mostly affected in one domain, may be ineffective for people who have a deficit primarily in another domain (Teunisse, Cools, van Spaendonck, & Aerts, 2001). The range of treatments that target the core deficits of autism is extensive and researchers are investigating both the efficacy and effectiveness
of treatment approaches for children with autism. It is hypothesised that the type of treatment that may work for children with autism in one developmental area (e.g., self-help skills) may not work for them in another developmental area (e.g., social skills). The next chapter evaluates the treatment approaches for young children with autism, its impact upon the developmental outcomes for the children with autism and reviews the measures and measure practices utilised in the autism intervention research.
CHAPTER 3
EARLY INTERVENTION IN AUTISM

This chapter reviews the practices and measures undertaken in the intervention research on young children with autism. The critical elements of effective early intervention (EI) programs are identified and discussed. The chapter also reviews and evaluates the literature on the outcome of EI for young children within the autism spectrum, which includes examining comparative evidence on a range of home-based and centre-based treatment and intervention approaches.

3.1 Overview

An increase in the prevalence of autism in children (Fombonne, 2005), along with treatment studies that suggest substantial gains when treatment is provided at a very early age (Lovaas, 1987; McGee, Daly, & Jacobs, 1994; McGee, Morrier, & Daly, 2000; Strain & Cordisco, 1994), has led to an increased emphasis on EI for young children with autism. The range of treatments available for autism is extensive.

Following Kanner’s (1943) description of autism, the early treatment approaches were based mainly on the psychogenic model of autism. This model assumes that autism is an emotional disorder caused by emotionally ‘cold’ parents, especially mothers, who have subconsciously rejected their offspring (Roberts, 2004). In the 1960s, a body of research revealed that autism is a result of various biological processes (Prior, Sanders, & Sheridan, 1997). Research evidence emerged to indicate that the treatment approaches derived from the psychodynamic conceptualisation were unhelpful to both the parents and the child with autism (Campbell, Schopler, Cueva, & Hallin, 1996; Eikeseth & Lovaas, 1992; Matson, Benavidez, Compton, Paclawskyi, & Baglio, 1996).

Well-researched treatment for autism has been within psychology and education. The Committee on Educational Interventions for Children with Autism of the National Research Council (NRC) in the United States reviewed 10 comprehensive intervention programs for young children with autism (Lord et al., 2001). The report identified interventions that target specific areas of need, such as
social skills; functional communication for both verbal language and alternative modes of communication; play skills; cognitive skills and behaviour management, which all have positive developmental outcomes that benefit the lives of children with autism. These interventions are embedded in a wide range of EI approaches for children with autism based on different aspects of childhood development (e.g., behavioural, developmental and social) (Baer, Wolf, & Risley, 1968; Dawson & Osterling, 1997; Rogers, 1998; Heflin & Simpson, 1998; Dunlap, 1999; National Research Council, 2001; Odom et al., 2003). Within these approaches, a number of educational strategies are recognised: discrete trial training, incidental teaching, and structured teaching (Lord et al., 2001; Roberts & Prior, 2006). The educational/behavioural and developmental interventions for young children with autism are the primary focus of this chapter as they currently form the basis of both home- and centre-based EI programs which are the targets of the current research.

3.2 Critical Elements of Effective Educational/Behavioural EI Programs in Autism

Research studies have implemented autism interventions using a variety of settings (e.g., at home with parents, or at EI centres with teachers) and approaches (e.g., developmental or behavioural). The variables within these intervention strategies that impact upon child outcomes include language training, social skills training, toy play and behaviour management. The EI programs are implemented with varying levels of intensity and for varying lengths of time. A review of the literature indicates that interventions that target multiple variables, extend over a long duration of time, and include parent involvement have yielded the most positive outcomes for children (Levy, Kim, & Olive, 2006). Rogers (1996) studied six comprehensive educational/behavioural treatment programs for young children with autism which differed in terms of curricula, settings, teacher-to-children ratio, ages and functioning levels. All of the studies reported significant IQ gains, significant language gains, improved social behaviour and decreased symptoms of autism. These gains were accomplished within one to two years of intensive intervention and the gains made by young children with autism were greater than those made by children with other
neurodevelopmental disorders such as significant developmental delay and cerebral palsy. Dawson and Osterling (1997) studied eight EI programs for young children with autism and reported significant positive child outcomes—significant IQ gains, increases in language abilities and benefits in other developmental areas.

Meta-analyses (Campbell & Ramey, 1994, 1995; Casto & Mastropieri, 1986; Lazar, Darlington, Murray, Royce, & Snipper, 1982; Shonkhoff & Hauser-Cram, 1987) have shown that EI programs that demonstrate strong evidence of efficacy produced modest to large effect sizes associated with later improved school performance for developmentally delayed children’s cognitive and social development (including children with ASD). Levy et al. (2006) looked at intervention studies conducted with young children with autism between 1975 and 2001 and their findings revealed that interventions that targeted multiple variables, extended over a long duration of time, and included parent involvement yielded the most positive outcomes for children.

These extensive literature reviews reveal that despite diverse intervention strategies and philosophical approaches, EI programs are effective in fostering significant developmental gains for young children with autism. Some critical elements of effective EI programs in autism have been identified by researchers and proponents of specific methodologies. These include: (1) earliest possible start to intervention; (2) optimal intensity of intervention; (3) individualisation of services for children and families; (4) individualised programming; (5) specialised curriculum and systematic teaching—curricula containing goals addressing the child’s strengths and weaknesses across a wide range of developmental areas; and (6) family involvement (Rogers, 1996; Dawson & Osterling, 1997; Guralnick, 1998; Hurth, Shaw, Izeman, Whaley, & Rogers, 1999; Iovannone, Dunlap, Huber, & Kinkaid, 2003; Hume, Bellini, & Pratt, 2005). Each of these critical elements in EI programs is discussed in turn in more detail below.

**Age of commencement**

Research indicates that children who participate in intensive intervention beginning by three years of age achieve significantly better outcomes than those who
begin after five years of age (Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris & Handleman, 2000). The findings of McGee, Morrier, and Daly (1999) suggest that intervention beginning before three years of age has an even greater impact. Children with autism who begin intervention very early—between ages two and four—make significantly more progress than do older children who receive the same interventions (Fenske et al., 1985; Lovaas & Smith, 1988). Commencing intervention at some point during the first five years is considered advantageous for the child due to greater neural plasticity in this period of a child’s life (Farran, 2001; Ramey & Ramey, 1998; Rogers, 1996). Harris and Handleman (2000) evaluated age at intake as a predictor of outcome in 27 children with ASDs who attended intensive behavioural intervention programs. They found that younger age at intake was related to placement in regular education at discharge. However, no compelling evidence supports an absolute critical period such that intervention provided after a certain age cannot be beneficial (Farran, 2001).

**Intensity of intervention**

Research has supported that programs which are more intensive and endure for longer periods of time tend to produce greater positive effects for children with an ASD and for their families than do less intensive or more short-lived interventions (Dawson & Osterling, 1997; Guralnick, 1998; Ramey & Ramey, 1998). Most well validated, autism-specific EI programs involve at least 15 hours per week, and include up to 40 hours per week of focussed treatment with a low child-to-adult ratio (Birnbrauer & Leach, 1993; Fenske et al., 1985; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993; McClannahan & Krantz, 1994; Rogers, 1996; Dawson & Osterling, 1997). One study found that length of time spent in the EI program was a stronger predictor of outcome than age of entry, or the number of hours of intervention per week, for children with autism (Luiselli, O’Malley, Cannon, Ellis, & Sisson, 2000).

Compared to positive outcomes achieved by more intensive interventions which implement 40 hours of therapy per week over two to three years (e.g., Lovaas, 1987), several studies (Birnbrauer & Leach, 1993; Fenske et al., 1985; Gabriels, Hill, Pierce,
Rogers, & Wehner, 2001; Harris et al., 1991; Luiselli et al., 2000; Rogers & DiLalla, 1991; Sheinkopf & Siegel, 1998; Smith, Buch, & Gamby, 2000) add support to the claim that lower intensity EI programs containing fewer hours (in the range of 12–25 hours) and reduced duration (for 7 to 37 months) can yield valuable outcomes for children with ASD. Smith et al. (2000) provided 25 hours intervention per week for 33 months and reported that 4 of 15 children achieved an IQ over 85 and were in regular classes, but one had behaviour problems. Eikeseth, Smith, Jahr, and Eldevik (2002) provided 28 hours intervention per week for 1 year. In their sample, 7 of 13 children with pre-treatment IQ over 50 achieved IQ over 85 and were in regular classes with some support after a year.

Recent comparative studies reveal that higher intensity interventions produced better developmental outcomes. Reed, Osborne and Corness (2007) compared outcomes for children who received low intensity (mean =12 hours per week) behavioural intervention to those of children who received higher intensity (mean = 30 hours per week) behavioural intervention. The higher intensity group made significantly greater gains in intellectual and educational functioning. In a meta-analysis of early intensive behavioural intervention research, Reichow and Wolery (2009) examined effect sizes of studies which compared low- and high-intensity interventions and also concluded that high-intensity interventions produced higher IQ scores than lower intensity interventions.

Specialised curriculum and systematic teaching

Some researchers claim that the extensive literature and practitioner experience with effective educational strategies, and strategies for young children with special needs, are also applicable to young children with ASD (Strain, Wolery, & Izeman, 1998). However, studies reveal that young children with autism demonstrate quite different developmental patterns to children with other kinds of developmental delays, even when matched for age and developmental level (Rogers, 1999; Hurth et al., 1999).

Dawson and Osterling (1997) pointed out that specific educational practices for young children with autism have been created by experienced clinicians to address
the relative strengths and weaknesses that characterise early autism, and to accelerate development in the core affected areas for children with autism. They examined a variety of specialised early intervention models which included one-to-one teaching programs, group programs for children with autism, and inclusive group programs with typically developing children, either through developmentally based or behaviourally based programs. A number of commonalities were identified across the programs that indicate the specific educational techniques most successful with children with autism. These are: (1) the ability to attend to elements of the environment (social stimuli) to comply with learning; (2) the ability to imitate others; (3) the ability to comprehend and use language; (4) the ability to play appropriately with toys; and (5) the ability to socially interact with others.

**Individualised programming**

Cognitive ability in young children with autism is highly correlated with program outcomes. Children with higher cognitive ability and higher learning rates show greater gains in IQ and language, and greater improvement in behaviour, compared to those with lower cognitive abilities (Birnbrauer & Leach, 1993; Gabriels et al., 2001; Smith & Lovaas, 1998; Weiss, 1999). Given that the autism spectrum encompasses a wide range of abilities, programs that are individualised and based on a developmental assessment yield better outcomes (Hurth et al., 1999; Ramey & Ramey, 1998). A particular EI approach may follow a core curriculum, but individualised programming varies according to the specific needs of the child, with goals and teaching methods tailored accordingly (Hurth et al., 1999; Lord et al., 2001). Stahmer, Collings, and Palinkas (2005) examined EI providers’ self-reports of the use of interventions in community settings and found that most providers attested to the importance of individualising programs based on specific child characteristics.

**Family involvement**

Literature reviews indicate that family involvement is considered an important feature of EI programs. The review conducted by the NRC in 2001 reported that nearly all empirically supported treatments reviewed by the committee included a
parent component. Parents participate by defining goals and priorities, implementing program components in home and community settings, taking part in parent training and education, serving as intervention agents, and extending the intensity of all programs. Programs are also sensitive to the stresses encountered by families who have a child with autism and emotional support for parents is included in effective programs (Dawson & Osterling, 1997; Hurth et al., 1999; Lord et al., 2001).

Researchers have evaluated parental satisfaction, stress levels and parental concern related to EI programs. Kohler (1999) reported that families’ greatest concerns with early intervention services for young children with autism were related to inefficiency in meeting children’s needs and poor communication between families and providers. Dillenburger et al. (2004) conducted a survey of 22 parents who participated in Applied Behaviour Analysis (ABA) programs with their children. Overall, the parents reported a positive impact of ABA on the lives of their children and their family and that, through participation, they achieved the goals they set with the service providers. Bailey et al. (2005) found from their National Early Intervention Longitudinal Study that families reported a high level of attainment of family benefit including children and families receiving quality service, families being knowledgeable about the needs of their child, and families acquiring a quality of life to enhance their well-being from their children’s participation in EI programs. Thus, family involvement as a component not only influences the child outcome by parents’ active participation, but it has also evolved to become an independent outcome requiring separate consideration in the research, as is discussed in chapter 1 section 1.2.5.

Educational/behavioural treatments and intervention programs for autism vary greatly and can be viewed in terms of their position on a continuum from traditional ABA discrete trial training to more contemporary behavioural approaches that use naturalistic language teaching techniques or developmentally oriented approaches (Anderson & Romanczyk, 1999; Prizant & Rubin, 1999; Prizant & Wetherby, 1998). In order to examine the critical elements of treatment programs that impact on the social and communication skills of children with autism, it is useful first to
characterise the active ingredients of the various treatment approaches, which is further discussed in sections 3.4 and 3.5.

3.3 Measures of Outcomes in Intervention Research

Gresham, Beebe-Frankenberger, and MacMillan (1999) evaluated the empirical evidence for the efficacy and effectiveness of the most frequently cited treatment programs for children with autism: the UCLA Young Autism Project, Project TEACCH, LEAP, applied behaviour analysis programs, and the Denver Health Science Program; which are all discussed in section 3.4.2 of this chapter. They evaluated these programs according to the conventional standards of research design and methodology and the criteria set by the Division 12 Task Force on Empirically Supported Treatments for Childhood Disorders of the American Psychological Association (Lonigan, Elbert, & Johnson, 1998). They found that although virtually all programs showed substantial developmental gains, particularly in measured IQ, there was no empirical evidence that any one program was more efficacious than another. The beneficial outcomes attributed to these treatment programs may well be a result of the common features or procedures used such as parent involvement/training, predictable routines or the use of a functional approach to problem behaviour. Gresham et al. (1999) advocated for more controlled outcome research with appropriate group or single-case experimental designs in relation to claims of efficacy.

Wolery and Garfinkle (2002) reviewed the outcome measures used in intervention research with young children with autism by adopting the first three levels of Horowitz’s ecological systems theory (Horowitz, 1987; Horowitz & Haritos, 1998) as a conceptual basis for analysing intervention outcome measurement practices. They have asserted that a systems theory helps to identify factors that may account for outcome variability. They explain that the first two levels in Horowitz’s model (environment as stimulus array and as learning opportunities) allow for the definition and measurement of the nature and quality of intervention programs, and of children’s interactions in those settings. The third level (environment as the social system) was used to identify risk and opportunity factors that exist in families and
communities. This approach provides a systematic way to review the outcomes measuring of the child’s and/or the family’s benefits which result from intervention.

Wolery and Garfinkle (2002) reviewed journals that have a focus on autism and sorted 72 articles using the conceptual basis described above and analysed issues arising from intervention measurement practices. Two issues raised in their review included: (1) risk and opportunity factors in the child’s family or community; and (2) the context, setting, and skill domains of the dependent variable. They found widespread under-reporting of children’s family characteristics and nearly all of the reviewed reports focused on young children with autism rather than on their families. However, in terms of the outcome behaviours measured, the social and communicative domains (major diagnostic areas for autism) were well represented while skill areas in imitation, play and attending/engagement (core deficits of young children with autism) were less represented.

Wolery and Garfinkle (2002) also reviewed 15 intervention programs for young children with autism selected from summary documents (Harris & Handleman, 1994; Dawson & Osterling, 1997). They grouped the outcome measures into: (1) cognitive or intellectual status; (2) developmental and achievement status and/or progress; (3) post-intervention placement; (4) recategorisation of diagnosis; and (4) autism symptom reduction. They reported that most programs (9 of the 15) used intelligence tests as an outcome measure, but none relied solely on such measures. All programs used more than one measure and most used multiple measures to quantify developmental and adaptive behaviour outcomes. A variety of criterion-referenced and norm-referenced tests were used. Some programs used measures of children’s behaviour in natural settings (McGee et al., 1999) but most did not. Most programs had ongoing assessment of children’s progress on individual goals; however, these data were not summarised and reported systematically. Most programs (9 out of 15) used post-intervention placement as an indicator of outcome. Wolery and Garfinkle (2002) have argued that this outcome measure cannot be relied on as an index of the amount of help required, as some schools place children with significant disabilities in regular classes, and others place children with mild disabilities in segregated classes.
Another potential outcome is whether diagnostic symptoms of autism are reduced. The programs approached this outcome by using standardised behavioural checklists or direct observation of symptoms (e.g., problem behaviour, echolalia) and noted their reduction or absence at the conclusion of treatment or in follow-up assessments. Wolery and Garfinkle (2002) cautioned as to the reliability of these measurements as outcomes.

The above reviews reveal that the representativeness of the outcome results as indices of the effectiveness of the EI programs for young children with autism is affected by the kinds of outcome measures used and by how well those outcomes are measured. The beneficial outcomes reported by EI programs may well be the result of the characteristics of the programs, the theoretical basis and procedures used in programs such as parent involvement/training, and predictable routines. The following sections outline the characteristics of the different approaches of EI programs for young children with autism, their impacts on the developmental outcomes of these children and some critical reviews of their effectiveness, including a consideration of the outcomes measured where possible.

3.4 Educational/Behavioural Treatment and Intervention models

Although no specific treatment has emerged as the established standard for all children with autism, recent survey data suggest that interventions based on ABA are some of the most frequently used interventions for children with autism (Green et al., 2006; Stahmer et al. 2005). This approach has produced a rich resource of conceptually consistent and scientifically validated techniques that can be applied in various combinations across many different contexts (Anderson & Romanczyk, 1999).

3.4.1 Behavioural Interventions

Behavioural interventions refer to behaviourally based therapy devised to reduce the symptoms associated with autism and to establish appropriate behaviour (McGahan, 2001). Behaviour modification is based on the principles of learning theory—that human behaviour is learnt and that it is governed by its antecedents and
its consequences. The theory explains that children learn new skills by modification of stimuli and the presentation of reinforcement based on Skinnerian operant conditioning theory developed in the 1950s (Jordan, Jones, & Murray, 1998; Roberts, 2004). This approach aims to understand autistic behaviour by identifying the variables that influence its acquisition and maintenance (Lovaas & Newsom, 1976; Schreibman & Koegel, 1982). The aim is to increase those aspects of the child’s behavioural repertoire that are deficient and to decrease behaviours which are excessive for a given set of circumstances. This frequently involves rearranging the antecedents and consequences of the behaviour (Prior, Sanders, & Sheridan, 1997).

Prior et al. (1997) have stated that early work on the treatment of autism demonstrated that autistic children’s behaviour could be modified by changing the environmental antecedents and consequences of these behaviours. This consisted of an elaborate system of rewards and punishments which were contingent upon the occurrence of specified behaviours. Treatment was often provided in a distraction free, one-to-one training setting. Current behavioural therapy employs the presentation of a stimulus or antecedent to a child and then provides a consequence such as a reinforcer based on the child’s response. A reinforcer could be anything, such as a desired item, that, when presented as a consequence of a response, increases the probability or frequency of that response (McGahan, 2001). The use of shaping procedures with precisely timed reinforcement and errorless prompting strategies is a critical element in the ABA approach to teaching and maintaining new, functional behaviour. Proponents of this approach view that behaviourally based strategies can be used to reduce many behavioural difficulties or to improve certain aspects of social, communicative and cognitive impairment (Howlin, 1997; Roberts & Prior, 2006). ABA is not a particular treatment procedure, but represents a systematic approach to the analysis and modification of behaviour.

Early intensive behavioural interventions and Applied Behaviour Analysis (ABA)

A review by Butter, Mulick, and Metz (2006) summarised that, based on principles derived from over 60 years of ABA research, an early intensive form of behavioural intervention has been developed to address ASDs. This involved both
prescriptions for how young children with autism should be taught and what should be taught to address the manifested core symptoms of autism—severe language delays, impaired social interactions, and repetitive and restricted behaviours. The origins of this form of early intensive behavioural intervention are attributed to the University of California at Los Angeles Young Autism Project (UCLA YAP) (Lovaas, 1981, 1987, 2003). This stream of early behavioural interventions typified by the Lovaas program—which is intensive and comprehensive—is referred to as early intensive behavioural intervention (EIBI) (Roberts & Prior, 2006; Reichow & Wolery, 2009). Butter et al. (2006) describe how EIBI programs follow a systematic initial approach of teaching fundamental learning skills including generalised imitation, visual discrimination, and matching to sample to permit acquisition of language and communication skills, primarily using Discrete Trial Training (DTT) as the teaching strategy (Roberts & Prior, 2006). A discrete trial is a small unit of instruction (usually lasting only 5–20 seconds) implemented by a teacher or a therapist who works one to one with a child in a distraction-free setting. EIBI programs are most often implemented in the family home or a specialised centre for 30–40 hours per week, involve one-to-one direct instruction and carefully planned small group or inclusion activities for three years or more, beginning with children as young as two years of age (Sheinkopf & Siegel, 1998; Magiati, Charman, & Howlin, 2007; Butter, Wynn, & Mulick, 2003).

DTT is regarded as one of the most extensively studied ABA procedures (Smith, 2001). Advocates for DTT believe that children with autism have little skill or inclination to learn from the environment via exploration, creative play, modelling and conversation as do typically developing children. DTT breaks down the ordinary flow of adult–child interactions into highly distinctive (discrete) events that are easily discriminated by the child, which thus maximises the child’s success in learning and minimises failure (Green, 1996; Newsom, 1998; Smith, 2001).

The first results from the Lovaas study (1987) primarily using DTT were impressive: an average difference of 30 points in IQ tests was observed between the treatment and control group, and 9 out of 19 (47%) participants were classified as having achieved ‘recovery’ (defined as a post-intervention IQ within the normal range
and successful unassisted completion of first grade in a regular education classroom). These results have generated considerable controversy and criticism around research methodology and debate over claims of recovery from autism. The research methodology of the Lovaas study, the criticisms of this approach and the debate over recovery are discussed in section 3.4.2 below.

Controversy has also arisen over whether EIBI with intensive DTT (15–40 hours per week for two or more years) is appropriate for young children with autism. Models of ABA that rely heavily on DTT have also been criticised for their labour-intensive nature, poor generalisation capabilities, and adverse effects on the child’s motivation (Cohen, 1998; Goldstein & Cisar, 1992; Koegel & Koegel, 1995; Thorp, Stahmer, & Schereibman, 1995).

Reichow and Wolery (2009) conducted a synthesis of EIBI for young children with autism based on the UCLA YAP model. Fourteen samples from 13 research reports were analysed. The analyses of effect sizes suggested that children with autism who received EIBI (18–40 hours per week) generally made large gains (a standardised mean change effect size of > 0.50) on multiple domains including IQ, adaptive behaviour, and expressive and receptive language; and that they made better progress than children with autism who received less intensive behavioural intervention (less than 18 hours per week) or other treatments (e.g., eclectic treatment). However, there are limitations to the interpretations of these results. No comparisons between EIBI and other widely recognised treatment programs have been published and it is not possible to determine whether EIBI is more or less effective than other treatment options. The results for the effect sizes should also be interpreted with caution as there were no controls in place for maturation and thus the effect sizes cannot be attributed to EIBI exclusively. As individual data were not present, it is not possible to infer whether children who undergo change in one domain (e.g., IQ) also make gains in another domain.

Despite the controversies, the findings from these studies still offer significant support to the premise that behaviour analytic intervention is the treatment of choice for young children with autism; and probably they are the most widely studied, empirically validated treatment programs (Lovaas, 1987; McEachin et al., 1993;
Green, 1996; Weiss, 1999; Butter et al., 2006). In the following section, examples of behavioural intervention programs are examined in terms of their approaches and effectiveness.

### 3.4.2 Examples of Behavioural Intervention Programs: Approaches, Effectiveness and Evaluations

Below are some brief descriptions of the five EI programs which have adopted behavioural approaches and have been reviewed by researchers. Their approaches and the reviews of these approaches are discussed in the section on evaluation of treatment outcomes of behavioural intervention programs.

#### The Lovaas Program

The Lovaas Program was developed by the UCLA YAP (YAP) under the direction of O.I. Lovaas, a psychologist who researched methods of ABA and began the behavioural intervention project in 1970. This project sought to maximise outcome gains by treating autistic children during most of their waking hours. Based on his research, Lovaas claimed that intensive behavioural intervention, primarily using discrete trials, is the optimal treatment option for children with autism. The YAP used time-intensive (40 or more hours per week) behavioural intervention techniques to treat children aged four years or under over a two-to-three year period. The parents worked as part of the treatment team throughout the intervention. During the first year, treatment goals consisted of reducing self-stimulatory and aggressive behaviours, building compliance to elementary verbal requests, teaching imitation, and establishing the beginnings of appropriate toy play. Aggressive and self-stimulatory behaviours were reduced by being ignored; by the use of ‘time out’; by the shaping of alternate, more socially acceptable forms of behaviour; and by delivery of a loud ‘no’ or a slap on the thigh contingent on the presence of the undesirable behaviour. The second year of treatment emphasised teaching expressive and early abstract language and interactive play with peers. The third year focused on the teaching of appropriate and varied expression of emotions; pre-academic tasks such
as reading, writing and basic arithmetic; and observational learning from other children. The use of aversive consequences such as a slap on the thigh is no longer recommended as part of the Lovaas program (Schopler, Short, & Mesibov, 1989). Outcomes of the program were discussed earlier in section 3.4.1.

The Murdoch Early Intervention Program

The Murdoch Early Intervention Program partially replicated the YAP designed by Lovaas and was reviewed by Birnbrauer and Leach (1993). Nine children in the program between the ages of 24 and 48 months and with a diagnosis of either autism or PDD NOS were compared with a control group of matched but younger non-treated children. The goal of the program was to provide an intensive program of 30 hours per week; however, the actual number of hours provided ranged from 8.7 to 24.6 with a mean of 18.7 hours per week. Four of the nine children in the experimental group and one from the control group made substantial improvements in IQ and language within 24 months, although scores continued to be below average and children continued to display ‘autistic’ characteristics.

Douglass Developmental Disabilities Center Program

The Douglass Developmental Disabilities program was established at Rutgers University in 1972 and is based on the principles of ABA. Under the program structure, children progress over a three-year period from a segregated, highly structured classroom to an integrated classroom. The segregated class provides intensive, one-to-one DTT based on the Lovaas model and maintains a two-to-one child-to-teacher ratio, focusing on the skills needed to function in an integrated classroom (Roberts & Prior, 2006). The integrated class is partially based on the Learning Experiences: An Alternative Program for Preschoolers and Parents (LEAP), described in section 3.5. The program is developmentally based, and recommends 25 hours per week. The aim of the program is for the children to be included in a mainstream educational setting after one to two years. The mean age of children enrolled in the program in 1997 was 50 months, and the age range was between 30 and 62 months. The program served both children with autism and typically
developing children of a similar age. Families are visited by a member of staff from the program twice a month and are offered parent and sibling support groups (Dawson & Osterling, 1997).

**May Institute**

The May Institute in Boston offers a developmentally sequenced program based on the principles of ABA. Intensive home-based training (15 hours per week) is provided to children and their families for a period of six months. The in-home therapist and parents together provide one-to-one intervention that focuses on basic skills such as self-care, language and the reduction of problem behaviours. On completion of the home-based intervention, the children attend one of the Institute’s two preschool programs: the ‘Step 1’ classroom or the integrated classroom. The Step 1 classroom contains only children with autism, and teaching occurs in highly structured, teacher-directed small groups. Most children attend the Step 1 class for approximately one year, where they learn and develop skills such as following instructions, imitation and working in groups. The integrated class is inclusive and contains typically developing children as well as those with developmental disabilities. The curriculum is focused on the teaching of skills that children need in a preschool setting. A service coordinator visits families monthly and discusses the child’s progress and parents’ areas of concern. The program also provides respite care for families and outside referral information (Roberts & Prior, 2006).

**Evaluation of treatment outcomes of behavioural intervention programs**

Prior et al. (1997) have commented that the most intensive behavioural intervention for young children with autism presented in the literature is the program developed by Lovaas (1987). Lovaas and colleagues (Lovaas, 1987; McEachin et al., 1993) reported that as many as 47% \((n = 9)\) of children enrolled in their structured program mainstreamed into general education and did well academically; another 40% \((n = 8)\) were assigned to special learning classes for delayed language, and only 10% \((n = 2)\) were assigned to classes for autism or intellectual disability. This
contrasted with the control group ($N = 19$), in which 45% were placed in special learning classes, and 53% were classified as severely retarded. Substantial increases in tested IQ (of an average of 30 IQ points) within the experimental group were reported, whereas in the control group IQ did not improve. McEachin et al. (1993) investigated the nine children who achieved the best outcomes in the 1987 Lovaas study. After a thorough evaluation of adaptive functioning, IQ and personality conducted by professionals blind to the child’s diagnosis and treatment status, evaluators could not distinguish treatment subjects from those who were typically developing adolescents.

By implication of the results established in 1987 and 1993, the Lovaas study indicates that young children with autism who had received EIBI using DTT achieved normal functioning—‘scoring within the normal range on standardized intelligence tests and successfully completing first grade in a regular, nonspecial education class entirely on one’s own’ (McEachin et al., 1993, p. 362). Perry et al. (1995) also claim to have found ‘recovery from autism’ in two siblings with autism who were exposed to the Lovaas program. These reports have generated considerable controversy and criticism around research methodology and debate over claims of recovery from autism.

Several researchers have raised a number of issues about the results of both the Lovaas (1987) study and McEachin et al.’s (1993) follow-up study. Jordan, Jones and Murray (1998) have observed that the two outcome measures used (IQ and educational placement) are gross measures and do not reflect improvements in the key areas of difficulty in autism. The allocation of children to different groups for treatment was less than random assignment and this has been raised as a concern by a number of other authors (Gresham & MacMillan, 1998; Rutter, 1996; Schopler et al., 1989). Schopler et al. (1989) commented that Lovaas’s sample functioned at a higher level at intake than is typical of children with autism. Jordan et al. (1998) further argued that 15 per cent of the referred children were excluded on the basis of their prorated mental age (PMA), an exclusion which affects the interpretation and generalisation of the project’s results to other children with autism. The long-term
follow-up data were also collected at different times, which created problems in making comparisons. Gresham and MacMillan (1997, 1998) point out that selection biases pose a fundamental threat to the internal validity of the UCLA YAP. They also raised the question of whether therapists providing the treatment in other settings could have the training, support/resources or supervision provided in the reported UCLA research.

The use of the terms ‘normal functioning’, ‘recovery’, and ‘cure’ in the Lovaas (1987) study has also created significant controversy. In the studies of Mesibov (1993) and Mundy (1993), they both noted that many of the skills required for normal functioning such as social interaction, friendship, conceptual abilities, social communication, obsessions and ritualistic behaviours, or disturbances of mood are not measured in the follow-up study of the Lovaas program. Mesibov (1993) stated that there are many high-functioning people with autism, who have near-normal IQs, in regular school programs who nevertheless remain handicapped in the areas of the social, cognitive and communicative aspects of autism. McEachin et al. (1993) stated that while results have been impressive, replications were required as no single study by itself can provide conclusive evidence, and in such replications, improved research methodologies need to be adopted.

Sallows and Graupner (2005) studied 24 children with autism who were randomly assigned either to a clinic-directed group, replicating the parameters of the early intensive behavioural treatment developed at UCLA, or to a parent-directed group that received intensive hours, but less supervision, by equally well-trained supervisors. The outcome after four years of treatment, including cognitive, language, adaptive, social, and academic measures, was similar for both groups. After combining groups, Sallows and Graupner (2005) found that 48% of all children showed rapid learning, achieved average post-treatment scores, and at age seven, were succeeding in regular education classrooms. These outcomes are consistent with those reported by Lovaas and colleagues (Lovaas, 1987; McEachin et al., 1993).
Other studies indicate that in less intensive programs (<40 hours per week) for children with autism, significant gains occur. Smith (1999) reviewed outcome studies of the May Institute, the early intervention program at Murdoch University and a research study at the Pervasive Developmental Disorder (PDD) Clinic at the University of California San Francisco (UCSF). The services reviewed at these other sites were less intensive, averaging 18–25 hours per week, and less frequently supervised than services at UCLA; however, children at these other sites also displayed gains. The children who received 25 hours per week of intervention in the UCSF study scored an average of 28 IQ points higher than those who were matched on cognitive ability and mental age, yet did not receive any treatment. A two-year follow-up study at the May Institute revealed average increases of 20–22 IQ points. At Murdoch, less improvement was noted, which may be attributed in part to staffing problems.

Harris and Handleman (2000) reported on a four-to-six year follow-up study of educational placement of 27 children with an autistic disorder who were between the ages of 31 and 65 months and had an IQ of between 35 and 109 at time of admission to the Douglass Developmental Disabilities Center. The results showed that those children who were enrolled at the centre before 48 months of age were far more likely to achieve an inclusive educational placement in a regular education class than were those children who began after that age. These outcome data are consistent with those of other researchers who have reported favourable outcomes for ABA programs involving children younger than 48 months of age (Birnbauer & Leach, 1993; Lovaas, 1987; Sheinkopf & Siegel, 1998). These findings are also consistent with research which identifies young age of commencement as a critical element of effective EI programs for young children with autism (refer to section 3.2 in this chapter). Harris and Handleman (2000) also revealed that the IQ of children shortly after their admission to the centre was also highly predictive of their later placement as well as of their IQ at discharge. The group of children who went on to attend regular classes had a mean IQ of 78 at entry and 104 at discharge, showing a 26-point gain. Those children who went into special education settings had a mean IQ of 46 at entry and of
At discharge. Although they remained in special education settings, the 13 IQ point increase nevertheless indicates a significant gain from intensive behavioural intervention programs (Harris & Handleman, 2000).

Apart from young age of EI commencement, the early learning rate is viewed as a predictor of treatment outcomes. Weiss (1999) assessed the predictive utility of early learning rates within the EIBI home-based program modelled on the Lovaas program. The study suggested that initial learning rates are moderately correlated with treatment outcomes after two years. Children who initially learned quickly continued to demonstrate rapid acquisition rates. These children also showed the greatest changes in autism severity and in adaptive behaviour.

Smith, Groen, and Wynn (2000) conducted a study which randomly assigned young children with PDD to intensive treatment groups or parent training groups. In both intensive treatment and parent training, children received intervention based on Lovaas et al.’s (1981) manual. The intensive treatment groups were directed by the authors who had a combined total of 10 years experience at the UCLA YAP under Lovaas’s supervision prior to the outset of this study. The groups received an average of nearly 25 hours per week of treatment for 12 months, which were gradually reduced over the following one to two years. The parents implemented the program set-up with the parent trainer for five hours per week. In addition, children in this group were enrolled in special education classes for 10–15 hours per week. The groups appeared similar at intake on all measures. At the follow-up stage, the intensive treatment group outperformed the parent training group on measures of intelligence, visual-spatial skills, language and academics, though not adaptive functioning or behavioural problems. Similar to the outcome studies of EIBI programs reviewed by Smith (1999) discussed above, an intensity of treatment hours of 18–25 hours per week produces gains in cognitive ability.

Recent EIBI studies continue to offer support for the view that intensive behaviour analytic intervention is effective in terms of developmental gains. Butter, Mulick, and Metz’s (2006) study provides case descriptions of eight children
previously diagnosed with an ASD and intellectual disability who, after EIBI
treatment, no longer met behavioural criteria for intellectual disability or a PDD. The
average gain in IQ standard scores was 34.6 points, and the average gain in adaptive
behaviour standard scores was 43 points. Language skills remained impaired for the
majority of the children. Butter et al. (2006) claim that the developmental outcomes
for the children in this study are similar to those of the best outcomes for children
described in the Lovaas (1987) study. However, a significant limitation of this study
is that there was no control or comparison group. Yet, given that research and reports
by others have demonstrated that EIBI has a strong influence in improving
developmental functioning (Cohen, Amerine-Dickens, & Smith, 2006; Howard,
Sparkman, Cohen, Green, & Stanislaw, 2005; Lovaas, 1987; Scheinkopf & Siegel,
1998; Smith 1999, Smith, Groen et al., 2000; Sallows & Graupner, 2005), Butter et al.
(2006) attribute the developmental outcomes of children in this study to the effects of
EIBI.

Cohen et al. (2006) replicated the UCLA EIBI in a community setting. They
conducted a three-year prospective outcome study that compared two groups: (1) 21
children who received 35–40 hours per week of EIBI from a community agency that
replicated Lovaas’s model; and (2) 21 age- and IQ-matched children in special
education classes at local public schools. A quasi-experimental design was used, with
assignment to groups based on parental preference. Assessments were conducted by
independent examiners for IQ (Bayley Scales of Infant Development or Wechsler
Preschool and Primary Scales of Intelligence), language (Reynell Developmental
Language Scales), and adaptive behaviour (Vineland Adaptive Behaviour Scales).
The results revealed that, with treatment, the EIBI group obtained significantly higher
IQ and adaptive behaviour scores than did the comparison group. No difference
between groups was found in either language comprehension or nonverbal skills. Six
of the 21 EIBI children were fully included into regular education without assistance
at Year 3, and 11 others were included with support; in contrast, only one comparison
child was placed primarily in regular education. Although the study was limited by
the nonrandom assignment to groups, Cohen et al. (2006) claims that the study provides evidence that EIBI can be successfully implemented in a community setting.

### 3.4.3 Research into home-based ABA programs

Although researchers have emphasised the need for replicating outcomes of early intensive intervention studies with improved methodologies (Smith, 1999), existing research, combined with case studies that have presented treatment in a format accessible to a general audience (e.g. Maurice, 1993), has led to a dramatic rise in requests from families for intensive, early ABA treatment. Smith, Buch and Gamby (2000) has commented that this demand has posed at least two major practical problems for service providers and families. First, the demand far exceeds the supply of professionals who have the training and experience necessary to provide high-quality treatment. Second, because of the intensity of services, for most families it is prohibitively expensive to employ professionals to deliver all of the treatment. The most common solution to these problems has been for professionals to assist parents in setting up their own treatment programs. In such programs, discussed in the manual edited by Maurice (1996), parents recruit paraprofessional therapists (often university students) to provide treatment for their children. The professional then trains the parents and therapists in ABA techniques and develops a treatment plan for the child. Subsequently, the professional conducts follow-up consultations to provide further training and to update the treatment plan as needed. Smith et al. (2000) observes that parent-directed programs with paraprofessional therapists may substantially enhance children’s functioning.

Sheinkopf and Siegal (1998) compared 11 preschoolers with PDD who were receiving parent-directed, intensive ABA treatment to 11 other children with PDD who were enrolled in classes in their local public schools. Twenty months after treatment onset, after receiving a mean of 27 hours of treatment per week, the ABA group displayed much higher intellectual functioning than the comparison group, as well as fewer parent-reported symptoms of autism. A limitation of this study was that the investigators did not directly observe treatment and hence could not directly
assess the quality of therapy or children’s rate of progress at different points during the intervention.

A number of studies that report on the effectiveness of such programs take into consideration factors such as demands on parents, frequency of training from consultants, reliance on therapists whose knowledge in learning theory and ABA varies, and high staff turnover, all of which may reduce treatment effectiveness. Some of these limitations are discussed in the review of studies presented below.

Smith et al. (2000) examined parent-directed, intensive early intervention for children with PDD. In this study, children’s parents recruited paraprofessional therapists and requested consultations on how to implement the UCLA treatment model in their homes (Smith & Lovaas, 1998). Parents and therapists then received six, one-day workshops over a five-month period, with additional consultations for the next two to three years. Six boys participated (intake age of 35–45 months, intake IQ of 45–60). The study addressed: (1) the children’s skill acquisition during the first five months of treatment; (2) outcome two to three years later; (3) treatment quality; and (4) parents’ impressions of the treatment. Five out of the six children rapidly acquired skills when treatment began, but only two clearly improved on standardised tests at the two-to-three year follow-up phase. Parents reported high satisfaction with the treatment. It is thus evident that parent-run, ABA early intervention programs bring about short-term gains for children with PDD or autism. However, whether parent-run programs can create long-term gains comparable to clinic-based programs requires further research that includes a large sample size and measurements at regular intervals, such as 12 months.

Bibby, Eikeseth, Martin, Mudford, and Reeves (2001) conducted a larger scale study on parent-initiated, intensive early intervention. They preferred to describe the intensive early intervention as ‘parent-managed’ rather than ‘parent-directed’ as described by Smith et al. (2000). Data from 66 children completing the study and served by 25 different early intervention consultants were analysed. Their study investigated the effects of parent-initiated approximations of the UCLA workshop
model. Families obtained initial information about behavioural early intervention from parents’ organisations, internet websites, email networks or professionals. They located and recruited a consultant to provide the overall direction for their child’s program. Families also hired between three and five potential therapists after advertising in local universities and colleges, newspapers and unemployment offices. In some cases, therapists included volunteers. Generally, 30-40 hours of one-to-one, therapist-to-child DTT treatment per week was recommended. Curricula differed across consultants and children but could generally be traced to the UCLA treatment manual. The child’s program commenced with a workshop provided by the consultant usually for two six-hour days at the child’s home. The workshop offered a mixture of theory, modelling and practice (e.g. using DTT) to the family and the novice therapists. The consultant was hired for further workshops with a median frequency of four times per year. The child’s progress and curriculum were reviewed at the follow-up stages, as was therapist performance.

After a mean of 31.6 months of intervention IQ scores had not changed. Vineland Adaptive Behaviour Scores had increased significantly by 8.9 points. No children aged over 72 months attained normal functioning (defined as IQ > 85) or unassisted mainstream school placement. Progress for 60 children across 12 months was found for mental age (+5.4 months), adaptive behaviour (+9.7 months) and language (+5.1 months). The interventions did not reproduce results from clinic-based, professionally directed programs. The reasons for the different outcomes between the parent-managed, community-based, intensive ABA program and the Lovaas program (1987) are debatable. In the community-based ABA program, the recruitment and training of the therapists may not be as controlled as in the clinic-based program. Although the curricula generally could be traced to the UCLA treatment manual, they differed across consultants and children with autism under treatment. Furthermore, the frequency of supervision by the consultants may vary among families and was not as tightly controlled as in the clinic-based ABA program of Lovaas. All of these factors may undermine the effectiveness of the treatment. Studies that are more controlled will help to identify factors that impact on the effectiveness of community-based ABA home programs.
3.5 Naturalistic and developmental approaches

Naturalistic interventions are generally described as following a developmental approach which is relationship-based and aims to help the child to learn to attend to tasks, to relate to people and to experience a range of feelings. The aim of these interventions is ultimately to enable children to think and relate in an organised and logical manner (Atchison et al., 1997).

The DIR Model: Developmental, Individual-Difference, Relationship-Based Treatment—‘Floor Time’

At the National Centre for Clinical Infant Programs, Greenspan and colleagues have worked with children with a wide range of disabilities from infancy through to age 10 years. Greenspan and others have created a developmental approach to early intervention with infants and children with disabilities, titled the Developmental Individual-Difference, Relationship-Based Model (DIR). This is also commonly referred to as the ‘Floor Time’ approach (Greenspan, 1998). Its theoretical foundation is based on a developmentally interactive theory. In this theory, most cognitive skills developed in the first four or five years of life are believed to be based on emotions and relationships (Greenspan & Wieder, 1997a). Affect and interactive relationships are the primary components of this theory and the practice of this model (Erba, 2000).

Greenspan asserts that the Floor Time approach to intervention (Greenspan, 1992; Greenspan & Wieder, 1998, 1999, 2009) focuses on the infant’s core functional, emotional and social capacities at each stage in his or her development, as well on his or her individual processing differences and relationship patterns with others. Floor Time is based on Greenspan’s theories of the six functional milestones necessary for a child to succeed in further learning and development. These milestones are: (1) shared attention and regulation; (2) engagement and relating; (3) purposeful emotional interaction; (4) social problem solving; (5) creating ideas and connecting ideas together; and (6) thinking logically. Appropriate emotional experiences during each of the six developmental phases help develop critical cognitive, social, emotional, language and motor skills, as well as a sense of self. DIR/Floor Time includes interactive experiences, which are child-directed and take
place in a low stimulus environment for sessions of 20–30 minutes each, with therapy time ranging from four to eight sessions, i.e., two to five hours a day (Greenspan, 1998).

In the Floor Time model, interactive play, in which the adult follows the child’s lead, encourages the child to ‘want’ to relate to the outside world (Roberts & Prior, 2006). Greenspan believes that each time the child has ‘Floor Time’, this acts as the child’s practice time to build the link between emotion and behaviour, and eventually speech, which helps the child to progress up the developmental ladder (Greenspan, 1998). The Floor Time theory is organic in nature and recognises the symptoms of children with autism as secondary manifestations of underlying sensory dysfunction. This hypothesis proposes that the primary neurophysiological dysfunction may lie in the connection between affect and the sequencing of motor patterns and verbal symbols (Greenspan & Wieder, 1997b). Thus, the primary goal of intervention for young children with autism is to help children work around processing difficulties so as to re-establish affective contact with primary caretakers and begin to master the six relationship-based milestones (Greenspan & Wieder, 1997b).

Greenspan and Wieder (1997b) reviewed the developmental charts of 200 children who were diagnosed with ASD and compared these charts to those of 53 comparison children with autism receiving community intervention support. After two years of a Floor Time intervention, of the 200 children, 58% fell into the good-to-outstanding category which meant that the children reviewed showed spontaneous symbolic abilities that related to intent and affect. In their review, they also reported that ASD children who were previously making very slow progress and having a difficult time learning to imitate and symbolise were the ones who responded to a combined behavioural and dynamic Floor Time approach. The behavioural approach helped them to master motor and behavioural sequences (e.g., imitation) and the Floor Time approach assisted them to make their sequences their own as opposed to them being under the control of external prompts.

In her review of major early intervention approaches, Erba (2000) commented that although Greenspan and Wieder’s chart review is not considered an empirical study, the results support the intervention and warrant further inquiry. There appear to
be no independent peer-reviewed, published studies of DIR/Floor Time’s effectiveness for young children with autism. Thus, comparative study with other approaches will be worth investigating in the future.

**Relationship Development Intervention**

Relationship Developmental Intervention (RDI) (Gutstein, 2001; Gutstein & Sheeley, 2002) is a program aimed at developing relationship skills for children with Asperger Disorder, PDD or autism. The goal of RDI is to increase motivation and interest in social relating in individuals with ASDs and to provide activities and coaching to assist them to enjoy and become competent in social relationships (Roberts & Prior, 2006). There are six levels in RDI—Novice, Apprentice, Challenger, Voyager, Explorer, and Partner—which are subdivided into a total of 24 developmental stages. Programming is individualised and based on the Relationship Development Assessment designed by Gutstein. For younger children with autism (aged two to eight years), the program emphasises foundation skills such as social referencing, regulating behaviour, conversational reciprocity and synchronised actions. Gutstein suggests that this approach is useful for higher functioning children and adolescents with ASDs, or for lower functioning children after they have learned basic relating skills through intensive behaviour intervention. However, in view of its lack of independent empirical evidence, it is suggested that RDI be considered as an addition to other interventions that have been proven to be effective (Perry & Condillac, 2003). Letso (2007) has commented that the theories and philosophies underlying RDI strategies are not supported by evidence, and nor is there widespread ‘agreement among researchers’ on the many theoretical conclusions that are the basis for the RDI treatment design.

**Learning Experience: An Alternative Program for Preschoolers and Parents (LEAP)**

The LEAP intervention model combines developmentally appropriate practice and ABA techniques in an inclusive program (Strain & Cordisco, 1994). The program caters for the range of strengths and needs of children with autism. The primary focus of the program’s underlying theory and practical implementation is the children’s
social development (Erba, 2000). The program consists of an integrated preschool classroom, behavioural skills training for parents, and outreach training services. The program does not provide one-to-one intervention; instead, services consist of 15 hours per week of classroom instruction provided by a teacher and an assistant who implement the program with 10 typically developing children and 3 to 4 children with autism. A key LEAP component is peer-based intervention, in which typically developing peers act as indirect mediators of behaviour change, behaviour models, and direct agents of training (Strain, Hoyson, & Jamieson, 1985). Parents of all children may participate in classes designed to teach behaviour management and strategies for teaching new skills.

The LEAP program is one of the few interventions for which longitudinal outcomes for their participants have been published (Erba, 2000). LEAP’s success is based on the social abilities of children with autism and is typically measured by preschool inclusion. Approximately 50% of students who take part in the LEAP program are reported as successfully attending ‘regular education classes’ (Dawson & Osterling, 1997). Strain, Kohler, and Goldstein (1996) reported a significant reduction of autistic symptoms following 24 months of treatment, and that 24 out of 51 LEAP children were subsequently included in a public school setting. Strain and Hoyson (2000) reported on outcomes for six children who entered the program in 1982, at which time they all had scores on the Childhood Autism Rating Scale which placed them in the moderate-to-severe range. At the completion of the program, and again at age 10 years, the children did not meet the threshold required to be characterised as having autism on the Childhood Autism Rating Scale (score ≥ 30). All children had scores less than 30. Five of the six children went on to attend regular mainstream classrooms throughout their school years without additional support.

There are no controlled outcome studies that support the efficacy of the LEAP program. The efficacy of the LEAP program compared to other types of programs or to comparison children not receiving preschool services has not been empirically demonstrated. Therefore, replication of these results and independent evaluation of
intervention is required in relation to the effectiveness of the LEAP program (Roberts & Prior, 2006).

The SCERTS model

The SCERTS model (Wetherby & Prizant, 2000) provides a framework for improving communication and social-emotional abilities in individuals with an ASD and in their families. It combines developmental, relation-based and skill-based approaches to target priority goals in social communication and emotional regulation by implementing transactional support throughout a child’s daily activities and across social partners. The model is implemented as a multidisciplinary approach that includes regular and special education, speech-language pathology, occupational therapy, psychology, and social work. The emphasis is on communication, social relatedness and sensory characteristics, and the broader context of a child’s development is recognised, including family involvement (Prizant, Wetherby, Rubin, & Laurent, 2003). SCERTS is a model of service provision rather than a program and has not been independently validated (Roberts & Prior, 2006). However, the authors have stated that the model draws from a range of treatment methodologies that are evidence-based and empirically supported (Prizant et al., 2003). These are now discussed.

The SCERTS model addresses communication and language deficits through social-pragmatic language therapy, which emphasises the functional use of pre-verbal and verbal communication skills in natural and semi-structured interactions. It includes the use of validated and effective strategies to support the use of non-speech communication systems such as picture symbols. The model also uses strategies developed as part of Greenspan’s Floor Time approach to address deficits in social relatedness and social-emotional reciprocity. For sensory processing deficits, the model adopts sensory integration therapy and environmental adaptations and supports. The model also posits that family members are collaborators and partners, and plans are developed accordingly to support families (Prizant et al., 2003).
Wetherby and Prizant (2000) stress that the SCERTS model: (1) is a comprehensive educational/treatment model based on current research in child development and ASD; (2) is sufficiently flexible to incorporate different perspectives (e.g. developmental approaches, contemporary ABA, LEAP, Floor Time and RDI); (3) can be applied in an individualised manner while addressing the ‘core deficits’ of ASD; and (4) is family-centred, taking into account critical individual differences across families in reference to their priorities, and their involvement in critical programmatic decision making. The SCERTS model, by drawing on the strengths of different approaches to address the core problems of ASD, provides a new perspective in developing an effective EI program. Prizant et al. (2006) developed a framework to summarise research studies that support one or more domains (social communication, emotional regulation and transactional support) of the SCERTS model. However, these studies were related to the effectiveness of particular approaches within one or more domains of the model, rather than providing a review of the effectiveness of the SCERTS model as a whole. There are no independent, peer-reviewed, published studies of SCERTS’s effectiveness for young children with autism. Therefore, comparative study with other approaches will be worth investigating in the future.

The TEACCH approach

The TEACCH program was founded at the University of North Carolina in 1972. This program was focused on the Treatment and Education of Autistic and related Communication Handicapped children and has come to be known as Division TEACCH. The TEACCH program emphasises the structuring of the environment in order to facilitate skill acquisition and to promote independence at all levels of functioning (Dawson & Osterling, 1997). Clear physical and visual boundaries are established to help children understand what they are expected to do in each area (Cumine, Leach, & Stevenson, 2000). Visual supports are used to assist children’s comprehension. The TEACCH program aims to provide the least restrictive style of teaching as possible. One-to-one instruction is offered to children as they learn new skills (Dawson & Osterling, 1997). However, they are encouraged to develop
independence and opportunities for integration and reverse integration are provided (Jordan et al., 1998).

According to Lord and Schopler (1994), in the mid 1990s, approximately 250 new preschool children attended TEACCH preschools each year, and as many as 650–700 preschool aged children were enrolled at any one time. Emphasis is placed on providing continuity of services to people with autism and their families. Consequently, the program caters for children as young as two years of age and continues to support them well into adulthood (Jordan et al., 1998).

In the TEACCH model, each child has an individual program plan based on a comprehensive assessment conducted at the start of the program (Cumine et al., 2000). The development of communication skills is a focus and the use of multimodal communication is encouraged. Comprehension is facilitated through the provision of structured teaching, incorporating visual supports (Cumine et al., 2000). Parent–professional collaboration is seen as an essential element to treatment outcome and generalisation, and parents are identified as critical instruments of change for their child; they are involved as equal partners throughout the program (Ozonoff & Cathcart, 1998; Panerai, Ferrante, & Zingale, 2002). The key components of the model include: (1) a developmental approach; (2) the inclusion of family and community; and (3) a direct relationship between assessment and intervention. In addition, behavioural principles are employed throughout the model, particularly during the assessment process and development of behavioural plans (Erba, 2000).

Schopler, Mesibov, and Baker (1982) evaluated the program outcomes for 647 individuals of all ages (ranging from 2 to 26 years of age). The long-term outcomes for individuals were reported as favourable on the basis of the rate of institutionalisation. Adults and adolescents in the study were found to have an institutionalisation rate of 7%. This was compared to the rate of institutionalisation of adolescents and adults with autism prior to the introduction of Division TEACCH in the 1960s of between 39% and 74%. In two additional follow-up studies, Lord and Schopler (1989) demonstrated that children with autism first assessed at between three and four years of age at the TEACCH had improved IQ scores at between seven and nine years, regardless of the intensity of the intervention. Ozonoff and Cathcart
(1998) conducted a study of the effectiveness of a TEACCH home-based program. Two groups of 11 children were matched by age, diagnosis and severity of autism characteristics. Children in both groups attended a preschool or school program in which they participated in an ABA program. However, the treatment group also received four months of home-based TEACCH intervention while the control group did not. The results indicated that the children in the treatment group demonstrated overall improvement that was three to four times greater than that of the control group.

Researchers have advocated for more peer reviews of the outcomes of TEACCH model for younger, preschool aged children with autism, given the current debate around the degree of effectiveness of different treatment approaches (Erba, 2000; Roberts & Prior, 2006).

*The Denver Model*

The Denver Model is a developmentally based program using behavioural techniques, which began in 1981 at the University of Colorado Health Sciences Center, Denver. It was commented that the Denver Model adopts similar aims to the TEACCH model that it targets to build upon the skills the child with autism has already gained (Roberts & Prior, 2006). The child’s individual curriculum is developed around quarterly meetings between the parents and the treatment team. Goals, objectives, instructional plans and activities are discussed for the child’s instruction across all settings. Interventions through the Denver Model involve three teaching settings: teaching within daily family routines, daily inclusive group preschool instruction, and 1:1 teaching. The model uses the tools of functional behavioural analysis; communication training; positive teaching of more conventional behaviours; and redirection to provide new behavioural strategies by which the child can achieve their goals. Dawson et al. (2009) conducted an evaluation on the effectiveness of the Denver Model and reported an increase in IQ scores of 17 points (>1 SD) and significant gains in language and adaptive behaviour.
3.6 Conclusion

As described in this chapter, the educational/behavioural programs for young children with autism range from highly structured, ABA discrete trial learning to more contemporary naturalistic behavioural interventions and developmentally oriented approaches. The heterogeneity in treatment outcomes associated with the diversity of the approaches requires further research in terms of what elements in the programs or approaches work for which specific population of young children diagnosed with ASD. Dawson and Osterling (1996) and Rogers (1998) have stated that knowledge of how best to tailor interventions to the needs of specific children is critical. Schreibman (2000) further commented that child variables such as chronological age, degree of cognitive impairment, language level and specific behavioural profile are important sources of outcome variability. Family variables such as parental stress and perceived community support are also considered significant elements in affecting program outcomes. In future research, it will be vital that comparative studies allow for determination of the differential effects of specific treatments or treatment components.
INTRODUCTION

Early intervention (EI) for children with established developmental problems (e.g., language disorder, autistic spectrum disorder, cerebral palsy, and global developmental delay) reveals a consistent pattern of effectiveness of a magnitude of developmental significance. Meta-analyses have shown that EI produced modest to large effect sizes associated with later improved school performance for developmentally delayed children. Improvements are found in cognitive and social development, including for children with ASD (White & Casto, 1985; Casto & Mastropieri, 1986; Shonkoff & Hauser-Cram, 1987; Guralnick & Bennett, 1987; Ramey & Ramey, 2004; Heckman, 2006). Rogers (1996) conducted a comparative study and found that children with autism made greater gains in intellectual functioning, language abilities and social behaviour after one to two years of EI than children with other neurodevelopmental disorders such as significant developmental delay and cerebral palsy. Children with autism enrol in EI programs of different forms which include centre-based and home-based programs. Some of these centre-based programs are more generic, catering for children with a range of developmental needs including autism and some of these centres are autism specific. These programs also adopt different models and approaches to EI. Research into what works best for children with autism has become a focus for researchers and practitioners working with young children with autism. At the time of commencing the projects in 1998 described here, there were few studies comparing the different forms of EI, and researchers were studying the critical factors affecting the developmental outcomes for young children with autism who were receiving EI (Rogers, 1996; Dawson & Osterling, 1997). The following sections outlined the rationale and aims for the present studies.
4.1 Rationale for the current studies

The prevalence rate of ASD is increasing in Australia and in other parts of the world (Glasson, 2002; Chakrabarti & Fombonne, 2001; Prior, 2003; Williams et al., 2008; Chakrabarti & Fombonne, 2005), which has led to continued early intervention service development and coordination for young children with autism (Le Couteur, 2003; New York State Department of Health, 1999; Shields, 2001; Honda & Shimizu, 2002). Literature reviews have concluded that despite diverse intervention strategies and philosophical approaches, interventions that target multiple variables (such as communication training, social skills training, or play and behaviour management), that extend over a long duration, and that include parent involvement yield the most positive outcomes for young children with autism (Levy et al., 2006). Research has also shown that parents of young children with autism often experience undue stress in the family related to the child’s disability (Crewther et al., 2003).

EI that covers the core deficits in ASD relating to socialisation, communication, play and ritualistic or stereotyped behaviours is considered to be effective in the treatment of autism in young children (Ramey & Ramey, 1998; Rogers, 1999). EI programs are either centre-based or home-based or both and may adopt a range of theoretical models or theories (e.g., behavioural or developmental models, TEACCH, Floor Time). However, the application of critical components such as the age of commencement, intensity of intervention, specialised curriculum and systematic teaching, individualised programming or family involvement in the EI program, which has been demonstrated to be effective for children with autism, may be more important than the philosophy and the models adopted (Dawson & Osterling, 1997; Guralnick, 1998; Hurth et al., 1999; Iovannone et al., 2003; Hume et al., 2005).

Numerous studies have uncovered strong evidence for the efficacy and validity of behavioural intervention, in particular EIBI (Lovaas, 1987; McEachin, Smith, & Lovaas, 1993; Bibby, Eikeseth, Martin, Mudford, & Reeves, 2002; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; Sallows & Graupner, 2005). Centre-based programs with behavioural intervention components aimed at treating deficits
In socialisation, language and play, and which have a degree of parent involvement, improve the short-term developmental outcomes and later school performance of children with autism (Guralnick, 1997, 1998). At the time of commencing the present study, parental involvement and parental stress and coping were understudied as factors affecting program outcomes of EI; and parent-driven, home-based ABA programs for young children with autism had also only recently commenced. Subsequently there have been only a few studies which have compared home-based EIBI programs with EI programs catering for children with autism or autism-specific EI (Eikeseth, Smith, Jahr, & Eldevik, 2002; Howard et al., 2005; Magiati et al., 2007; Sheinkopf & Siegel, 1998).

In light of the gaps in knowledge of the effectiveness of EI programs for young children with autism at the time this research commenced, the present investigation sought to identify critical program components, models and goals of EI programs, and examined their effects on the developmental outcomes for young children with autism and other developmental disabilities. Centre-based and home-based EI programs were compared.

4.2 Aims of the current research project

The present project commenced in November 1998. At that time, young children with autism in Victoria generally entered one of the following types of EI program: (1) centres that cater for young children with varying types and degrees of delay; (2) centres specifically for children with autism; (3) home-based ABA programs; or (4) individual specialist therapies. The home-based applied behaviour analysis (ABA) program, an intensive form of behavioural intervention for young children with an autism spectrum disorder (ASD), is based on the principles of ABA (Lovaas, 1987), and had been the focus of attention for both parents and professionals for sometime in the United States. In Victoria, the first ABA home-based programs had been established just for over two years at the time of commencement of this project.
The present investigation was designed to examine the approaches and methods of practice of EI in Victoria including centres that were autism specific and those that were not, and children in home-based ABA programs; and to identify any relationships among program variables, child variables, family variables, and treatment outcomes. The philosophy adopted by EI centres (developmental or behavioural) and degrees of parental involvement in centre- and home-based programs were also examined. The investigation was conducted via a questionnaire survey delivered to centre-based and home-based programs in Victoria. As there were changes (the Victorian State Disability Plan 2002-2012; the Autism in Victoria, 2003; the Early Childhood Intervention Services vision and key priorities, 2003) in the EI services since the questionnaire was first conducted in late 1998, a six-year follow-up questionnaire survey was administered to ascertain whether the changes had affected program outcomes of EI.

A longitudinal study was further designed and commenced in 2000 to follow-up a group of preschool children with autism participating in centre-based or ABA home-based EI programs in Victoria over a period of 12 months. Program outcomes were measured with respect to intellectual functioning, language abilities, interpersonal relationships and play pre- and post- intervention. Child characteristics and family coping strategies were studied in relation to developmental outcomes. The investigation made use of the literature existing at that time to guide the direction of specific research aims.

4.2.1 Aim 1

The first aim was to contribute to the body of literature on EI for young children with autism or other developmental delays by examining the effects of different types of EI on the developmental outcomes for children with different developmental needs participating in a range of EI programs. The literature reveals that there are large individual differences in response to different types of EI and that identifying prognostic indicators presents considerable challenges (Yoder & Compton, 2004). There have been a few comparative studies on children with autism or other developmental delays in home-based EIBI programs, generic EI programs or autism-
specific EI programs; however, no definite trend at the time the study commenced was identified as to the developmental areas in which children gain most after a period of participation in an EI program. The present questionnaire survey examined the effectiveness of centre-based programs, either generic or autism-specific and home-based ABA programs in eight developmental levels which are related to autism and other developmental disorders: (1) level of developmental delay; (2) receptive language ability; (3) expressive language ability; (4) social competence; (5) self-help skills; (6) attention span; (7) ability to follow instructions; and (8) rhythmic patterns. It was expected that children would show differential improvement in the above developmental areas. Program effectiveness was examined such that the investigation could provide comparative data on the effectiveness of the three types of EI programs, generic centre-based EI programs, autism-specific EI programs and home-based ABA programs for children with autism and other developmental disorders.

4.2.2 Aim 2

The second aim was to examine whether the models, approaches and goals adopted by EI programs, both home-based and centre-based, had differential effects on the developmental outcomes of young children with autism and other developmental delays. According to current literature, the models and goals of programs adopted seemed to be less likely to have a significant impact upon the developmental outcomes of young children with autism. This area has not been widely researched.

Child characteristics and program components, such as the age at commencement of EI, intensity of intervention, individualised programming or specialised curriculum, and family involvement, have been considered critical factors affecting the program outcomes of EI (Rogers, 1996; Dawson & Osterling, 1997; Guralnick, 1998; Hurth, Shaw, Izeman, Whaley, & Rogers, 1999; Iovannone, Dunlap Huber, & Kinkaid, 2003; Hume, Bellini, & Pratt, 2005). The present study also explored these factors in relation to developmental outcomes for children after treatment. As the research on parent-driven, home-based ABA programs had previously been understudied, research into the critical factors across the home-based and centre-
based programs in the present study provided comparative data on different types of EI programs and an understanding of factors affecting program effectiveness.

4.2.3 Aim 3

The third aim was to examine whether the trend in EI program outcomes would differ after a significant period of time. It was expected that the government policy changes or developments in EI services might affect the provision of services in the EI sector. A follow-up survey was undertaken six years after the initial questionnaire survey was conducted. Participants at the follow-up survey were asked the same questions and similar analyses were conducted. The results of the both surveys were compared. It was expected that there would be changes in trends according to the changes in the development of EI services and government policies on EI provision.

4.2.4 Aim 4

The fourth aim was to compare program outcomes for young children with autism in treatment under different modes of EI across a 12-month period. The age at commencement of EI program, IQ level, language abilities, interpersonal relationships, play skills, and autism severity were investigated. Research has shown that the age at commencement of EI, IQ level, language abilities and autism severity are predictive variables in some cases (Ozonoff & Cathcart, 1998; Smith, Eikeseth, Klevstrand, & Lovaas, 1997; Eikeseth et al., 2002; Gabriels, Hill, Pierce, & Rogers, 2001), while other studies have not identified specific factors relating to outcome (Birnbauer & Leach, 1993; Smith, Groen, & Wynn, 2000). It was expected that in the present study young children with autism would make significant developmental gains after a 12-month period of EI. However, the extent of these gains may be differential across different developmental areas, namely cognitive abilities, language abilities and interpersonal and play skills. Moreover, one of more of the key variables such as the age at commencement of EI, the mode of EI (whether centre-based or home-based), and parental coping strategies was/were expected to have effects on the developmental outcomes for young children with autism or other developmental delays.
CHAPTER 5

STUDY ONE: A SURVEY OF EARLY INTERVENTION APPROACHES AND METHODS OF PRACTICE FOR YOUNG CHILDREN WITH AUTISM AND OTHER DEVELOPMENTAL DISORDERS

INTRODUCTION

The investigations consisted of two survey studies, a survey study in 1998 and a follow-up survey study in 2004. The first aim was to contribute to the body of literature on EI for young children with autism by examining the effects of different types of EI on the developmental outcomes for children with autism and other developmental delays participating in the range of programs. The survey in 1998 examined the effectiveness of different types of EI programs in eight developmental levels: (1) level of developmental delay; (2) receptive language ability; (3) expressive language ability; (4) social competence; (5) self-help skills; (6) attention span; (7) ability to follow instructions; and (8) rhythmic patterns. It was expected that children would show differential improvement in the above developmental areas. Program effectiveness was examined such that the investigation could provide comparative data on the effectiveness of different EI programs.

The second aim was to examine whether the models, approaches and goals adopted by EI programs, both home-based and centre-based, have differential effects on the developmental outcomes of young children with autism and other developmental delays. Child characteristics and program components, such as the age at commencement of EI, intensity of intervention, individualised programming or specialised curriculum, and family involvement, which were considered critical factors affecting the program outcomes of EI, were also studied. The third aim was to examine whether the trend in EI program outcomes would differ after a significant period of time. A follow-up survey was undertaken six years after the initial survey was conducted. Participants at the follow-up were asked the same questions and similar analyses were conducted. It was expected that
there would be changes in trends according to the changes in the development of EI services and government policies on EI provision.

Chapter 5 and Chapter 6 examined child characteristics, program characteristics, and developmental outcomes in EI programs and interactions of some of the key program variables such as intensity of intervention and models and goals of programs with program outcomes. Chapter 5 reported and discussed the results of the survey study in 1998. Chapter 6 reported and discussed the follow-up survey in 2004 and compared results of the two surveys.

METHOD

5.1 Participants

Potential participating centre-based EI programs were identified via the listed EI programs for children aged under six years with a developmental disability including autism in four Melbourne metropolitan and five Victorian country regions in 1998. The regions included the Eastern Metropolitan Region, Northern Metropolitan Region, Southern Metropolitan Region, Western Metropolitan Region, Barwon-South Western Region, some parts of the Gippsland Region, Grampians Region, Hume Region and Loddon-Mallee Region. A total of 58 early intervention centres were sent the survey questionnaire (Appendix A) with a covering letter explaining the intent of the study (Appendix B).

A similar survey for home-based EI programs (Appendix C) was sent to 150 families that were members of the Autism Behaviour Intervention Association (Vic) (ABIA), and a covering letter was prepared by the Association (Appendix D). The ABIA is an association for families of young children with an ASD that are participating in an intensive, behaviourally oriented, home-based intervention program.

5.2 Materials

Two surveys were developed for this study: one for the centre-based programs, and one for the home-based ABA programs. Questions concerning variables related to these programs, including child factors, family factors and treatment outcomes, were
developed based on a review of the literature on approaches and models in early intervention (e.g., Cherkes-Julkowski & Gertner, 1989; Guralnick, 1989; Lovaas, 1987; Rogers, 1996; Sanders, 1996). For comparison purposes, the two questionnaires included similar questions on all variables relevant to both types of program.

Questions were related to the types of disability targeted by the early intervention program; the number of children in the program with these disabilities, therapist or teacher–child ratio; professionals involved with the program (e.g., special education teachers, psychologists and speech pathologists); types of therapy offered through the early intervention program, theories or models guiding the program; length (in months) of the child’s stay in the program (ABA home-based program only); age of child at entry into the program; and average hours per week that the child participated in the early intervention program; and amount of parental participation.

For both the centre-based programs and the home-based ABA programs, outcomes were measured in eight developmental areas: level of developmental delay, receptive language ability, expressive language ability, social competence, self-help skills, attention span, ability to follow instructions and rhythmic habit patterns (Cherkes-Julkowski & Gertner, 1989). These were measured on a 4-point scale, where: 1=severe, 2=moderate, 3=mild and 4=none, for developmental delay and rhythmic habit patterns; 1=minimal, 2=poor, 3=fair and 4=age-appropriate, for language abilities, social competence and self-help skills; 1=severe limitation, 2=moderate limitation, 3=mild limitation and 4=age-appropriate, for attention span; and 1=none, 2=a lot of prompting, 3=a little prompting, and 4=independent, for the ability to follow instructions.

The two questionnaires were pilot tested with three home-based programs and three centre-based programs. Refinement of some of the questions was undertaken in response to comments arising from the pilot test. Instructions on the selection of a group of children for reporting in the centre-based early intervention programs were included in the final version.
5.3 Procedure

The study was approved by the RMIT University Human Ethics Committee in August 1998 (Appendix E). Each questionnaire package contained a letter of explanation (Appendix B/D), a prepaid return envelope and the relevant questionnaire. All questionnaire packages were mailed in November 1998 and returned by December 1998. Participation was voluntary and completion and return of the questionnaire were taken as consent to participate in the study.

For home-based ABA programs, the parent/s was requested to complete the questionnaire with their program supervisor. This procedure ensured that parental bias was minimised and that more valid data would be obtained. In conjunction with the program supervisor, the parent rated his/her child’s progress in each of the eight developmental levels: first how the child was developing at the beginning of their ABA program, and then the child’s development at the time of completing the questionnaire. The duration of time the child spent in the program (in months) depended on when the home-based ABA programs had commenced—these programs had only first been established in Melbourne approximately two years prior to the time of the study. All questionnaires were mailed by the ABIA and returned to the author via prepaid, return-addressed envelopes.

For centre-based programs, program coordinators were asked to select one group of children (8 to 10 children), aged 3 to 5 years, who began the program at the beginning of 1997 and were still participating at the end of 1998 when the surveys were received and completed (a period of approximately 24 months). The reason for the group size of 8 to 10 children was that this was the average size of a group in a centre-based EI program in Melbourne metropolitan region. The average level of development for the selected group of children, across each of the eight developmental areas, was then rated for the beginning of the previous year and at the end of the year in which the questionnaire was completed.

All questionnaires were anonymous and returned to the author in prepaid, return-addressed envelopes.
5.4 Analysis

5.4.1 Calculation of program effectiveness

For the centre-based programs, a program effectiveness score was calculated by measuring the units of improvement on the 4-point scale for each of the eight developmental areas, comparing the children’s development levels at the beginning of the program (i.e., the beginning of 1997) and their levels at the end of 1998 when the centres completed the survey. For example, if the average group improvement over the 24 months was from a score of 1 (‘minimal’) to a score of 3 (‘fair’), an improvement of two units was recorded for the area of development. Two types of scores were obtained for each centre-based program: an overall program effectiveness score for the group of children, and a score in each of the developmental areas. The overall program effectiveness score was derived by aggregating the scores obtained in each developmental level for the group of children rated.

Similarly, an effectiveness score for the home-based ABA programs was calculated by measuring the units of improvement on the 4-point scale for each of the eight developmental areas, by comparing the child’s status at the beginning of the program with his/her levels at the time the questionnaire was completed. The length of period of the program varied depending on when the child commenced the program before the questionnaire was completed at the end of 1998. The duration of the program varied between less than three months to over two years. For the calculation of an effectiveness index, again, if the child was rated 1 (‘minimal’) at the beginning of the program but was rated as 3 (‘fair’) when the respondent completed the questionnaire, two units of improvement were recorded for that developmental area. From this computation, two types of scores were obtained for each child: an effectiveness score for each of the eight developmental areas, and an overall program effectiveness score. The overall program effectiveness score was derived for each child by aggregating the scores the child obtained in each developmental area.
5.4.2 Statistical Analysis

Versions 15 and 17 of SPSS were used for statistical analysis. As the developmental outcomes were continuous interval data in the calculation of program effectiveness, parametric tests were used.

To compare the survey study in 1998 and the follow up survey in 2004, a mixed $2 \times 8$ Analysis of Variance (ANOVA) design was used to examine the program effectiveness of centre-based EI programs. The eight developmental outcomes were assessed within the respondents of centre-based EI programs; and also the respondents of centre-based EI programs were assessed between two times (1998 and 2004). In this comparison, non-parametric statistics may have been considered as more appropriate by some researchers. However, Norman (2010) and Gaito (1980) have argued that “Likert scales, consisting of sums across many items will be interval” (P.629). When the numbers for rating are reasonably distributed on the subjective rating scales, inferences about their means and differences can be made. Each of the developmental levels considered in the present study has an underlying normal distribution. Children with developmental delay are typically categorised as severe, moderate, mild or in the normal range across different areas of development and this formed the basis of the 4 categories used in the current questionnaires.

In the ANVOA, the within subject factor was the developmental outcomes for the eight developmental areas and the between subject factor was time (time 1 - 1998 and time 2 -2004). The mixed design was to examine if there was a significant interaction effect between time and developmental outcomes, i.e., whether there was a pattern of change over time across the eight developmental outcomes in centre-based EI programs. The main effects for developmental outcomes and those for time were also examined. This was to examine whether there were differences between the two sets of program outcomes. A similar mixed $2 \times 8$ Analysis of Variance (ANOVA) design was used to examine the program effectiveness of home-based ABA programs. Only the main effect for program developmental outcomes are reported in Chapter 5. The main effect for time and the interaction between developmental outcomes and time are reported in Chapter 6.

Analysis of covariance (ANCOVA) was used to examine whether the duration of the home-based ABA programs (which ranged from less than three months to over two
years) had a significant effect on the overall effectiveness of the program. The number of hours the child spent (on average) in the home-based ABA program per week served as a covariate. A factorial ANOVA was also used to examine whether program effectiveness in the eight developmental areas differed according to whether the centre-based EI or home-based ABA programs adopted different program models or whether they used general goals or specific goals to guide their delivery.

Chi-square tests were used to examine whether there were significant relationships between program types (centre-based EI verses home-based ABA) and types of therapies adopted (e.g., discrete trial learning, educational-based learning, sensory integration, speech therapy or behaviour management).

RESULTS

5.5 Sample

Of the 58 questionnaires sent to the centre-based early intervention programs, 20 were returned, giving a return rate of 34.5%. Fifty of the 150 questionnaires mailed to family members of the ABIA whose membership implied a home-based program were returned, giving a comparable return rate of 33.3%.

5.6 Home-based ABA programs

5.6.1 Profile

In all the 50 families, each family had one child in a home-based ABA program and, according to parents, the majority (n=45) of the children had a diagnosis of autism or ASD, two children had global developmental delay, one child had Down syndrome, and two families did not record their child’s disorder. The children ranged in age from 2 to 9 years (M = 4 years, 6 months), 43 were male, 5 were female, and 2 families did not record their child’s sex. The age of entry into the ABA program varied from less than 3 years of age (11 children) to over 6 years of age (3 children), with the majority of children being between 3 and 4 years and 11 months (36 children) at entry. The socioeconomic characteristics of the 50 families were as follows: 42 (N= 46) fathers were skilled workers, managers, professionals, or owned their own business; 22 (N= 49)
mothers were full-time homemakers while 21 mothers reported that they were skilled workers, managers, professionals, or owned their own business. Four fathers and one mother did not report their employment. The results revealed that a majority of the children in the home-based ABA programs had parent(s) who were professionals, managers or business owners.

Of the 50 families involved in an ABA home-based program, 19 families were using local psychologists (one family used two) while 18 families were using overseas psychologists (one family used three) or program providers from the United States. Apart from psychologists, 22 out of the 50 families were using a speech pathologist (2 families used 2) in their programs, and 5 families employed an occupational therapist. The number of program therapists used by the families ranged from 1 (5 families) to 7 (1 family), with the majority of the families having 2 therapists (23 families). Parents also acted as therapists in 23 families. Discrete trial learning, a major feature of ABA home-based programs, was used in 94% (47 families) of home-based programs, followed by educational-based teaching (44%, 22 families), speech therapy in (42%, 21 families) and other forms of behaviour management in (74%, 37 families) in the home-based programs.

5.6.2 Developmental Outcomes

The main effect for program outcomes in home-based ABA programs was significant. There were significant differences among the eight developmental areas, $F(7, 50) = 6.5, p < .001, \Lambda = .53$. These means are listed in Table 5.1. The highest mean score was found in the developmental area of self-help skills, while the lowest was for rhythmic habit patterns. Further pairwise post-hoc Bonferroni comparisons (adjusted for multiple comparisons) of these means were conducted. Significant differences were found for the pairwise comparisons listed in Table 5.2. These results suggest that the improvement of self-help skills was significantly different from the gains in developmental delay and rhythmic pattern after home-based ABA treatment. On the other hand, the improvement in rhythmic pattern was significantly less than that in all developmental areas except developmental delay.
5.6.3 **Duration of programs**

ABA home-based programs were first begun in Victoria just over 2 years prior to the commencement of the study. The most common duration of the ABA program run by families was between 7-18 months. The duration of their programs was listed in Table 5.3.

Table 5.1

**Mean Scores for Eight Developmental Areas for Home-Based ABA Programs (SD)**

<table>
<thead>
<tr>
<th>Developmental areas</th>
<th>Mean Scores (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-help skills</td>
<td>1.12 (.72)</td>
</tr>
<tr>
<td>Ability to follow instructions</td>
<td>1.06 (.74)</td>
</tr>
<tr>
<td>Receptive language ability</td>
<td>.96 (.86)</td>
</tr>
<tr>
<td>Expressive language ability</td>
<td>.92 (.88)</td>
</tr>
<tr>
<td>Attention span</td>
<td>.90 (.65)</td>
</tr>
<tr>
<td>Social competence</td>
<td>.88 (.66)</td>
</tr>
<tr>
<td>Developmental delay</td>
<td>.68 (.77)</td>
</tr>
<tr>
<td>Rhythmic habit patterns</td>
<td>.46 (.58)</td>
</tr>
</tbody>
</table>

(SD) = Standard Deviation

Table 5.2

**Post-hoc Comparisons for the Home-Based ABA Programs**

<table>
<thead>
<tr>
<th></th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to follow instructions with rhythmic habit patterns</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Self-help skills with rhythmic habit patterns</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Attention span with rhythmic habit patterns</td>
<td>.002</td>
</tr>
<tr>
<td>Social competence with rhythmic habit patterns</td>
<td>.003</td>
</tr>
<tr>
<td>Receptive language with rhythmic habit patterns</td>
<td>.004</td>
</tr>
<tr>
<td>Developmental delay with self-help skills</td>
<td>.006</td>
</tr>
<tr>
<td>Expressive language with rhythmic habit patterns</td>
<td>.026</td>
</tr>
</tbody>
</table>
Table 5.3

Number of children in different durations of home-based ABA programs

<table>
<thead>
<tr>
<th>Durations of programs</th>
<th>Number of children (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3 months</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>Around 6 months</td>
<td>5 (10%)</td>
</tr>
<tr>
<td>7 months to a year</td>
<td>11 (22%)</td>
</tr>
<tr>
<td>18 months</td>
<td>14 (28%)</td>
</tr>
<tr>
<td>2 years</td>
<td>10 (20%)</td>
</tr>
<tr>
<td>More than 2 years</td>
<td>6 (12%)</td>
</tr>
</tbody>
</table>

5.6.4 Intensity of programs

Families reported that the child in the home-based program spent between 3 to 39 hours per week in their programs, averaging 15.6 hours. Of the 48 families reporting program hours per week, 19 families (39.5%) reported that they ran their program for more than 5 and up to 10 hours per week, 12 families (24%) ran their program for between 11 and 19 hours per week, and 17 families (34%) ran their program for between 20 and 40 hours per week.

Pearson correlations were used to analyse whether hours per week, an indication of the intensity of the program, was related to developmental outcomes. Hours per week as a variable did not correlate significantly with the overall effectiveness score. It did not correlate significantly with the outcomes of the other developmental areas, except for receptive language abilities, $r (N=48) = .32, p=.03$. It suggests that more home-based ABA treatment hours lead to more gains in receptive language abilities.

The home-based ABA program hours per week were further explored via its relationship between the duration of the program, and the overall program effectiveness score. Data were analysed using a single-factor between-subjects analysis of covariance (ANCOVA). The factor consisted of six levels of program duration ranging from less than 3 months to over 2 years, with hours the child spent in the home-based program per week serving as a covariate. The factor ‘duration of program’ had a highly significant effect on the overall effectiveness of the program: $F(5, 36) = 3.78, p = .007$, partial $\eta^2 =$
A significant interaction was found between different levels of duration of the programs and hours spent on the program: \( F(5,36) = 2.94, p < .025, \text{ partial } \eta^2 = .29. \)

Figures 5.1 to 5.6 show the trends of the interaction between the covariate (hours per week) and the factor (program duration). Post-hoc testing of the interaction between the intensity of the program, hours per week and the program duration revealed a significant relationship between hours and program effectiveness at the fifth level of duration, which represented programs of 2 years duration: \( F(5,36) = 6.38, p < .016, \text{ partial } \eta^2 = .15. \) Programs running for 2 years were associated with less effective developmental outcomes. Although no significant relationship was found for the other levels, there was a general trend of more hours per week being associated with more effective program outcomes for program durations of less than 3 months, around 6 months, 13 months to 1.5 years and more than 2 years. For programs running for 7 to 12 months, the hours put into the program were associated with similar outcomes to those for programs that had run for 2 years, such that more hours per week were associated with less effective program outcomes. These two periods might be the critical times where programs might not be run as effectively as intended. This was discussed further in section 5.9.

*Figures 5.1 to 5.6* The trends of the interaction between the covariate (hours per week) and the factor (program duration).
5.6.5  Program models and goals

Of the 50 home-based ABA programs, 47 respondents stated that they adopted a behavioural model using Discrete Trial Training (DTT) based on Lovaas’s (1987) study. However, in terms of the goals/objectives/expected outcomes of these programs, some stated outcomes in more general terms and others in more specific terms. The general program goals \( (n = 26) \) were characterised by a description of the whole range of developmental outcomes for the child, for example, reaching his/her potential academically, socially and behaviourally; or to facilitate total independence or recovery to within the normal range. The specific program goals \( (n = 21) \) were characterised by program outcome goals such as improved expressive speech, improved social skills or decreased undesirable behaviour (see Appendix F for program models and goals). For further analysis, the goals of the home-based programs were categorised according to their goal descriptions into two general categories: (1) general program goals; and (2) specific program goals.
Data were analysed for any differences in the home-based ABA developmental outcomes (measured as an effectiveness score for the eight developmental areas) according to whether the home based program adopted general program goals or specific program goals, using an ANOVA. Results from the ANOVA showed that there was no significant interaction between developmental outcomes and the two sets of program goals (general and specific), $F(7,39)=1.35, \ p=.26$. However, there were medium effect sizes for the two sets of program goals on the measures of program outcomes for receptive language ($d = -0.4$) and attention span ($d = -0.5$) indicating that home-based ABA programs that stated more general program goals seemed to produce more gains in the developmental receptive language and attention span (see Figure 5.7)

![Bar chart showing program outcome measures for home-based programs with general goals (n = 26) versus home-based programs specific goals (n = 21).]

**Figure 5.7** Program outcome measures for home-based programs with general goals ($n = 26$) versus home-based programs specific goals ($n = 21$).

### 5.6.6 Parental Involvement

Forty respondents (80%) from the home-based programs reported that parents had attended training sessions in relation to their child’s disability. Thirty-two families (80%) who attended parental sessions rated parental involvement as “very effective”. One respondent from the home-based program rated parental involvement as ‘not very effective’, but no respondents reported parental involvement as ‘ineffective’.
5.7 Centre-based EI programs

5.7.1 Profile

Out of the 20 EI centres participating in the survey, all centres reported that they had children with autism in their programs. However, the number of centre-based programs that catered specifically for children with autism was small as there were only two centres which were autism specific. The other 18 EI centres catered for young children with varying types and degrees of developmental delay which included autism, global delay, language disorder, motor delays, Down syndrome, Fragile X, attention deficit hyperactivity disorder or cerebral palsy.

The EI centres had from 5 to 90 children with varying types of developmental delays including autism, averaging 32 children (SD=21.6). The two autism specific centres had 8 children in one centre and 30 children in another centre. The 18 generic EI centres had from 1 to 16 children with autism in their programs, averaging 6 children (SD=4.2). Of the 18 generic centres, the number of children with different types of developmental delays is listed in Table 5.4.

Table 5.4

<table>
<thead>
<tr>
<th>Types of developmental needs</th>
<th>Number of centres</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism spectrum disorder</td>
<td>18</td>
<td>6 (4.3)</td>
</tr>
<tr>
<td>Global delay</td>
<td>17</td>
<td>14.7 (11.9)</td>
</tr>
<tr>
<td>Specific developmental language disorder</td>
<td>13</td>
<td>4.6 (7.1)</td>
</tr>
<tr>
<td>Delay in motor development</td>
<td>13</td>
<td>9 (4.2)</td>
</tr>
<tr>
<td>Down syndrome</td>
<td>11</td>
<td>5.6 (3.3)</td>
</tr>
<tr>
<td>Fragile X syndrome</td>
<td>4</td>
<td>.75 (.9)</td>
</tr>
<tr>
<td>Attention deficit hyperactivity disorder</td>
<td>2</td>
<td>1.5 (.7)</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>1</td>
<td>2 (0)</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>5.8 (6.9)</td>
</tr>
</tbody>
</table>

(SD) = Standard Deviation
The staff to child ratio in the centres ranged from 1 staff member to 5 children to 1 staff member to 2 children, averaging 1 staff member to 2.6 children. Out of the 20 centre-based EI programs, a majority ($n=18$) reported that they had one or more special education teachers. Other professionals employed by the centres included speech therapists ($n=20$ centres), physiotherapists ($n=13$ centres), psychologists ($n=12$ centres), occupational therapists ($n=9$ centres), and social workers ($n=5$ centres). Educational-based teaching and speech therapy were offered by all of the 20 (100%) centre-based programs, followed by behaviour management in 19 (95%) of the centre-based programs. Discrete trial learning, a major feature of ABA programs, was only used by 3 (15%) of the centre-based EI programs.

**5.7.2 Developmental Outcomes**

One of the major analyses is to compare if there were differential program outcomes among different developmental areas in centre-based programs. The main effect for centre-based developmental outcomes was significant. There were significant differences among the eight developmental outcomes, $F(7,25) = 7.43, p < .001, \Lambda = .33$. These means are listed in Table 5.5. The highest mean score was found in the outcome measure of social competence, while the lowest was for rhythmic habit patterns. Further pairwise post-hoc Bonferroni comparisons (adjusted for multiple comparisons) of these means were conducted. The pattern of post-hoc comparisons showed that centre-based programs outcome of receptive language, expressive language and social competence were significantly different from the program outcomes of developmental delay and rhythmic habit patterns (see Table 5.6).

Results for the two centres that only had children with an ASD showed that their children’s gain on social competence was higher, being 1.6 and 1.5 units of improvement respectively, as compared with a mean of 1 unit across the 18 generic EI centres which provided services for children with ASD and children with other developmental needs. These ASD-specific EI centres also reported substantial improvement for the outcome measures for children’s receptive language, expressive language and self-help skills, with
Improvement ranging from 1.3 to 1.5 units, compared with an average improvement of less than 1 across the 18 generic EI centres.

Table 5.5

*Mean Scores for Eight Developmental Areas for Centre-Based EI Programs (SD)*

<table>
<thead>
<tr>
<th>Developmental Areas</th>
<th>Mean Scores (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social competence</td>
<td>1.02 (.55)</td>
</tr>
<tr>
<td>Receptive language ability</td>
<td>.79 (.45)</td>
</tr>
<tr>
<td>Self-help skills</td>
<td>.72 (.51)</td>
</tr>
<tr>
<td>Expressive language ability</td>
<td>.70 (.56)</td>
</tr>
<tr>
<td>Ability to follow instructions</td>
<td>.42 (.48)</td>
</tr>
<tr>
<td>Attention span</td>
<td>.30 (.39)</td>
</tr>
<tr>
<td>Level of developmental delay</td>
<td>.13 (.46)</td>
</tr>
<tr>
<td>Rhythmic habit patterns</td>
<td>.07 (.22)</td>
</tr>
</tbody>
</table>

*(SD) = Standard Deviation*

Table 5.6

*Post-hoc Comparisons for Centre-Based EI Programs*

<table>
<thead>
<tr>
<th></th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental delay and receptive language</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Developmental delay and social competence</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Receptive language with rhythmic habit patterns</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Social competence with rhythmic habit patterns</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Self-help skills with rhythmic habit patterns</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Social competence with attention span</td>
<td>.004</td>
</tr>
<tr>
<td>Expressive language with developmental delay</td>
<td>.006</td>
</tr>
<tr>
<td>Receptive language and attention span</td>
<td>.023</td>
</tr>
<tr>
<td>Expressive language and rhythmic habit patterns</td>
<td>.024</td>
</tr>
</tbody>
</table>
5.7.3 Intensity and duration of programs

All EI centre respondents were requested to rate the same group of children in their programs at the beginning of 1997 and at the end of 1998. The duration of the program measured in centres was for a period of approximately 24 months. Centres reported that children spent between 1 and 30 hours per week in their programs ($M = 8.6$ hours, $SD = 7.7$).

Pearson correlations were used to analyse whether hours per week, an indication of the intensity of the program, was related to program outcomes. “Hours per week” as a variable did not correlate significantly with the overall effectiveness score or the other eight developmental areas. Thus there was no pattern identified for more treatment hours leading to higher outcomes in any developmental area.

5.7.4 Program models and goals

The EI centres adopted different theoretical models to guide the delivery of their programs. Out of the 20 EI centres, 18 reported the theoretical models that guided the delivery of their programs. A majority of the centres adopted a developmental model ($n = 11$), some adopted a combination of developmental and behavioural models ($n = 5$), one centre adopted the ABA behavioural model, and one reported that it adopted all theories (see Appendix G).

Using the overall developmental effectiveness score for each centre, data were analysed for any differences between the centres’ developmental outcomes according to the program models mostly adopted, i.e., developmental model ($n = 11$) versus a combination of developmental and behavioural models ($n = 5$), using independent sample t-test. Results indicated that the program model/s adopted did not affect program outcome as there was no significant relationship between program outcomes and the theoretical model adopted by the centre, $t (10) = .54$, $p = .60$.

For the goals of the centre-based programs, one centre did not report any goals. Overall, the reported goals were characterised by: (1) child-centred approaches with individualised goal setting; (2) family-centred practice that included providing opinions/educational programs to parents or devising therapy programs in which parents and staff could work together; or (3) child support in generic settings such as playgroups,
childcare and/or preschools. Some goals reported by the centres were stated in more general terms, while some goals reported by other centres tended to be more specific. General program goals were characterised by descriptions such as providing every child with the opportunity for meaningful learning, providing comprehensive and flexible programs to meet the needs of families involved, or providing information, support and guidance to families. Specific goals included preparing children for mainstream school; improving receptive and expressive communication; and behavioural management. According to the goal descriptions, program goals were classified into: (1) general program goals ($n = 14$); and (2) specific program goals ($n = 5$). Whether the types of goals used by the centres had any effect on their program outcomes was then examined.

In relation to the eight specific developmental areas for the centre-based developmental outcomes, data were analysed to identify any differences according to whether the centre adopted general or specific program goals, using a factorial ANOVA. As both data for effectiveness scores and goals of centres were available for 16 centres, only the goals of those 16 centres were analysed in relation to the developmental outcomes across the eight developmental areas. Results from the ANOVA revealed that there was no significant interaction between measures of developmental outcomes and the two sets of program goals (general and specific), $F(7,8)=.39, p=.22$. However, there were large effect sizes between the two sets of program goals on the measures of developmental outcomes of social competence ($d = 1.3$), attention span ($d = 1.1$) and self-help skills ($d = 0.98$), which were all higher for programs that adopted specific program goals (Figure 5.8). Results from two-tailed independent samples $t$-tests revealed that among the eight developmental areas, one program outcome—social competence—differed significantly between general and specific program goals: $t (14) = -2.63, p < .02$.

5.7.5 Parental Involvement

Out of the 20 centres, 17 respondents (85%) from the centre-based programs reported that their programs had offered parent training sessions. Three respondents (17.6%) from the centre-based programs in which parent training sessions were offered rated parental involvement as ‘very effective’. The majority of the respondents (76.5%) from the centre-based programs in which parent training sessions were offered rated
parental involvement as ‘moderately effective’. No centres reported parental involvement as ‘ineffective’.

![Graph](image)

**Figure 5.8** Program outcome measures for centre-based programs with general goals ($n = 11$) versus centre-based programs with specific goals ($n = 5$).

### 5.8 Comparisons between the centre-based EI and the home-based ABA programs in the survey study

The results for the centre-based programs are not directly comparable to those of the home-based programs because the calculation of the overall effectiveness index was for a group of children in the former case and individual children in the latter. However, for the within-group comparison in the home-based ABA programs, children’s gain on self-help skills and ability to follow instructions were highest, whereas in centre-based programs the most improvement occurred for social competence. This may reflect the nature of the programs offered within these two different settings, a “group” centre-based program versus “one-on-one instruction” home-based ABA programs.

Results for the two centres that only had children with autism showed that their children’s gain on social competence was higher than children in generic EI centres which provided services for children with autism and children with other developmental
needs. These autism specific EI centres also reported substantial improvement for the outcome measures for children’s receptive language, expressive language and self-help skills.

The combined results indicate that the aspects of development in children with autism or with other developmental delays for which centre-based EI programs and home-based ABA programs are most effective are different.

Cross-tabulation of program type (centre-based vs home-based) and types of therapy revealed significant relationships between: program type and discrete trial learning: $\chi^2 (1, N = 70) = 25.47, p < .001, V = .60$; program type and educational-based teaching $\chi^2 (1, N = 70) = 18.66, p < .001, V = .51$; program type and sensory integration $\chi^2 (1, N = 70) = 18.66, p < .004, V = .34$; program type and speech therapy $\chi^2 (1, N = 70) = 19.80, p < .001, V = .53$; and program type and behaviour management $\chi^2 (1, N = 70) = 3.94, p < .047, V = .24$. As indicated in section 5.6.1 and section 5.7.1, discrete trial learning, a major feature of ABA home-based programs, was used in almost all home-based programs while it was used by few centre-based programs. Educational-based teaching was offered by all centre-based programs but was adopted by about half of the home-based programs only. While speech therapy was offered by all centre-based programs, it was only offered in less than half of the home-based programs. Further, behaviour management was offered in almost all centre-based programs, and three-quarter of the home-based programs.

The relationship between the effectiveness of parental involvement and whether the involvement was in a home-based program or in a centre-based program was found to be significant: $\chi^2 (2, N = 57) = 21.6, p < .001$. Thirty-two respondents (80%) who attended parental training sessions in the home-based programs rated parental involvement as ‘very effective’, whereas only 3 respondents (17.6%) from the centre-based programs in which parent training sessions were offered rated parental involvement as ‘very effective’. One respondent from the home-based program rated parental involvement as ‘not very effective’, but no parents and no centres reported parental involvement as ‘ineffective’.
5.9 Discussion

The results of the present study revealed that home-based ABA programs were provided for a majority of children with developmental delays, primarily ASD (94%) from a very young age: 11 children started their intervention program at under 3 years of age, with 1 child under 2 years. Only three children entered the ABA program at 6 years of age or older. A retrospective study by Fenske, Zalenski, Krantz, and McClannahan (1985) found that children with autism have significantly better outcomes if intervention begins prior to age 5. Green (1996) reviewed home-based and school- or centre-based behaviour intervention for young children with autism up to 5 years of age and found that the best outcomes have been reported for children who commenced a behavioural program at 2 or 3 years of age. As discussed in Chapter 3 section 3.2, young age of commencement is considered a critical factor for early intervention. Children who participate in intensive intervention beginning at 3 years of age have a significantly better outcome than those who start after 5 years of age (Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris & Handleman, 2000). Commencing intervention at some point during the first 5 years is considered advantageous for the child due to greater neural plasticity during this period of a child’s life (Farran 2001; Ramey & Ramey, 1998; Rogers, 1996). Thus the early age that parents generally introduced their children to these programs in this study may be perceived by parents as a factor in maximising developmental outcomes.

From the results of the present study, families that engaged in an ABA program appeared to be from a higher socioeconomic background as the majority of the fathers were skilled workers, managers, professionals or running their own business, and about one third of the mothers were also professionals. In Victoria, ABA programs are funded by families so this result is not surprising as it is likely that most lower SES families are not able to afford such programs. It may also be the case that because home-based, intensive ABA was a relatively new intervention within Australia at the time of this study, parents with professional or semi-professional backgrounds were better informed about these programs and their potential benefits for their children. Such parents may have been more likely to have access to information sources such as the internet at that time. Other research also indicates that middle-class families tend to seek out a variety of
formal and informal supports and services for children with special needs (Shonkoff, Hauser-Cram, Krauss, & Upshur, 1992).

Lovaas et al. (1987) reported that a group of young children receiving 40 hours of ABA program intervention over a two-year period enjoyed significantly higher rates of success than a group receiving 10 hours and a group receiving typical community support. However, in the present study, the effective number of hours per week spent in the home-based program varied with the number of months the child had been in the program. Most frequently families reported that they ran their program for between 11 and 24 hours per week and only 5 of the families ran an ABA program from 30 to 39 hours per week. There was a general trend of more hours per week being associated with more effective program outcomes (for periods <3 months, 6 months, 18 months and more than 2 years). However, programs that had been running for 2 years were least effective as more program hours per week was associated with less effective program outcomes, with a similar trend observed at 7 to 12 months, in which children did not make much progress in developmental outcomes. There was a similar trend that children made less progress in their reduction of autistic behaviour after attending EI for 6 months in the longitudinal study which results were discussed in Chapter 7 section 7.7. These two periods (7 to 12 months; > 2 years) in the present study might be the critical times where programs might not be run as effectively as intended. Families that had run programs for more than two years indicated that two years might be a saturation point for the program, at which time the program features had to be carefully examined and the program content had to be revamped to continue to achieve effective results. Similarly, there was a plateau effect where progress of children was not as prominent. Thus there was no simple linear relationship between program hours per week and length of time the program had been running that would indicate optimal child outcomes.

Children at the EI centres received an average of 8.6 hours per week of EI, with reported variations of between 1 hour and 30 hours per week in the programs. This result is in contrast to the number of hours per week children with ASD spent in home-based ABA programs. The child in the home-based program spent between 3 to 39 hours per week in their programs, averaging 15.6 hours. Most well validated, autism-specific EI programs involved at least 15 hours per week and up to 40 hours per week of focused
treatment with a low child-to-adult ratio in ABA programs (Birnbrauer & Leach, 1993; Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993; McClannahan & Krantz, 1994; Rogers, 1996, Dawson & Osterling, 1997). Studies have found that length of time spent in the EI program was a stronger predictor of outcome than either age of entry or the number of hours of intervention per week for children with autism (Luiselli, O’Malley, Cannon, Ellis, & Sisson, 2000). Granpeesheh et al. (2009) found that an increase in treatment hours and a decrease in child age predicted an increase in the number of mastered behavioral objectives in EIBI programs. In the present study, the duration of the program was found to be another key factor interacting with hours per week of EI in achieving optimal developmental outcomes for young children with autism as discussed in the previous paragraph. Few studies have looked at child outcomes after fixed intervals of time such as 6 months, 12 months, 18 months and 24 months and compared results to see if there were differential outcomes. The results of the present study indicate that when the effect of program hours per week took account of the duration of the program, there was a pattern of differential child outcomes.

Literature finds that even programs that have a strong philosophical basis stressed the importance of individualising therapeutic approaches. Guralnick (1997) has stated that the source of positive outcomes for children with autism and other developmental delays may be due to curriculum content, a functional approach to problem behaviour and family involvement rather than to program philosophy (that is, the elements involved in the ‘mechanism’ of early intervention) that are producing the positive outcomes. In the present study, different centres adopted different models or theories for their programs, with a developmental model being the most common. No matter which model or theory the centres adopted, a general trend toward an individualised plan for each child; family engagement in planning, receiving information, and child therapy; and support in general settings for the child was reflected in the goals stated by the EI centres. For some centres, the goals stated were more general, whereas in other centres the goals were stated in a more specific manner. While overall program effectiveness was not significantly affected by theoretical models adopted, programs with more specific goals reported better
outcomes for social competence, attention span and self-help skills, with improved social competence being significantly related to specific program goals.

Recent research on educational approaches to the management of autism in young children supports the above findings that in early intervention individualised instructions and family involvement are the most effective approaches (Autism Society of American, 1998; Dempsy & Foreman, 2001). A study of areas of agreement in program practices (Hurth, Shaw, Izeman, Whaley & Rogers, 1999) revealed that individualisation was rated highly by programs. More recent studies on outcomes for young children with disabilities emphasised studying family outcomes in relation to the child’s disabilities (Bailey et al., 2006) and to a systems approach to address the effectiveness of EI programs: service coordination, parent empowerment and the comprehensiveness of the available services (Bruder et al., 2005; Van Der Heyden, 2005; Guralnick, 2005) and few studies examine the source of positive outcomes for children independent of the context (family and system of services) that the child is in.

Overall, children either maintained their skills or showed improvements in the eight developmental areas measured. In the home-based ABA programs, self-help skills and the ability to follow instructions were areas that revealed the best program outcomes, whereas in the centre-based programs, social competence showed the best program outcomes over the two years. In addition, centre-based outcome effects were highest in the two centres that catered specifically for children with autism, especially in the areas of social competence and language. Given that social skills are, and continue to be, a major area of difficulty for children with autism, a centre-based EI program appears to offer the best gains in the area of social development. Studies of group-based early intervention programs in autism have shown that after treatment children improved significantly on measures of joint attention, social interaction and imitation (Salt et al., 2002; Dawson & Adams, 1984). Joint attention has been linked to the development of play, social-cognitive skills and social approach behaviours in children with autism (Mundy & Crowson, 1997). The findings in the present study are consistent with literature findings that group-based programs are effective in producing gains in the area of social development for children with autism and related disorders.
In studies on parent-directed intensive ABA treatment, positive program outcomes were found with less than 40 hours as advocated by Lovaas (Sheinkopf & Siegal, 1998; Smith et al., 2000). Sheinkopf and Siegal suggested success with fewer hours in a home-based ABA program was related to that the intense involvement of parents, and that implementation of treatment at home, helped parents generalise their children’s skills outside formal treatment sessions. In Smith et al.’s study, parents also reported high levels of satisfaction with treatment outcomes and that they perceived that implementation of treatment at home as effective in achieving the overall treatment outcomes of their children. The present study showed that the time and resources devoted to training parents are perceived as effective by parents. Most parents who attended parental training sessions in the home-based programs rated parental involvement as ‘very effective’, whereas only three respondents from the centre-based programs in which parent training sessions were offered rated parental involvement as ‘very effective’. Parents appeared highly involved in ABA home-based programs as a majority of them were program coordinators or even co-therapists. Overall, few respondents thought that parental involvement in training sessions was not effective. A parent-driven, centre-based ABA treatment model (Cattell-Gordon & Cattell-Gordon, 1998) reported effective results with parents as team leaders of therapists and as planners for the creative use of resources. Thus parent training appears to be an important factor that contributes to parent satisfaction with their child’s early intervention program.

Some caution must be exercised in interpreting the results of this study. The ratings of the developmental levels of both types of early intervention programs were both subjective and retrospective. However, the effectiveness index for program outcomes, which represented the units of improvement made in this study, provides an indicator as to the possible benefits gained in different developmental areas via the two different approaches (centre-based EI and home-based ABA) for EI for children with autism and for the effectiveness of centre-based early intervention for children with other disabilities. This suggests directions for future research related to pre- and post-standardised assessments, criterion-based assessments, or direct observation of areas of development of young children with autism or other disabilities.
CHAPTER 6

A SIX-YEAR FOLLOW-UP SURVEY OF EARLY INTERVENTION APPROACHES AND METHODS OF PRACTICE FOR YOUNG CHILDREN WITH AUTISM AND OTHER DEVELOPMENTAL DISORDERS

INTRODUCTION

Over the last ten years there have been significant policy developments in Victoria which have led to new developments in service delivery for children with disabilities, in particular, children with ASD. There was the “Victorian State Disability Plan 2002-2012” which states the aims of the disability services. This includes promoting inclusion and participation of people with a disability; ensuring a flexible service system; monitoring and improving services; and obtaining and managing resources for best outcome and value. The “Autism in Victoria: an investigation of prevalence and service delivery for children aged 0-6 years” (2003) document outlined the prevalence rate of autism in Victoria and reviewed service provision and recommended empowerment for parents and children with ASD. The “Early Childhood Intervention Services vision and key priorities” (2003) document outlined policy directions in the following three years. These included acknowledging that families with children with a disability or developmental delay are partners in the service system; and that evidence-based delivery incorporates the principles of family centred practice, participation and inclusion and tailoring models of service to individual needs. The above documents would influence how the centre-based EI programs were delivered in Victoria following the 1998 survey. The author also anticipated that there might be changes in the planning and delivery of the centre-based EI programs after the survey in 1998.

The aim of the follow-up survey in 2004 was to examine whether the trend in EI program outcomes would differ after this significant period of time which included the above service delivery changes. The follow-up survey study was undertaken six years after the first questionnaire survey was conducted. When the
first survey was conducted in 1998, the ABA home-based programs had been established for just over two years in Victoria. By 2004, ABA home-based programs had been an established intervention in Victoria for eight years. It was also anticipated that there might be changes in the practices of the ABA home-based program after the programs over this six year period.

METHOD

6.1 Participants

Similar to the survey in 1998, participants from centre-based EI programs were invited via the listed EI programs for children under six years with a disability including autism in four Melbourne metropolitan and five Victorian country regions. The regions included the Eastern Metropolitan Region, Northern Metropolitan Region, Southern Metropolitan Region, Western Metropolitan Region, Barwon-South Western Region, some parts of Gippsland Region, Grampians Region, Hume Region and Loddon-Mallee Region. A total of 60 early intervention centres were sent the survey questionnaire for EI centres (Appendix H(b)) with a covering letter explaining the intent of the study (Appendix I).

6.2 Materials

In the follow-up survey, the two questionnaires, one for the centre-based programs (Appendix A), and one for the home-based programs (Appendix C), developed for the first survey conducted in 1998 were used. Only minor amendments to dates were made (Appendix H(a) and Appendix H(b)). The use of the same questionnaires was for the purpose of comparing results obtained from the survey in 1998 and the follow up survey in 2004. For variables measured in the questionnaires, refer to section 5.2 in Chapter 5.

6.3 Procedure

The follow-up survey was approved by the RMIT University Human Research Ethics Committee (Appendix J). The questionnaire was mailed to the program coordinators of the early intervention centres which were sent the
questionnaire in 1998 as well as new centres listed after 1998. Each questionnaire package contained a letter of explanation (Appendix I), a prepaid return envelope and the appropriate questionnaire. All questionnaire packages were mailed in November 2004 and participants were requested to return the completed questionnaire by December 2004. The questionnaire was anonymous. Participation was voluntary and completion and return of the questionnaire was taken as consent to participate in the study.

Because of a change of policy by the ABIA (Vic) related to Federal Privacy laws enacted since the survey in 1998, there was not an independent mail-out of the questionnaire to families in the follow-up survey as occurred in the first survey. Instead, families of young children with an ASD or other developmental disabilities participating in an intensive, behaviourally oriented, home-based intervention program were invited to complete the questionnaire via the association’s newsletter. Questionnaires were mailed to around 160 families by the ABIA with the newsletter in November 2004. Families undertaking home-based ABA programs were requested to complete the questionnaire with the assistance of their program coordinators.

Similar to 1998, the parent, in conjunction with the program supervisor, rated their child’s progress in each of the eight developmental levels: First how the child was developing at the beginning of their ABA program, and then the child’s current development at the time of completing the questionnaire.

In the follow-up, centre-based questionnaire, again similar to 1998, program coordinators were asked to select one group of children (8 to 10 children, aged 3 to 5 years) who began the program the previous year and were still participating in the program at the end of the year the questionnaires were received and completed (approximately 24 months). The average level of development of the selected group of children in each of the eight developmental areas was then rated for early the previous year and at the end of the year when the questionnaire was completed.
6.4 Measurement

6.4.1 Calculation of program effectiveness

The same measures used in the survey in 1998 were adopted in the follow-up survey in 2004. For details of these measures, refer to section 5.4 in Chapter 5.

For results reported in this chapter, ‘Time 1’ refers to the time the survey was conducted in 1998 and ‘Time 2’ refers to the time the follow-up survey conducted in 2004, six years later.

6.4.2 Statistical Analysis

Versions 15 and 17 of SPSS were used for statistical analysis. As explained in section 5.4.2 in Chapter 5, a mixed $2 \times 8$ Analysis of Variance (ANOVA) design was used to examine the program effectiveness of centre-based EI programs. The eight developmental areas were assessed within the respondents of centre-based EI programs; and also the respondents of centre-based EI programs were assessed between two times (1998 and 2004). The within subject factor was the developmental outcomes for the eight developmental areas and the between subject factor was time (Time 1 - 1998 and Time 2 -2004). The mixed design was to examine if there was a significant interaction effect between time and developmental outcomes, i.e., whether there was a differential pattern of change over time across the eight developmental outcomes in centre-based EI programs. The main effects for program areas and those for time were also examined. This was to examine whether there were differences between the two sets of developmental outcomes. A similar mixed $2 \times 8$ Analysis of Variance (ANOVA) design was used to examine the program effectiveness of home-based ABA programs.

Chi-square tests were used to determine whether there were significant relationships between program type (centre-based versus home-based ABA) and type of therapy (e.g., discrete trial learning, education-based learning, sensory integration, speech therapy, behaviour management) adopted at Time 2. Chi-square tests were also used to examine whether there was a significant relationship between
effectiveness of parental involvement as rated by centre-based programs at Time 1 and Time 2.

RESULTS

6.5 Sample size

Of the 60 questionnaires sent to the centre-based early intervention programs, 20 were returned, giving a return rate of 33.3% which was similar to that of the return rate six years previously. However, only eight families from the ABIA (Vic) whose membership implied a home-based ABA program, returned the questionnaires, compared to the 50 families that responded in the first survey in 1998. Due to the change of policy of recruitment by the ABIA (Vic) in 2004, the return rate of 5% was significantly lower than six years prior although a reminder was published in the newsletter that followed the mail out. The change in recruitment obviously had a significant impact on the return rate of the questionnaire in this follow-up survey.

Thus the sample size in the follow-up survey consisted of 20 coordinators of centre-based EI programs and 8 families undertaking home-based ABA programs who completed the questionnaire with the assistance of their program coordinators.

6.6 Home-based ABA programs

6.6.1 Profile

Of the families participating in a home-based ABA program, each family reported having one child in the program, ranging in age from 3 to 6 years, 7 months ($M = 4$ years, 8 months). Seven children had a diagnosis of autism or ASD ($n = 7$) and one child had a global developmental delay; seven children were male and one was female. According to reports of families, the majority of children entered the ABA program at an age between 2 years and 2 years, 11 months ($n = 5$). Two children entered the program at an age of between 3 years and 3 years, 11 months, and one child entered the program at 4 years to 4 years, 11 months. Regarding the socioeconomic characteristics of the families, six fathers were professionals (e.g., lawyers, accountants), or owned their own business; one father was an unskilled
worker and another father did not record his employment. Six mothers were full-time homemakers. The two mothers who were not homemakers reported that they were professionals (i.e., teacher, social worker). This was similar to 1998 where a majority of the children in the home-based ABA programs had at least one parent who was either a professional, or a business owner or a manager.

Of the eight families involved in a home-based ABA program, three families used local psychologists; two families used overseas psychologists, mainly ABA service providers from the United States; and two families used ABA program providers. One family did not use psychologists or ABA program providers as part of their team. Apart from psychologists and program providers, three families used a speech therapist and one family used an occupational therapist. The number of program therapists used by the families ranged from two (2 families) to three (6 families). Seven families reported that the parents did not act as program therapists; only one family reported that the parents also acted as therapists (12.5%); in contrast, in 1998, 23 families (46%) reported that they acted as therapists.

The follow-up survey revealed that discrete trial learning, a major feature of ABA home-based programs, was used by all the home-based programs. Apart from discrete trial learning, other therapies were used. Education-based teaching was adopted by four home-based ABA programs (50%). One home-based ABA program included sensory integration therapy. Speech therapy was included in three home-based ABA programs (37.5%). Other forms of behaviour management were included in seven (87.5%) home-based ABA programs.

6.6.2 Developmental Outcomes

One major analysis is to compare if there were differential program outcomes among different developmental areas in home-based ABA programs. The main effect for developmental areas in home-based ABA programs was significant. There were significant differences among the eight developmental areas, $F(7,50) = 2.40, p = .034$, $\Lambda = .75$. These means are listed in Table 6.1. The highest mean score was found in the area of self-help skills, while the lowest was for rhythmic habit patterns. Post-hoc testing was carried out using pairwise comparisons of estimated marginal means
with Bonferroni adjusted $\alpha$ levels. Significant differences were found between self help skills and social competence, $p=.01$; and ability to follow instructions and social competence, $p=.02$. Results suggest that the gains in self-help skills and the ability to follow instructions were significantly more than that in social competence after home-based ABA treatment.

Table 6.1

*Mean Scores for Eight Developmental Areas for Home-Based ABA Program (SD)*

<table>
<thead>
<tr>
<th>Developmental Areas</th>
<th>Mean Scores (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-help skills</td>
<td>1.25 (.71)</td>
</tr>
<tr>
<td>Ability to follow instructions</td>
<td>1.13 (.84)</td>
</tr>
<tr>
<td>Receptive language ability</td>
<td>1.00 (.76)</td>
</tr>
<tr>
<td>Attention span</td>
<td>0.75 (.71)</td>
</tr>
<tr>
<td>Developmental delay</td>
<td>0.75 (.71)</td>
</tr>
<tr>
<td>Rhythmic habit patterns</td>
<td>0.63 (.52)</td>
</tr>
<tr>
<td>Expressive language</td>
<td>0.63 (.92)</td>
</tr>
<tr>
<td>Social competence</td>
<td>0.25 (.46)</td>
</tr>
</tbody>
</table>

$(SD) = $ Standard Deviation

6.6.3 *Duration of programs*

By 2004 home-based ABA programs had been an established intervention for eight years. The duration of the current ABA programs was listed in Table 6.2. Most families had run the program for 7 months to 2 years.
Table 6.2
Number of children in different durations of home-based ABA programs

<table>
<thead>
<tr>
<th>Durations of programs</th>
<th>Number of children (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3 months</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Around 6 months</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>7 months to a year</td>
<td>2 (25%)</td>
</tr>
<tr>
<td>18 months</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>2 years</td>
<td>2 (25%)</td>
</tr>
<tr>
<td>More than 2 years</td>
<td>1 (12.5%)</td>
</tr>
</tbody>
</table>

6.6.4 Intensity of programs

Families reported that the child in the home-based program spent between 8 and 25 hours per week in their programs, averaging 14.6 hours. Two families reported that they ran their program for up to 10 hours per week, 5 families ran their program for between 11 and 19 hours per week, and one family ran their program for 25 hours per week.

Pearson correlations were used to analyse whether hours per week, an indication of the intensity of EI programs, is related to developmental outcomes of home-based ABA programs. Significant relationships were found between hours per week and (1) receptive language, $r (N=8) = .81, p=.02$; (2) expressive language, $r (N=8) = .72, p=.05$; (3) social competence, $r (N=8) = .79, p=.02$; (4) self help skills, $r (N=8) = .78, p=.02$; and (5) ability to follow instructions, $r (N=8) = .81, p=.02$.

These results suggest that more home-based ABA treatment hours are related to more gains in receptive language abilities, expressive language abilities, social competence, self help skills and the ability to follow instructions.

6.6.5 Programs models and goals

All the families in the follow-up survey reported that they adopted a behavioural model, using the discrete trial program based on Lovaas’s (1987) study -
the ABA home-based program to which is normally referred. In the follow-up survey, some programs stated their goals/objectives/outcomes in more general terms and others in more specific terms. Two families did not report on goals of their programs. Of the six families that reported goals, the general program goals \((n = 2)\) were characterised by a description of the developmental outcome of the ‘whole child’—to establish the best possible life for the child and to increase his/her activities in regular social, academic and family aspects of life for the positive benefit of the child. Four home-based ABA programs were characterised by specific goals in program outcomes: to increase socialisation skills; to enhance cognitive and motor skill development; to improve attention span on tasks and interaction with other children; and to achieve improvement in receptive and expressive language skills, imitation skills, play skills and communication via PECS. (The models and goals in home-based ABA programs are listed in Appendix K.)

Because of the small size of the sample and the missing data, data could not be analysed statistically to determine whether there were any differences in program outcomes for home-based ABA programs according to whether the program adopted general program goals or specific program goals. However, figure 6.1 illustrates the trend for the differences in developmental areas (effectiveness scores) according to whether the home-based ABA program adopted general program goals or specific program goals.
Figure 6.1 Program outcome measures of the follow-up study for home-based ABA programs with general goals \((n = 2)\) versus home-based programs with specific goals \((n = 4)\).

Figure 6.1 shows that there were some noticeable differences between the two sets of program goals on the measure of developmental outcomes of receptive language and rhythmic habit patterns. Children in home-based ABA programs adopting specific goals achieved a higher level of program outcome in receptive language than those children in programs adopting general goals. On the other hand, those children in home-based ABA programs adopting general goals achieved a higher level of program outcome in reducing rhythmic habit patterns.

6.6.6 Parental Involvement

Out of the eight respondents from the home-based ABA programs, seven \((87.5\%)\) reported that they had attended training sessions in relation to their child’s disability. Five \((62.5\%)\) respondents who attended parental training sessions for the home-based programs rated parental involvement as ‘very effective’.
6.7 Centre-based EI programs

6.7.1 Profile

Of the 20 EI centres, one centre did not report number of children under types of developmental needs. Of the 19 centres that reported statistics, 2 centres indicated that they catered specifically for children with autism, 16 centres indicated that they catered for young children with varying types and degrees of delay which included autism and there was one centre that reported that it did not include children with autism in its programs. The EI centres had from 7 to 113 children with varying types of developmental delays, averaging 47.25 children ($SD= 33.46$). One autism specific centre had 99 children and the other centre had 12 children. The 16 generic EI centres had from 1 to 28 children with autism in their programs, averaging 12.8 children ($SD=9.2$). Of the 17 generic centres, the number of children with different types of developmental delays is listed in Table 6.3.

<table>
<thead>
<tr>
<th>Types of developmental needs</th>
<th>Number of centres</th>
<th>Mean ($SD$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism spectrum disorder</td>
<td>16</td>
<td>12.8 (9.2)</td>
</tr>
<tr>
<td>Global Delay</td>
<td>16</td>
<td>17.8 (13.6)</td>
</tr>
<tr>
<td>Specific developmental language disorder</td>
<td>11</td>
<td>6.6 (5.7)</td>
</tr>
<tr>
<td>Delay in motor development</td>
<td>9</td>
<td>4.8 (4.3)</td>
</tr>
<tr>
<td>Down syndrome</td>
<td>9</td>
<td>9.2 (19.2)</td>
</tr>
<tr>
<td>Fragile X syndrome</td>
<td>3</td>
<td>.67 (1.2)</td>
</tr>
<tr>
<td>Attention deficit hyperactivity disorder</td>
<td>2</td>
<td>1 (0)</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>4</td>
<td>12.3 (8.4)</td>
</tr>
<tr>
<td>Other developmental delays</td>
<td>8</td>
<td>4.1 (4.2)</td>
</tr>
</tbody>
</table>

($SD$) = Standard Deviation
The staff to child ratio ranged from 1 staff member to 5 children to 1 staff member to 1.5 children, averaging 1 staff to 2.4 children. Of the 20 centre-based EI programs, a majority \((n=16\) centres) reported that they had one or more special education teachers. Other professionals employed by the centres included speech therapists \((n=18\) centres), physiotherapists \((n=9\) centres), psychologists \((n=10\) centres), occupational therapists \((n=15\) centres), and social workers \((n=2\) centres). Speech therapy was offered by 18 (90%) centre-based programs, followed by education-based teaching and other forms of behaviour management offered in 18 (90%) centre-based programs, and sensory integration in 15 (75%) in centre-based programs. Discrete trial learning, a major feature of ABA home-based programs, was used by three centre-based programs (15%).

6.7.2 Developmental Outcomes

There were no significant main effect for centre-based developmental outcomes, \(F(7,25) = 2.27, p = .062, \Lambda = .61\). These means are listed in Table 6.4. However, the highest mean score was found in the developmental area of social competence and the lowest mean score was in the developmental area of level of developmental delay. Subsequent post-hoc pairwise Bonferroni comparisons in the follow-up study (adjusted for multiple comparisons) did not reveal any significant differences among the outcome measures.

Table 6.4
Mean Scores for Eight Program Outcome Measures for Centre-Based EI programs (SD)

<table>
<thead>
<tr>
<th>Developmental Areas</th>
<th>Mean Scores (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social competence</td>
<td>.59 (.51)</td>
</tr>
<tr>
<td>Ability to follow instructions</td>
<td>.48 (.52)</td>
</tr>
<tr>
<td>Expressive language ability</td>
<td>.45 (.49)</td>
</tr>
<tr>
<td>Self-help skills</td>
<td>.48 (.32)</td>
</tr>
<tr>
<td>Attention span</td>
<td>.43 (.60)</td>
</tr>
<tr>
<td>Receptive language ability</td>
<td>.26 (.31)</td>
</tr>
<tr>
<td>Rhythmic habit patterns</td>
<td>.21 (.43)</td>
</tr>
<tr>
<td>Level of developmental delay</td>
<td>.16 (.29)</td>
</tr>
</tbody>
</table>

\((SD) = \text{Standard Deviation}\)
Results for the two centres that catered specifically for children with autism showed that their children’s gain on social competence varied. One centre had a gain of improvement of 0.80 units and the other centre did not show any gain, as compared with a mean of 0.52 units of improvement in social competence across the 16 generic EI centres that had data on program outcomes. Both autism specific centres had a gain of 0.80 units of improvement on receptive language for children in their programs compared to a mean of 0.44 across the 16 generic EI centres.

6.7.3 Intensity and duration of programs

All EI centre respondents were requested to rate the same group of children in their programs at the beginning of 2003 and at the end of 2004. The duration of the program measured in centres was for a period of approximately 24 months. The centres reported that children spent between 1.5 and 16.5 hours per week in their programs ($M = 4.5$ hours).

Pearson correlations were used to analyse whether hours per week ($M = 4.5$), an indication of the intensity of the program, is related to program outcomes. “Hours per week” as a variable did not correlate significantly with the overall effectiveness score or any of the eight developmental areas. Thus there was not a pattern identified for more centre-based EI treatment hours leading to higher outcomes in developmental areas.

6.7.4 Models and Goals of programs

In the follow-up survey, seventeen of the 20 EI centres reported on the theoretical models adopted. They adopted a variety of theoretical models, which included a developmental model ($n=6$), a behavioural model ($n=2$), a combination of behavioural and developmental models ($n=1$), all other models including family-centred practice, activity-based models and autism-specific models (e.g., TEACCH) ($n=8$).

Using the overall developmental effectiveness score for each centre, data were analysed for any differences between the centres’ program outcomes according
to the program models mostly adopted, i.e., developmental model \((n = 6)\) versus all theories model \((n = 8)\), using independent sample t-test. Results indicated that the program model/s adopted did not affect developmental outcome. There was no significant relationship between developmental outcomes and the theoretical model adopted by the centre, \(t (11) = .76, p = .46\).

The goals stated by the centres were developed within the context of the model set by individual centres. The goals stated were characterised by: (1) individualised goal setting for the child in the program; (2) partnership with families in the delivery of the program, including parent education and support programs; and (3) child support in generic settings such as playgroups, childcare and/or preschools. The goals stated in the follow-up study included specific programs adopted by the centres such as PECS and ABA-DTT. The one centre that adopted the TEACCH Program developed goals guided specifically by the TEACCH model. Also there were two centres that emphasised the importance of a multidisciplinary team approach in their stated goals.

For further analysis, the goals of the centres were categorised according to their goal descriptions into two program goal models: (1) general program goals \((n = 12)\), and (2) specific program goals \((n = 8)\). General program goals were characterised by descriptions such as for children and families to be actively included in their communities; for parents to feel better able to assist their children’s learning; and for children to increase/improve developmental outcomes in all areas of development. Specific goals included descriptions such as offering individual 1:1 intensive programs based on assessment including behavioural management and toilet training; providing an individual autism-specific program based on TEACCH; and improving language with signing and/or words. (The theoretical models and goals identified in the follow-up survey are listed in Appendix L.)

Data were analysed by using a single-factor between-subjects MANOVA to examine if there were any differences in program outcomes for EI centres according to whether the centre adopted general or specific program goals. The eight developmental outcomes (effectiveness scores) were the multiple dependent variables and the two program goals (general or specific) were the single between-subjects
factor. Results showed that there was no significant interaction between measures of program outcomes and the two sets of program goals (general and specific), $F(8,8)=2.7, p=.09, \Lambda=.27$. However, there were medium effect sizes for differences between the two sets of program goals on the measure of program outcomes for expressive language ($d = 0.52$) and ability to follow instructions ($d = 0.50$). The program outcome was higher for following instructions in programs that adopted general goals, and the outcome was higher for expressive language in programs that adopted specific goals.

Figure 6.2 Program outcome measures for centre-based programs with general goals ($n = 12$) versus centre-based programs with specific goals ($n = 8$) in the follow-up study.
6.7.5 Parental Involvement

All 20 respondents from the centre-based programs reported in the follow-up survey that their programs offered parent training sessions. Twelve EI centres (60%) rated parental involvement as ‘very effective’ and eight centres (40%) rated parental involvement as ‘moderately effective’.

6.8 Comparisons between the centre-based EI and the home-based ABA programs in the follow-up survey study

The results for the centre-based programs are not directly comparable to those of the home-based programs. However, for the within-group comparison in the home-based ABA programs, children’s gain on self-help skills was highest and their gain on social competence was lowest, whereas in centre-based programs the most improvement occurred for social competence. The combined results again indicate that the aspects of development in children with autism and other developmental delays for which centre-based EI programs and home-based ABA programs are most effective are different. Given that social skills are, and continue to be, a major area of difficulty for children with autism, a centre-based EI program appears to offer the best gains. Also this time scores tended to be higher in all areas for home-based ABA programs.

Cross-tabulation of program type (centre-based versus home-based) and types of therapy revealed significant relationships between program type and discrete trial learning ($\chi^2 (1, N = 28) = 13.08, p < .001^{1}$, $V = .68$); between program type and educational incidental teaching ($\chi^2 (1, N = 28) = 6.32, p = .012, V = .48$); between program type and educational activity-based therapy ($\chi^2 (1, N = 28) = 5.4, p = .02, V = .44$); between program type and sensory integration ($\chi^2 (1, N = 28) = 9.12, p = .003, V = -.57$); and between program type and speech therapy ($\chi^2 (1, N = 28) = 15.22, p<.001, V = -.74$). The follow-up survey revealed that discrete trial learning, a major feature of ABA home-based programs, was used by seven home-based programs (87.5%) and by three centre-based programs (15%). Education-based teaching, on the

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1 The $p$ levels for these $\chi^2$ tests were based on Fisher’s exact test.
other hand, was offered by 18 centre-based programs (90%) and adopted by four home-based ABA programs (50%). In relation to sensory integration, only one home-based ABA program included this therapy, while 15 EI centres (75%) included this as part of their program. Speech therapy was offered by 18 EI centres (90%), while it was included in three home-based ABA programs (37.5%). Other forms of behaviour management was offered by 18 EI centres (90%) and was included in seven (87.5%) home-based ABA programs.

In 2004, 12 EI centres (60%) rated parental involvement as ‘very effective’ and 8 centres (40%) rated parental involvement as ‘moderately effective’. In home-based ABA programs, five (62.5%) respondents who attended parental training sessions rated parental involvement as ‘very effective’.

6.9 Comparisons between home-based ABA and centre-based EI program outcomes of the survey and the six-year follow-up survey

6.9.1 Profiles of EI programs

Overall, results reveal that there were some major changes in the profile of centre-based programs over time. Compared to 1998, there was an increased intake of children by EI centres in 2004, in particular, children with autism. The difference between the number of children with autism enrolled in generic EI centres in 1998 and 2004 is significant, \( t (20.7) = -2.7, p = .013 \) (unequal variance). The mean numbers of children enrolled at both times are listed in Table 6.5.

Between 1998 and 2004, there was a drop of 48% in intensity of services measured by hours per week at centres. In 1998, centres reported that children spent between 1 and 30 hours per week in their programs \( (M = 8.6 \text{ hours}) \), whereas in 2004, the centres reported that children spent between 1.5 and 16.5 hours per week in their programs \( (M = 4.5 \text{ hours}) \).

Between 1998 and 2004, there were differences in theoretical models adopted and program goals stated. While a majority of the EI centres in 1998 adopted a developmental model (see Appendix G), the EI centres in 2004 indicated that they adopted a variety of theoretical models, which included a developmental model, a
Table 6.5  

*Number of children with autism enrolled in EI centres*

<table>
<thead>
<tr>
<th>Description</th>
<th>Mean scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of children enrolled at the EI centres (1998)</td>
<td>32 (SD=21.6)</td>
</tr>
<tr>
<td>Mean number of children enrolled at the EI centres (2004)</td>
<td>47.3 (SD=33.5)</td>
</tr>
<tr>
<td>Number of children with autism enrolled at all EI centres (1998)</td>
<td>7.3 (SD=6.7)</td>
</tr>
<tr>
<td>Mean number of children with autism enrolled at all EI centres (2004)</td>
<td>17.6 (SD=22.1)</td>
</tr>
<tr>
<td>Mean number of children with autism enrolled at generic EI centres (1998): (n=18)</td>
<td>6 (SD=4.2)</td>
</tr>
<tr>
<td>Mean number of children with autism enrolled at generic EI centres (2004): (n=16)*</td>
<td>12.8 (SD=9.2)</td>
</tr>
<tr>
<td>Mean number of children with autism enrolled at autism-specific EI centres (1998) (n=2)</td>
<td>19</td>
</tr>
<tr>
<td>Mean number of children with autism enrolled at autism-specific EI centres (2004) (n=2)</td>
<td>55.5</td>
</tr>
</tbody>
</table>

(SD) = Standard Deviation  
* 2 centres did not provide date for number of children with autism enrolled

A combination of behavioural and developmental models, models based on family-centred practice, activity-based models and autism-specific models (e.g., TEACCH). The goals stated by the centres were developed within the context of the models adopted by individual centres. In 2004, there was a greater emphasis on documenting individualised goals for the child and a plan for family support. The goals stated in the follow-up survey included those for specific programs adopted by the centres such as PECS and ABA-DTT. The one centre that adopted the TEACCH Program developed goals guided specifically by the TEACCH model.

In home-based ABA programs, families engaged in ABA programs were from a higher socio-economic status and that remained unchanged over time as did the use of a DTT approach to intervention. The age of entry into the program was lower in 2004. In 1998, the majority of children entering the ABA home-based
program was aged between 3 and 4 years and 11 months. In 2004, the majority of children entered the ABA program at an age between 2 years and 2 years, 11 months. The mean program hours per week spent in home-based ABA programs were similar overtime with a mean of 15.6 hours per week and a mean of 14.6 hours in 2004. However, a greater range of program hours per week was reported in 1998, from 3 to 39 hours, whereas in 2004, the range of program hours per week was from 8 to 25 hours. In 1998, 23 families (46%) reported that parents also acted as therapists in the program, whereas in 2004, only one family (12.5%) reported that the parents acted as program therapists.

6.9.2 Developmental outcomes

Centre-based EI programs

Comparisons among the effectiveness scores for the eight developmental areas for the centre-based programs between Time 1 (1998) and Time 2 (2004) were made using 2 x 8 MANOVA. The within-subject factor was developmental outcome which is the effectiveness scores (8 levels, for the 8 developmental areas), and the between-subjects factor was time (2 levels, Time 1 and Time 2). Results revealed a significant interaction effect of time by developmental outcomes, \( \Lambda = .51, F(7,25) = 3.42, p = .011 \). This means that the change in developmental outcomes measured in effectiveness scores varied across the eight developmental areas between the time when the survey was conducted in 1998 and the time when the follow-up survey was conducted in 2004. Figure 6.3 illustrates the pattern of change of program outcomes over time.

A follow-up simple main effects test indicated that at Time 2 (2004), changes in social competence \( F(1, 31) = 5.21, p = .029 \) and receptive language \( F(1,31) = 15.41, p < .001 \) were less over a 24-month period than at Time 1 (1998). That is, children in EI in 1998 made more progress in those areas than children in EI in 2004. Progress was similar in the two time periods in the other six developmental areas.
Figure 6.3 Change of program outcomes over time across the eight program outcomes of centre-based programs between Time 1 and Time 2.

Keys for Program Outcomes:
1. Developmental delay
2. Receptive language
3. Expressive language
4. Social competence
5. Self-help skills
6. Attention span
7. Ability to follow instructions
8. Rhythmic habit patterns

Time 1: 1998
Time 2: 2004
Home-based ABA programs

There was a large difference between the sample size of the survey in 1998 (N = 50) and the follow-up survey in 2004 (N = 8) for the home-based ABA programs. Comparisons among the effectiveness scores for the eight developmental areas of the home-based programs between Time 1 (1998) and Time 2 (2004) were made using 2 × 8 MANOVA. The within-subject factor was developmental outcome which is the effectiveness scores (8 levels, for the 8 developmental areas), and the between-subjects factor was time (2 levels, Time 1 and Time 2). Results revealed that there was no significant interaction effect of time by developmental outcome for the eight developmental areas for home-based programs, Λ = .81, F(7,50) = 1.63, p = .149. This means that the change in developmental outcomes measured in effectiveness scores across the eight developmental areas between the time when the survey was conducted in 1998 and the time when the follow-up study was conducted in 2004 was not significant. However, there was still a pattern of change of developmental outcomes over time illustrated in Figure 6.4.

A follow-up simple main effects test showed that at Time 2 (2004) changes in social competence (F(1, 56) = 6.73, p = .012) were less over a 24-month period than at Time 1 (1998). That is children in home-based ABA programs during 1998 made significantly more progress in the area of social competence than children in home-based ABA programs in 2004. Progress was similar in the two time periods in the other seven developmental areas.
Figure 6.4 Change of program outcomes over time across the eight developmental areas for home-based ABA programs between Time 1 and Time 2.

Keys for Program Outcomes:
1. Developmental delay
2. Receptive language
3. Expressive language
4. Social competence
5. Self-help skills
6. Attention span
7. Ability to follow instructions
8. Rhythmic habit patterns

Time 1: 1998
Time 2: 2004
6.9.3  Types of therapy

Similar to the findings of the survey in 1998, the follow-up survey revealed that discrete trial training, a major feature of ABA home-based programs, was used by 47 (94%) home-based ABA programs in 1998 and all the 8 home-based ABA programs (87.5%) in 2004. Only a small number of EI centres adopted discrete trial training (DTT) as a type of therapy in their programs, with 3 centre-based programs (15%) both in 1998 and in 2004 doing so. Education-based teaching, on the other hand, was offered by 18 centre-based programs (90%) in 2004 and all 20 centre-based programs in 1998. Speech therapy was offered by 18 centre-based programs (90%) both in 1998 and in 2004. In ABA home-based programs, educational-based teaching was adopted by 22 families (44%) and speech therapy in 21 families (42%) in 1998. Similarly in 2004, educational-based teaching was adopted by four home-based ABA programs (50%) and speech therapy by three home-based ABA programs (37.5%). Further, behaviour management as a form of therapy was offered in 19 (95%) of the centre-based programs, and 37 (74%) of the home-based programs in 1998. Whereas in 2004, other forms of behaviour management was offered by 18 EI centres (90%) and was included in seven (87.5%) home-based ABA programs.

Overall, the types of therapy offered by centre-based programs and home-based programs were similar in 1998 and 2004. In both studies, a trend was evident that centre-based programs were characterised by education-based teaching, sensory integration, speech therapy and behaviour management, while home-based programs were characterised by ABA discrete trial learning and behaviour management.

6.9.4  Parental involvement

All 20 respondents from the centre-based programs in 2004 reported that their programs offered parent training sessions, while in the survey in 1998, 17 of the respondents (85%) from the centre-based programs reported that they had offered parent training sessions. In 2004, out of the eight respondents from the home-based ABA programs, seven (87.5%) reported that they had attended training sessions in relation to their child’s disability. Out of the eight families, only one family reported that parents also acted as therapists (12.5%). In 1998, forty respondents (80%) from
the home-based programs reported that parents had attended training sessions in relation to their child’s disability. Out of the 50 families, 23 families (46%) reported that they actively involved as therapists in the home-based ABA programs.

A Pearson chi-square test was conducted to identify whether there were significant differences between effectiveness of parental involvement as rated by EI centres in 1998 (Time 1) and in 2004 (Time 2). The results revealed a significant relationship between time and effectiveness of parental involvement: $\chi^2 (1, N = 39) = 8.05, p = .005, V = -.45$. In 1998, three EI centres (15.8%) rated parental involvement as ‘very effective’ and 16 EI centres (84.2%) rated parental effectiveness as ‘moderately effective’. In 2004, 12 EI centres (60%) rated parental involvement as ‘very effective’ and eight centres (40%) rated parental involvement as ‘moderately effective’.

In home-based ABA programs, five (62.5%) respondents who attended parental training sessions for the home-based programs in 2004 rated parental involvement as ‘very effective’, while in 1998, 32 (80%) such respondents rated parental involvement as ‘very effective’. Therefore, over time the profile of perceived effectiveness of parental involvement has changed.

**DISCUSSION**

**6.10 Discussion**

The follow-up survey at Time 2 (2004) included 20 EI centre-based programs and 8 home-based ABA programs and was six years after the original survey (Time 1) was conducted in 1998.

Results showed that there was an increase of intake of children with developmental needs including ASD in EI centres in 2004 and in particular, an significant increase of intake of children with autism in both generic EI centres and autism specific centres. A reason for this increase may be due to the significant increase in reported Australian prevalence rate of diagnosed ASD or suspected ASD during this period. Within Australia, formal studies on the prevalence rate of ASD
were few until quite recently. In Victoria, the prevalence rate of ASD in 2002 was estimated at 27 per 10,000 children aged 0–6 (Crewther et al., 2003). This figure represents a significant increase in reported prevalence rates compared to figures of prevalence rates in the 1990s. Wing (1997) reported a prevalence rate of 19 per 10,000 for children with ASD. In the present study, the EI centres had an average of 7.3 children with ASD in their programs in 1998 but in 2004, the EI centres had an average of 17.6 children with ASD in their programs.

In 1998, the home-based ABA program had been running for just over two years in Victoria and families at that time might want to try the program from the minimum number of hours that they could afford to have to the maximum number of hours recommended by the Lovaas’s study. In 2004, the home-based ABA program had been established for 8 years and no families were running their programs more than 25 hours per week. Also in 2004, fewer parents acted as therapists in their child’s program. This might relate to the possibility that there were more trained therapists in 2004 as compared to in 1998.

While there was an increase in intake of children with autism and other developmental needs in centre-based programs, the number of hours per week children received such services at the centres was reduced. In 1998, EI centres reported that children spent an average 8.6 hours per week in EI but in 2004, this had nearly halved to 4.5 hours per week. This drop is worth noting considering that some researchers (Gabriels, Hill, Pierce, Rogers, & Wehner, 2001; Sheinkopf & Siegel, 1998; Smith, Buch, & Gamby, 2000) argued that intensity of EI (defined by hours per week) is a critical factor affecting program outcomes. Well validated, autism-specific EI programs involved at least 15 hours per week (Birnbrauer & Leach, 1993; Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993; McClannahan & Krantz, 1994; Rogers, 1996; Dawson & Osterling, 1997). According to the report outcomes of autism in Victoria based on an investigation of the prevalence of autism and the service delivery to children aged 0–6 years (Crewther et al. 2003), EI service providers in Victoria varied regarding their perception of the optimal number of hours for a child accessing their service. Thirty-seven per cent of service providers believed
that 2–4 hours a week of EI was optimal. However, a further 32% of service providers believed that 6–10 hours was optimal. The number of hours per week perceived as optimal by practising service providers in Victoria was far less than the hours per week recommended by researchers. Prior and Roberts (2006) recommended a minimum of 20 hours per week over two or more years for young children with autism to make major gains. Although hours per week of EI is considered to be the measure of intensity of EI and a factor affecting program outcomes, there seemed to be no consensus among program providers, especially in centre-based programs, on the optimal level of hours per week to maximise effective developmental outcomes for children with autism and other related disorders.

There was a drastic drop in the recruitment of families participating in home-based ABA programs in the follow-up survey. The reason for this was likely due to the change of policy within the ABIA. The ABIA supported an independent mail-out to individual families in the first survey in 1998 with a supporting letter, but at the time of the follow-up survey in 2004, families were encouraged to participate via an advertisement in the ABIA’s newsletter. Although the sample was much smaller in 2004, there were some significant findings.

Similar to 1998, families engaged in an ABA program in 2004 were generally from a higher socioeconomic background. The majority of the fathers were either professionals or in their own business, and about one third of the mothers were also professionals. In Victoria, ABA programs are funded by families so this result is not surprising as it is likely that many lower socioeconomic status (SES) families are not able to afford such programs. Parents with professional or semi-professional backgrounds may also be better informed about these programs and their potential benefits for their children. From late 2008, through the Helping Children with Autism package, an Australian Federal Government initiative, families can now access recognised ABA providers through funding provided by the government, which is up to $12,000 per child for EI before the child turns 7 years of age. Thus the SES of families may change once the package has been used.

The number of hours per week is highly recognised as a critical factor affecting program outcomes in ABA DTT. The ABA DTT is a major feature reported
as being used in home-based ABA programs in the present studies. Up to 40 hours per week of focused treatment with low child-to-adult ratio is highly recommended in ABA DTT (Lovaas, 1987; McEachin, Smith, & Lovaas, 1993). Other studies revealed that at least 18 hours per week of focused treatment with low child-to-adult ratio enabled effective program outcomes in IQ, language and adaptive behaviour (Birnbrauer & Leach, 1993; McClannahan & Krantz, 1994; Rogers, 1996; Dawson & Osterling, 1997; Reichow & Wolery, 2009). In 1998, out of the 48 families who reported on the number of hours of intervention per week, 17 reported that they ran their home-based ABA programs for between 20 and 40 hours per week. In 2004, out of the 8 families engaged in home-based ABA programs, only one ran their program for 25 hours per week and the majority ran their programs for between 11 and 19 hours per week. Comparing the intensity measured by hours per week in 1998 and in 2004, there was a drop of families who committed more time (> 19 hours) in home-based ABA program. A possible reason for this is that running an intensive home program requires a high degree of commitment in terms of money and time, which is not sustainable for some families. However, the sample (N = 8) in 2004 was small so comparisons between 1998 and 2004 for home-based ABA programs should be treated with caution.

Social competence, an area that individuals with autism have major deficits in, is a major feature in EI programs for young children with autism (Wolery & Garfinkle, 2002). In the present studies, the developmental outcome for social competence was the highest among the eight developmental areas (ability to follow instructions, attention span, receptive language ability, expressive language ability, level of developmental delay, self-help skills, rhythmic habit patterns and social competence) in centre-based programs in both 1998 and 2004. The results showed that centre-based EI programs demonstrated consistent positive outcomes in helping children with autism and other developmental disorders to achieve a higher level of social competence after a 24-month period. Although social competence was consistently the highest program outcome measure in 2004, the change in social competence was significantly less over a 24-month period compared to 1998. That is, children in centre-based EI programs during 2004 made less progress in the area of
social competence than children in EI in 1998. Similarly, children in centre-based EI programs during 2004 made less progress in the area of receptive language than children in EI in 1998. There were other major changes in centre-based programs identified in 2004: an increased intake of children by EI centres, a drop of 48% in the intensity of services measured by hours per week at centres, and different patterns of goals set by centres. As intensity of EI (expressed in terms of hours per week) has been identified as a critical factor affecting program outcomes, a speculative factor for the lower gains in social competence and receptive language in 2004 may be related to the 48% decrease of program hours per week in EI centres in the year as compared to 1998.

In home-based ABA programs, similar to the results in 1998, the highest developmental outcomes were found in the areas of self-help skills and the ability to follow instructions. The results showed that home-based ABA programs demonstrated consistent positive outcomes in helping children with autism and other developmental needs to achieve a higher level of self-help skills and ability to follow instructions over a 24-month period. At both times under study (1998 and 2004), DTT, a major feature of ABA programs, was used by most home-based programs, but few centre-based programs. DTT is characterised by 1:1 therapist-to-child ratio and the break down of the ordinary flow of adult–child interactions into highly distinctive (discrete) events that maximises the child’s successes in learning and minimises failures (Green, 1996; Newsom, 1998; Smith, 2001). The results of the present study suggest that the DTT approach has consistent success in helping children in home-based ABA programs to acquire self-help skills and ability to follow instructions. However, results of the present study also revealed that social competence, which is an area of high developmental outcome for centre-based EI programs, is an area of lower developmental outcome for home-based ABA programs. Furthermore, children in home-based ABA programs in 2004 made significantly less progress in social competence than children in the home-based ABA programs in 1998. As discussed earlier, social competence is a critical developmental area for treatment for young children with autism as it is a major deficit in individuals with autism. These results
showed that home-based ABA programs characterised by 1:1 therapist-to-child ratio did not provide the social environment for young children to develop social skills.

As discussed in Chapter 3 section 3.2, parental involvement is important in contributing to positive EI program outcomes. Parents participated in ABA programs with their children reported a positive impact of ABA in the lives of their children and their family (Dillenburger et al., 2004). Bailey et al. (2005) reported a high level of attainment of family benefit from their children’s participation in EI in the National Early Intervention Longitudinal Study. In the present studies, significantly more EI centres in 2004 rated parental involvement as ‘very effective’ whereas there was a small drop of respondents from home-based programs who perceived parental involvement as ‘very effective’ in 2004. These results indicate that the profile of perceived effectiveness of parental involvement has improved over time at least in EI centres. For centre-based EI programs in 2004, there was a greater emphasis on documenting individualised goals for the child in the program and a plan for family support and all centres reported that they had offered parental training sessions. These might have had an impact on the perceived effectiveness of parental involvement among centre-based respondents in 2004. For home-based ABA programs, only one family reported that parents acted as therapists in 2004 whereas almost half the families reported that they acted as therapists in 1998. The direct involvement of more parents as therapists in 1998 may result in more parents rating parental involvement as “very effective” whereas less parents involved as therapists in 2004 may result in perceived effectiveness of parental involvement as less effective when compared to 1998.

Overall, the follow-up survey revealed that there were some major changes in the profile of centre-based EI programs over time. Compared to 1998, there was an increased intake of children with developmental needs including children with ASD by centre-based EI programs, a drop of 48% in the intensity of services measured by hours per week at centres, and a greater emphasis on documenting individualised goals for the child in the program and a plan for family support in 2004. Whereas in home-based ABA programs, the predominant characteristic that families in ABA programs were of a higher socioeconomic status remained unchanged between 1998
and 2004, and the adoption of a DTT approach by home-based programs was the same over this period. However, there was a reduction of program hours per week reported by families in the follow-up survey in 2004.

For program outcomes, social competence was consistently the most effective program outcome in centre-based programs whereas the measure of self-help skills was consistently the most effective program outcome in home-based ABA programs over time. The specific characteristics of the respective program types (group-based versus one-to-one DTT) might have contributed to the differential effective outcomes as discussed above. Whereas the centre-based EI program contributes significantly to the improvement of social competence, which is a major area of deficit for young children with autism, the home-based ABA programs seem to fail to facilitate a similar magnitude of improvement in this area. However, the home-based ABA programs effectively facilitate gains in self-help skills and the ability to follow instructions which are also the areas of deficits in young children with autism. It is important to note that the present studies only reported perceived effectiveness in developmental areas. Further comparative studies are required to confirm the results presented here.

The present studies also showed that the profile of perceived effectiveness of parental involvement has changed over time. In 2004, EI centres reported that they all offered parent training and put an emphasis on family support; and there was a significant increase of number of centres that perceived parental involvement as ‘very effective’. In home-based ABA programs, there were fewer families reported that they acted as therapists in 2004 and there was a drop of respondents from home-based programs who perceived parental involvement to be ‘very effective’. However, because of the small sample size, these results are tentative and require further investigation for verification.
CHAPTER 7

A LONGITUDINAL STUDY OF YOUNG CHILDREN WITH AUTISM SPECTRUM DISORDER

INTRODUCTION

The present longitudinal study was designed and commenced in 2000 and completed at the end of 2005. As discussed in Chapter 5, the Victorian Government charted some policy reviews and developments during this period which would have impacted upon the service delivery of EI. Prominent among these were: the “Victorian State Disability Plan 2002-2012”; “Report Outcomes of Autism in Victoria : An investigation of prevalence and service delivery for children aged 0-6 years” (2003) and the “Early Childhood Intervention Services vision and Key Priorities”(2003). This study was conducted among these changes in the service delivery of early childhood services, especially in the centre-based programs. The author expected that the changes in the EI service delivery would have impact upon the program outcomes of children participating in the study. The present study followed up a group of preschool-aged children with autism participating in either centre-based and ABA home-based EI programs in Victoria over a period of 12 months. Children’s progress was measured with respect to intellectual functioning, language abilities, interpersonal relationships and play; and severity of autism. The child characteristics such as the age of commencement at EI, severity of autism, level of cognitive and language abilities, and family coping strategies were studied in relation to intervention outcomes.

7.1 Aims

The aim of this longitudinal study was to compare treatment outcomes for young children with autism in treatment under different placements of EI (ABA home-based program, generic EI centre-based program or autism specific centre-based program) after a 12-month period. The age at commencement of EI program, IQ level, language abilities, interpersonal relationships, play skills, and autism severity were investigated in
relation to treatment outcomes as they were considered important factors relating to EI program outcomes for young children with autism. Research has shown that the age at commencement of EI, IQ level, language abilities and autism severity were predictive variables for good developmental outcomes (Ozonoff & Cathcart, 1998; Smith, Eikeseth, Klestrand, & Lovaas, 1997; Eikeseth et al., 2002; Gabriels, Hill, Pierce, & Rogers, 2001), while other studies have not identified specific factors relating to outcomes (Birnbauer & Leach, 1993; Smith, Groen, & Wynn, 2000). At the commencement of the longitudinal study, there were few studies comparing home-based EI programs and autism-specific centre-based EI programs. Subsequently, there was some research published in this area (Eikeseth et al., 2002; Howard et al., 2005). In a more recent two-year follow-up study of community-based early intensive behavioural intervention and specialist nursery provision for children with ASD (Magiati, Charman, & Howlin, 2007), results revealed that there were no significant group differences between the intensive behavioural home-based intervention ($N = 23$) and autism-specific nurseries ($N = 16$) for cognitive ability, language, play or severity of autism. The only difference approaching significance in favour of the intensive behavioural home-based intervention was Vineland daily living skills standard scores, with a large effect size. However, there were significant individual differences in progress, with intake IQ and language level best predicting overall progress. The present study examined similar variables in relation to treatment outcomes of young children with autism providing indicators of the impact of key factors, namely, intellectual functioning, language abilities, interpersonal skills, play skills and severity of autism, on treatment outcomes for young children under different EI placements.

It was hypothesised that in the present study young children with autism would make significant gains across developmental areas after a 12-month period of EI. However, the extent of gains may be differential in different developmental areas - cognitive abilities, language abilities and interpersonal and play skills. Moreover, the age at commencement of EI, the placement of EI (whether ABA home-based, or generic centre-based or autism specific centre-based) or the baseline IQ would have greatest impact upon the treatment outcomes of the young children with autism.

Furthermore, specific studies related to parental coping strategies with young children with autism were few. This study also examined whether parental coping
strategies were related to the developmental outcomes for young children with autism under different EI placements.

METHOD

7.2 Participants

Potential participants were recruited from EI centres in metropolitan Melbourne and from the Autism Behavioural Intervention Association (ABIA) via invitations listed in newsletters of the EI centres and the ABIA. Criteria for children to be involved in the study were that: (1) the children were in the age range of 3–5 years when they first entered an EI program; (2) the program that they entered was either a centre-based EI program or a home-based ABA program; (3) the children needed to have a confirmed diagnosis of an ASD by an autism assessment team, or by a paediatrician; (4) there were no major co-morbid medical diagnoses; and (5) they resided in Victoria in or near Melbourne. Children were first recruited in 2000 and the last child was recruited in early 2005. In total, 12 children from a range of EI programs in Victoria who met the criteria were recruited between 2000 and 2005. The 12 children were followed up over a period of 12 months from the time they first entered the EI program.

7.3 Materials

 Outcome measures for the child in the longitudinal study included cognitive ability, speech and language skills, interpersonal relationships, play and leisure skills and severity of autism. These variables were measured using standardised tests at baseline i.e., when the child first entered EI and again 12 months later at review. Coping strategies of the parent (either mother or the father) as primary carer of the child with autism, were also measured at baseline and at review. The child’s behaviour was observed in natural settings—at home (ABA home-based program), at preschool and/or at the EI centre, at baseline, and then again 6 and 12 months later.
**Instruments used**

**Leiter International Performance Scale, Revised (Leiter-R)**

The Leiter-R (Roid & Miller, 1997) was used to assess the cognitive functioning of the children in this study as it is a comprehensive nonverbal diagnostic assessment of the strengths and limitations of a child’s cognitive skills. The test is individually administered and is designed to assess the cognitive functions of children and adolescents aged between 2 years, 0 months and 20 years, 11 months. It is a reliable and valid scale of intelligence regardless of language or motor ability. Concurrent validity with the Stanford-Binet for 4- to 8-year-old children ranged from .69 to .93 (Roid & Miller, 1997). Correlations with the Wechsler Performance scale (WISC-III) ranged from .79 to .80 (Roid & Miller, 1997). The battery includes measures of nonverbal intelligence in fluid reasoning and visualisation, as well as visuospatial memory and attention. Results of the Leiter-R can determine whether the individual is functioning within the normal global range of intellectual ability. Only the Visualization and Reasoning (VR) Battery was used in the current study. The VR battery measures the abilities of fluid reasoning and fundamental visualisation. Fluid reasoning is considered a key component of intelligence (e.g., Carroll, 1993; Gustafsson, 1984), while visualisation is another fundamental component of nonverbal intelligence. For the age group two to five years, the VR battery includes:

1. **Figure Ground:** (The Find It Game) Identification of embedded figures or designs within a complex stimulus.
2. **Form Completion:** (The Put Together Game) Ability to recognise a ‘whole object’ from a randomly displayed array of its fragmented parts.
3. **Matching:** (The Matching Game) Discrimination and matching of visual stimuli; selection of response cards or manipulative shapes that match easel stimuli.
4. **Sequential Order:** (The Which Comes Next Game) Logical progressions of pictorial or figural objects; selection of related stimuli that progress in a corresponding order.
5. **Repeated Patterns:** (The Over and Over Game) Patterns of pictorial or figural objects that are repeated. Child supplies ‘missing’ portion of pattern by moving response cards into alignment with easel.
6. Picture Context: (The Belongs Together Game) Ability to recognise a pictured object that has been removed from a larger display (missing location indicated by markings) using visual contextual clues.

7. Classification: (The Goes Together Game) Categorisation of objects or geometric designs.

Together the fluid reasoning and fundamental visualisation give an estimate of cognitive functions as an IQ score.


The PLS–3 is a standardised language assessment tool measuring the language development of young children from birth to 6 years, 11 months (Zimmerman, Steiner, & Pone, 1992). The PLS–3 assessment tool was used as it provided standardised measures on the receptive, expressive and total language abilities of the child - standard scores and percentile ranks, and age equivalents on the Auditory Comprehension scale, Expressive Communication scale and the Total Language scale. The Auditory Comprehension Subscale is used to evaluate a child’s receptive language skills in the areas of attention, semantics, structure and integrative thinking skills. Tasks on the Expressive Communication subscale parallel those on the Auditory Comprehension subscale. The subscale tasks evaluate expressive language skills in the areas of vocal development, social communication, semantics, structure and integrative thinking. Tasks on integrative thinking skills assess a child’s ability to express him- or herself in a logical way.

The Vineland Social-Emotional Early Childhood Scales (Vineland SEEC Scales)

The Vineland SEEC Scales was used to examine a child’s feelings and relationships, and to document how he or she interacts in the home and external environment. It is an individually administered assessment of usual social and emotional functioning for children from birth through to 5 years, 11 months (Sparrow, Balla, & Cicchetti, 1998). As social functioning is a core deficit in young children with autism, the test helped to provide standardised data on the skills of paying attention, entering into intentional social interactions, understanding expressions of emotion, keeping relationships and developing self-regulation behaviours. The test comprises of three
scales—Interpersonal Relationships, Play and Leisure Time, and Coping Skills—and the Social-Emotional Composite. In the current study, only the Interpersonal Relationships and Play and Leisure Time scales were used as the two scales provide information on the two major deficits in behaviours in young children with autism. The Vineland SEEC Scales were derived from the Socialisation Domain of the Vineland Adaptive Behaviour Scales (Vineland ABS; Sparrow, Balla, & Cicchetti, 1984). The norms for the Vineland SEEC Scales were determined on the basis of the data used to construct the norms for the Vineland Adaptive Behaviour Scales, Expanded Form (Sparrow, Balla, & Cicchetti, 1998). The Vineland SEEC Scales are administered by means of a semi-structured interview with a respondent who is familiar with the child’s behaviour.

**Gilliam Autism Rating Scale (GARS)**

Severity of autism was measured in the current study using the GARS. The GARS is a behavioural checklist for the assessment of individuals aged 3 through to 22 years who have severe behavioural problems and it helps identify individuals who have autism (Gilliam, 1995). The GARS was chosen because it can be administered by someone who has direct, sustained contact with the referred person, including parents, teachers or therapists of the person referred. Items on the subtests are based on the definition of autism adopted by the Autism Society of America (ASA) (1994) and on diagnostic criteria for autistic disorders published in the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* (DSM–IV) (American Psychiatric Association, 1994). The GARS is comprised of four subtests, namely Stereotyped Behaviours, Communication, Social Interaction and Developmental Disturbances. Each subtest describes behaviours that are symptomatic of autism including the person’s development during early childhood. The GARS measures behaviours on the basis of how frequently they occur and provides useful data for quantifying the frequency and severity of autistic behaviour. Standard scores and percentiles are provided. The GARS sensitivity rate is .90, as reported by Gilliam (1995). Moderate correlations were found between the GARS, CARS and DSM-IV criteria (Gilliam, 1995). However, South et. al (2002) found that although reliability among the individual GARS scales was good, the GARS consistently underestimated the likelihood that autistic children in the studied sample would be
classified as having autism. The study further revealed that there was a lack of convergent validity between the GARS and expert clinicians’ ratings. However, South et al. commented that there was currently no good alternative surveillance measure for use by nonprofessionals, such as parents.

The author used the GARS for examining parental perception of autism in their children not for diagnostic purposes. The group of young children with autism in the longitudinal study all had a confirmed existing diagnosis by an autism assessment team or a paediatrician. Moreover, the severity of autism was also rated by the author, who was an experienced clinician in the field of autism using the Ritvo-Freeman Real Life Rating Scale. Any discrepancies may give pointers to differences between parental perception of their child’s severity of autism and other standardised measures of autistic behavioural symptoms such as Vineland SEEC scale scores or Ritvo-Freeman Real Life Rating Scale scores.

Ritvo-Freeman Real Life Rating Scale (RLRS)

The Ritvo-Freeman Real Life Rating Scale was originally developed by Freeman and Ritvo (1986) to evaluate the effects of specific treatments on symptomatic behaviours in clients with autism in real life settings. This scale is applicable in natural settings and was used in this study to quantify the observations of children in the study in their natural settings—whether at home, at preschool or at their EI centre. It can also be used by non-professional raters who can be trained to achieve significant inter-observer agreement. The scale is applicable to clients with all degrees of severity of autism in their natural settings. Highly significant correlations were found between behaviours/experiences rated on all scales (Freeman & Ritvo, 1986). It is scored by hand and can be repeated frequently without effecting validity or inter-observer agreement. The instrument contains 47 specific behaviours which are grouped into five scales: the sensory-motor scale, the social relationship to people scale, the affectual responses scale, the sensory response scale and the language scale. The client/child is observed over a 30-minute period. The occurrence of the behaviour, and frequency when it occurs, is scored according to the following scale: 0 = never, demonstrates the target behaviour; 1 = target behaviour, is witnessed only 1–3 times; 2 = target behaviour, is seen 4 or more times; and
3 = target behaviour, is witnessed almost constantly throughout the observation period. A mean score for each scale of behaviours (sensory-motor, social, affect, sensory and language) can be derived. Reverse scoring is used to subtract normal/appropriate behaviour from the subscales. An overall index for the Real Life Rating Scale is derived by combining the mean scores of the scales and dividing by the number of scales. When a second rater is present for the observation, it is recommended that raters should review definitions and observe and score patients until they reach 80% agreement.

**Ways of Coping (WAYS)**

The Ways of Coping questionnaire (Folkman & Lazarus, 1988) was designed to identify the thoughts and actions an individual has used to cope with specific stressful encounters. The WAYS was used to assess the coping behaviours of parents of a child with autism in the current study over a period of 12 months. The WAYS consists of 50 items (plus 16 filler items) within 8 scales empirically derived from the Ways of Coping Checklists developed in the 1970s by the stress and coping research group of Lazarus. This suggested two main functions of coping: problem-focused coping and emotion-focused coping (Lazarus, 1991). Since this classification did not reflect the complexity and richness of coping processes, a series of factor analyses with different data sets were carried out, generating over time the current version of the instrument now called the WAYS. The intercorrelations among these scales are rather low, confirming their desired distinctiveness (Schwarzer & Schwarzer, 1996). Confirmatory factor analyses of the original eight-factor scale model demonstrated support for this model (Lundqvist & Ahlstrom, 2006). Individuals respond to each item on a four-point Likert scale, indicating the frequency with which each strategy is used after a real-life stress situation that has been experienced during the week. The eight scales are:

1. **Confrontive Coping:** describes aggressive efforts to alter the situation and suggests some degree of hostility and risk-taking.

2. **Distancing:** describes cognitive efforts to detach oneself and to minimise the significance of the situation.

3. **Self-Controlling:** describes efforts to regulate one’s feelings and actions.
4. Seeking Social Support: describes efforts to seek informational support, tangible support, and emotional support.

5. Accepting Responsibility: acknowledges one’s own role in the problem with a concomitant theme of trying to put things right.

6. Escape-Avoidance: describes wishful thinking and behavioural efforts to escape or avoid the problem. Items on this scale contrast with those on the Distancing scale, which suggest detachment.

7. Planful Problem-Solving: describes deliberate problem-focused efforts to alter the situation, coupled with an analytic approach to solving the problem.

8. Positive Reappraisal: describes efforts to create positive meaning by focusing on personal growth. This also has a religious dimension.

The WAYS manual provides instructions for scoring the eight scales.

7.4 Procedure

The longitudinal study was approved by the RMIT University Human Research Ethics Committee in April 2000 (Appendix M) and an extension was approved by the Committee until December 2005 (Appendix N). The study commenced in 2000 and was completed at the end of 2005. Parents of the child signed a consent form (Appendix R) to participate in the longitudinal study. Parents were informed of the particulars of the project including the assessments involved with the child and the parent, and the observations of the child in different settings (i.e., home, preschool or EI centre) (Appendix O and Appendix P). Parents were also informed that the project was for the purpose of research and not for treatment and that they were free to withdraw at any time from the study. The child remained anonymous and would not be identified by name in the research findings or reports. Pseudonyms were used in all reports, papers and this thesis.

The child and their family were assessed just prior to or soon after they first began EI, and then again 6 and 12 months later. Each child’s progress in cognition, communication, interpersonal relationships, and play and leisure skills, as well as the severity of their autism, were measured using standardised tests at baseline and then 12 months later. The standardised assessments were conducted either at home, at
childcare/preschool or at EI centres by the author (90% of the assessments) with the assistance of a probationary psychologist (10% of the assessments) who has experience in conducting assessments. The author is a fully registered psychologist who has the capacity to supervise a probationary psychologist. The GARS which assessed the severity of autism was completed by the parent (mother or father) as primary carer of the child. The Vineland SEEC Scales interview which assessed the interpersonal relationships and play and leisure skills was conducted by the author with the parent. The child’s behaviour was observed by the author in natural settings—at home, at preschool or at the EI centre, at baseline, and then again 6 and 12 months later using the Ritvo-Freeman RLRS. In some cases, the children were enrolled in both EI and preschool programs, in which case their behaviour was observed in both settings where possible. To ensure the accuracy of observations, a second observer in this study was present for 20% of the observations, rating the child by the same observation schedule. Inter-observer agreement measures were obtained to determine the accuracy of scoring, the occurrence of a specific behaviour, and the occurrence or non-occurrence of specific behaviours. The most common convention for reporting inter-observer agreement measures is by determining the percentage of agreement between observers (Cooper, Heron, & Heward, 1987). The interobserver agreement is 80% in this study which is required for the users of the Ritvo-Freeman RLRS. Parents’ coping strategies were measured at baseline and then again 12 months later. The WAYS questionnaire was completed by the parent (either the mother or the father) as the primary carer of the child participating in the study.

7.5 Statistical Analysis

Paired sample t-tests were used to compare if there were significant differences in outcome measures between baseline assessment and review assessment in the areas of cognition, language, severity of autism, interpersonal relationships, and play and leisure skills.

Analyses of covariance (ANCOVA) using the age of start in the EI program and the baseline IQ as the covariates were conducted to determine whether there were significant differences in the areas of language, interpersonal relationships, and play and leisure skills when the effects of age of start and the baseline IQ were controlled.
Pearson correlations were conducted to examine whether there were relationships between the age of start in EI and pre- and post-assessment differences/gains in IQ, language, severity of autism, interpersonal relationships, and play and leisure skills; and real life rating scores from observations.

A trend analysis was conducted to compare the index scores for the three observation times (T1 – baseline, T2 – mid-intervention and T3 – review) at home, preschool or EI over the 12-month when the child attended EI.

Paired sample t-tests were used to investigate if there were significant differences in the pre- and post-measures of parental coping strategies. Also Pearson correlations were used to measure the relationships between variables including the age of start of the child in EI, the baseline IQ, and pre- and post-assessment differences/gains in language, severity of autism, interpersonal relationships, and play and leisure skills; and real life rating scores from observations; and the scores for parental coping strategies pre- and post-intervention.

### 7.6 Results

Twelve children from a range of EI programs in Victoria who met the criteria participated in the longitudinal study between 2000 and 2005. At entry, the mean age of the 12 participants was 49 months ($SD = 9.5$ months). The oldest child to enter the study was 62 months and the youngest was 33 months. These children all had a recent diagnosis of autism by a paediatrician with supporting documents, either letters or reports. Of the 12 children, 9 children had a diagnosis of Autism Spectrum Disorder, 2 children had a diagnosis of Asperger’s Syndrome and 1 child had a diagnosis of PDD-NOS. They had not been in any forms of EI before participating in the study.

The 12 children attended either one of the following EI program types in the course of the 12 months: a generic centre-based program, a whole-day autism-specific centre-based program, a half-day autism-specific centre-based program, ABA home-based program, mixed generic and autism-specific centre-based programs, or mixed ABA home-based and centre-based programs. In addition to their EI programs, 11 children attended either playgroup/childcare, preschool or school. One child attended EI only for
the first 10 months and in addition, attended preschool for the last two months during the 12-month assessment period.

Over the 12 months, some children changed EI and educational placements and therefore the author could not keep to the original aim of comparing different EI placements with a full attendance of 12 months in either a generic centre-based program, an autism-specific centre-based program or an ABA home-based program.

The criterion for classifying children in a combination of program treatments was that the child was required to spend at least 5 months in each of the programs in the combination. If the child spent less than 5 months in one of the programs, the child was grouped under the program type from which he received the most treatment in terms of duration during the 12-month assessment period. Thus, one child in the study who had received 10 months of EI at a generic centre before moving to an autism-specific centre was classified under ‘generic EI centre-based program’ for analysis of program outcomes.

In the course of the 12 months, out of the 12 children, 10 children attended EI regularly for the whole 12-month assessment period. One child only attended 8 months of centre-based EI as he then commenced school and did not therefore complete 12 months of EI as planned. One child had half-day autism-specific centre-based program for 10 months only but had one-on-one speech therapy throughout the 12 months. Another two children were classified as having their EI placements changed. In additions, one child commenced school after six months of preschool, however, the child had 12 months of ABA home-based program throughout the 12 months.

The final EI placements of the 12 children are listed in Table 7.1 below.

Table 7.1

<table>
<thead>
<tr>
<th>Types of EI placements</th>
<th>Number of children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic EI centre-based program</td>
<td>3</td>
</tr>
<tr>
<td>Whole-day autism-specific centre-based program</td>
<td>3</td>
</tr>
<tr>
<td>Half-day autism-specific centre-based program</td>
<td>2</td>
</tr>
<tr>
<td>Home-based ABA program</td>
<td>2</td>
</tr>
<tr>
<td>Combination of programs</td>
<td></td>
</tr>
<tr>
<td>- mixed centre-based programs (Generic and autism-specific)</td>
<td>1</td>
</tr>
<tr>
<td>- mixed home-based and centre-based programs</td>
<td>1</td>
</tr>
</tbody>
</table>
The nonverbal IQ, language abilities, interpersonal relationships, leisure and play, and severity of autism showed variability across the 12 children at baseline assessment i.e., when they first commenced EI. One child could not be assessed at baseline because of his significant developmental delay and thus no scores were obtained for the child in the areas of nonverbal IQ and language at baseline. The profiles of the children across the areas of development are listed in Table 7.2 below.

Table 7.2

Mean scores of children’s attainment in baseline assessment and review assessment

<table>
<thead>
<tr>
<th>Areas of Development</th>
<th>Mean (sd)</th>
<th>Range</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- nonverbal IQ baseline(SS)</td>
<td>103.6 (20.8)</td>
<td>59 to 131</td>
<td>11</td>
</tr>
<tr>
<td>- nonverbal IQ review(SS)</td>
<td>102.3 (26.7)</td>
<td>40 to 127</td>
<td>12</td>
</tr>
<tr>
<td>Total Language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- baseline (AE)</td>
<td>34.2 (15.0)</td>
<td>17 to 65</td>
<td>11</td>
</tr>
<tr>
<td>- review (AE)</td>
<td>48.3 (22.5)</td>
<td>16 to 81</td>
<td>12</td>
</tr>
<tr>
<td>Receptive Language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- baseline (AE)</td>
<td>36.09 (17.4)</td>
<td>15 to 68</td>
<td>11</td>
</tr>
<tr>
<td>- review (AE)</td>
<td>49.17 (23.0)</td>
<td>16 to 81</td>
<td>12</td>
</tr>
<tr>
<td>Expressive Language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- baseline (AE)</td>
<td>32.55 (14.75)</td>
<td>19 to 66</td>
<td>11</td>
</tr>
<tr>
<td>- review (AE)</td>
<td>48.00 (23.98)</td>
<td>14 to 82</td>
<td>12</td>
</tr>
<tr>
<td>GARS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- baseline (SS)</td>
<td>87.1 (14.3)</td>
<td>62 to 109</td>
<td>12</td>
</tr>
<tr>
<td>- review (SS)</td>
<td>85.8 (15.3)</td>
<td>55 to 108</td>
<td>12</td>
</tr>
<tr>
<td>Vineland Interpersonal Relationships</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- baseline (AE)</td>
<td>20.8 (13.0)</td>
<td>1 to 51</td>
<td>12</td>
</tr>
<tr>
<td>- review (AE)</td>
<td>38.7 (20.5)</td>
<td>6 to 70</td>
<td>12</td>
</tr>
<tr>
<td>Vineland Play and Leisure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- baseline (AE)</td>
<td>22.1 (12.7)</td>
<td>3 to 50</td>
<td>12</td>
</tr>
<tr>
<td>- review (AE)</td>
<td>36.8 (19.0)</td>
<td>10 to 70</td>
<td>12</td>
</tr>
</tbody>
</table>

Note: SS = Standard scores and AE = Age equivalent in months.

Paired sample t-tests were used to compare if there were significant differences in outcome measures between baseline assessment and review assessment in the areas of cognition, language, severity of autism, interpersonal relationships, and play and leisure skills. For cognition and language, only the scores of the 11 children that were assessed at baseline and at review were used in paired sample t-tests. For GARS, Vineland Interpersonal Relationships and Vineland Play and Leisure, the scores of all the 12
children were used. Results showed that there were no significant differences between baseline and review assessment scores in nonverbal IQ and GARS scores; however, there were significant differences in the areas of language, interpersonal relationships and play and leisure skills in terms of age equivalent attainments. In these three areas, there were gains of more than 12 months at the 12-month review assessment. The gains in age equivalent scores were 17 months for total language, 16 months for receptive language, 18 ½ months for expressive language, 18 months for interpersonal relationships and 15 months for play and leisure skills. These results are further detailed in Table 7.3 below.

Table 7.3

Results of Paired Sample Test between scores at baseline assessment and scores at review assessment

<table>
<thead>
<tr>
<th>Areas of Development</th>
<th>Mean difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonverbal IQ baseline</td>
<td>- 4.27 (SS)</td>
<td>t = -1.58</td>
<td>.15</td>
</tr>
<tr>
<td>- nonverbal review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total language baseline</td>
<td>- 17.09 (AE)</td>
<td>t = -5.74</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>- total language review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptive language baseline</td>
<td>- 16.09 (AE)</td>
<td>t = -5.34</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>- receptive language review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expressive language baseline</td>
<td>- 18.55 (AE)</td>
<td>t = -4.78</td>
<td>.001</td>
</tr>
<tr>
<td>- expressive language review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GARS baseline</td>
<td>1.33 (SS)</td>
<td>t = .39</td>
<td>.70</td>
</tr>
<tr>
<td>- GARS review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vineland Interpersonal Relationships</td>
<td>- 17.92 (AE)</td>
<td>t = -5.36</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>baseline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Vineland Interpersonal Relationships review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vineland Play and Leisure baseline</td>
<td>- 14.75 (AE)</td>
<td>t = -4.79</td>
<td>.001</td>
</tr>
<tr>
<td>baseline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Vineland Play and Leisure Review</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: SS = Standard scores and AE = Age equivalent.

The age of the children and their cognitive abilities may be factors affecting the gains children made after the 12-month period. Analyses of covariance (ANCOVA) using
the age of start at the EI program as the covariate were conducted to determine whether there were still significant differences in the areas of language, interpersonal relationships, and play and leisure skills. The results of this analysis are shown in Table 7.4 below.

Table 7.4

*Results of ANCOVA using age of start at EI as the covariate in the areas of language, interpersonal relationships, and leisure and play*

<table>
<thead>
<tr>
<th>Areas of Development</th>
<th>$\Lambda$</th>
<th>$N$</th>
<th>$F$</th>
<th>Degrees of Freedom</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total language baseline - total language review (+age of start)</td>
<td>.97</td>
<td>11</td>
<td>.27</td>
<td>1, 9</td>
<td>.62</td>
</tr>
<tr>
<td>Receptive language baseline - receptive language review (+age of start)</td>
<td>.98</td>
<td>11</td>
<td>1.55</td>
<td>1, 9</td>
<td>.70</td>
</tr>
<tr>
<td>Expressive language baseline - expressive language review (+age of start)</td>
<td>.77</td>
<td>11</td>
<td>2.67</td>
<td>1, 9</td>
<td>.14</td>
</tr>
<tr>
<td>Vineland Interpersonal Relationships baseline - Vineland Interpersonal Relationships review (+age of start)</td>
<td>.75</td>
<td>12</td>
<td>3.31</td>
<td>1, 10</td>
<td>.10</td>
</tr>
<tr>
<td>Vineland Play and Leisure baseline - Vineland Play and Leisure Review (+age of start)</td>
<td>.98</td>
<td>12</td>
<td>.22</td>
<td>1, 10</td>
<td>.65</td>
</tr>
</tbody>
</table>

Analyses of covariance (ANCOVA) using the IQ at baseline as the covariate were conducted to see if there were significant differences in the areas of language, interpersonal relationships, and play and leisure skills. The results of this analysis are displayed in Table 7.5 below.
Results from the ANCOVA analyses in Table 7.4 and in Table 7.5 showed that there were no significant gains in the areas of language, interpersonal relationships, or play and leisure skills when the influence of age of start or the IQ at baseline was controlled. The gains in months in age-equivalent developmental age in language, interpersonal relationships, and play and leisure skills after one year of intervention were not independent of the influence of the age or IQ of the child.

Table 7.5

*Results of ANCOVA using IQ score at baseline as the covariate in the areas of language, interpersonal relationships, and leisure and play*

<table>
<thead>
<tr>
<th>Areas of Development</th>
<th>Λ</th>
<th>N</th>
<th>F</th>
<th>Degrees of Freedom</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total language baseline - total language review (+IQ at baseline)</td>
<td>.88</td>
<td>11</td>
<td>1.28</td>
<td>1, 9</td>
<td>.29</td>
</tr>
<tr>
<td>Receptive language baseline - receptive language review (+IQ at baseline)</td>
<td>.89</td>
<td>11</td>
<td>1.07</td>
<td>1, 9</td>
<td>.33</td>
</tr>
<tr>
<td>Expressive language baseline - expressive language review (+IQ at baseline)</td>
<td>.82</td>
<td>11</td>
<td>2.0</td>
<td>1, 9</td>
<td>.19</td>
</tr>
<tr>
<td>Vineland Interpersonal Relationships baseline - Vineland Interpersonal Relationships review (+IQ at baseline)</td>
<td>.97</td>
<td>11</td>
<td>.29</td>
<td>1, 9</td>
<td>.60</td>
</tr>
<tr>
<td>Vineland Play and Leisure baseline - Vineland Play and Leisure Review (+IQ at baseline)</td>
<td>.99</td>
<td>11</td>
<td>.12</td>
<td>1, 9</td>
<td>.74</td>
</tr>
</tbody>
</table>

However, there were specific patterns of individual differences identified by Pearson correlations. The age at the start of EI is considered an important factor affecting program outcomes such as IQ gains, language gains and improvement in social-emotional
functioning. The critical factors affecting treatment outcomes were discussed in relation to current research in sections 3.2, 5.9 and 6.10. In the present longitudinal study, Pearson correlations indicated: (1) a significant relationship, $r (N = 12) = .71, p = 0.01$, between the age of start at the EI and the improvement (gains in developmental age) in Vineland Interpersonal Relationships measures (Figure 7.1); (2) a significant trend of the lower the age of start in EI, the larger IQ gains that were obtained after a 12-month of intervention: $r (N = 11) = -.70, p = .016$ (Figure 7.3); and (3) a significant trend that older children had a higher expressive language gain after a 12-month of intervention: $r (N = 11) = .67, p = .024$ (Figure 7.5).

Figure 7.1 shows the relationships between the Vineland Interpersonal Relationships gains in developmental age (Vineland IPD) and the age of start in EI, in months. The EI program that the child attended is also labelled. The graph shows a positive linear relationship between the age of start in EI and the gain in developmental months in interpersonal relationships after a year of intervention. The trend showed the older a child is, the more gains they will have in interpersonal relationships after a year of intervention.

Figure 7.2 showed the gains in Vineland Interpersonal Relationships by program types. The graph showed that two older children, aged 55 months and 62 months at start of EI, who had the two highest gains in interpersonal relationships (>30 developmental months) attended whole-day autism-specific centre-based programs. The points are labelled with the child’s age in months.
Figure 7.1 The relationships between the Vineland Interpersonal Relationships gains in developmental age (VinelandIPD) and the age of start in EI, labelled by EI program types.

Figure 7.2 The gains in developmental ages for children in Vineland Interpersonal Relationships by EI program types.
Figure 7.3 showed the trend that the lower the age of start in EI, the larger IQ gains that were obtained after a year of intervention. Two older children showed a negative gain in nonverbal IQ (i.e. their IQ scores went down) when assessed after a year of intervention.

Figure 7.3 The relationship between IQ differences and age of start in EI programs, labelled by program types.

Figure 7.4 showed the relationship between the program types and the differences in IQ for the 11 children being assessed at both times in the study, labelled by age. The two highest scores in IQ gains (>10 IQ points) were for younger children, aged 33 months and 38 months—one from an autism-specific centre-based program and the other one from an ABA home program. In general IQ gains were small.

Figure 7.5 showed the trend that older children had a higher expressive language gain (ExpressLangD) after a year of intervention. The 3 children who had a gain of more than 30 months (measured by developmental age) in expressive language gains were aged 55 months, 56 months and 62 months, when they commenced either in a ABA home-based program or a whole day autism specific centre-based program (Figure 7.6).
Figure 7.4 The relationship between program type and differences in IQ of the 11 children being assessed in the study, labelled by age of start in the program.

Figure 7.5 The relationship between expressive language differences and age of start in EI programs.
There were no significant relationships found between the age of start and receptive language gains, total language gains, Vineland Play and Leisure measures or GARS measures.

Pearson correlations indicated that from the assessment results for the 11 children in both pre- and post-assessments, the IQ measures were significantly correlated with language gains (see the graphs from Figure 7.7 to Figure 7.10 below). The results were: \( r (N = 11) = 0.64, p = .03 \) for IQ baseline measures and total language gains; \( r (N = 11) = 0.65, p = .03 \) for IQ review measures and total language gains; \( r (N = 11) = 0.60, p = .05 \) for IQ baseline measures and receptive language gains; \( r (N = 11) = 0.63, p = .04 \) for IQ review measures and receptive language gains; \( r (N = 11) = 0.65, p = .03 \) for IQ baseline measures and expressive language gains. Also the Pearson correlation for IQ baseline measures and IQ review measures is highly significant – \( r (N=11) = .90, p < .001 \). There were no significant relationships between IQ review measures and expressive language gains. These trends show that IQ measures are good predictors of language improvements in children with ASD in EI.

Figure 7.6 The relationship between program type and differences in expressive language skills of the 11 children being assessed in the study, labelled by age of start in the program.
Figure 7.7 The relationship between total language differences by age equivalent attained and IQ baseline measures and IQ review measures.

Figure 7.8 The relationship between receptive language differences by age equivalent attained and IQ baseline measures and IQ review measures.

Figure 7.9 The relationship between expressive language differences by age equivalent attained measures and IQ baseline measures

Figure 7.10 The correlation between IQ baseline measures and IQ review measures
There were no significant relationships found between IQ measures and Vineland Play and Leisure measures, Vineland Interpersonal Relationships measures or GARS measures.

The 12 children in the study were rated with the Ritvo-Freeman RLRS when they were observed at either preschool/childcare or home at baseline; at 6-month at preschool/childcare or EI program or both where possible; and at 12-month at school/preschool or EI program or both where possible. The index scores of the Real Life Rating Scale provided data for the behaviours indicative of autism at pre-intervention, mid-intervention and post-intervention. The following table provided the index scores at the three points of observation times (T1 – baseline, T2 – mid-intervention and T3 – review). For Danny, the mid-intervention observation was not possible because of a family crisis.

Table 7.6
Results of index scores of the Ritvo-Freeman Real Life Rating Scale (RLRS) of the 12 children observed at T1-baseline, T2-mid-intervention and T3-review

<table>
<thead>
<tr>
<th>Cases</th>
<th>RLRS scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>1. John</td>
<td>.50</td>
</tr>
<tr>
<td>2. Jessie</td>
<td>.59</td>
</tr>
<tr>
<td>3. Sam</td>
<td>.59</td>
</tr>
<tr>
<td>4. Benjamin</td>
<td>.11</td>
</tr>
<tr>
<td>5. Joshua</td>
<td>.24</td>
</tr>
<tr>
<td>6. Corey</td>
<td>.05</td>
</tr>
<tr>
<td>7. Michael</td>
<td>-.18</td>
</tr>
<tr>
<td>8. Danny</td>
<td>1.08</td>
</tr>
<tr>
<td>9. Abbey</td>
<td>.50</td>
</tr>
<tr>
<td>10. Lachlan</td>
<td>.84</td>
</tr>
<tr>
<td>11. Lucas</td>
<td>.55</td>
</tr>
<tr>
<td>12. Liam</td>
<td>.42</td>
</tr>
</tbody>
</table>

Notes: T1: Baseline; T2PS: 6-month at preschool; T2EI: 6-month at EI; T2AV: 6-month average of preschool and EI scores; T3PS/S: 12-month at preschool or school; T3EI: 12-month at EI; T3AV: 12-month average of preschool/school and EI scores
A trend analysis was conducted to compare the index scores for these three points of observation times (T1 – baseline, T2AV – mid-intervention and T3AV – review) over the one year of intervention. Figure 7.11 shows the change in time that demonstrated a significant quadratic trend: F(1,10) = 7.13, \( p = .024 \). Post-hoc testing was carried out using pairwise comparisons of estimated marginal means with Bonferroni adjusted \( \alpha \) levels. Significant differences were found between T1 and T2AV, \( p = .002 \); between T2AV and T3AV, \( p = .015 \); and between T1 and T3AV, \( p < .001 \).

![Estimated Marginal Means of MEASURE_1](image)

**Figure 7.11** The trend analysis of index scores of the Ritvo-Freeman Real Life Rating Scale for: Time 1 – baseline (T1), pre-intervention; Time 2 – mid-intervention (T2AV); Time 3 – review (T3AV), post-intervention.

The significant trend suggests that children after attending EI for six months, demonstrated a reduction of autism-related behaviours (sensory-motor, social, affect, sensory and language) and that the effect level tapered off during the next six months in which the reduction of similar behaviours was less drastic.

Further paired sample \( t \)-tests revealed that there was a significant difference between index scores for EI(T2EI) and Preschool(T2PS) at Time 2, \( t (5) = 7.88, p = .001 \) while there was no such significant difference at Time 3 between T3EI and T3PS/S,
EI had a mean score of -0.08 for autism-related behaviours (a negative score indicates significant less autistic behaviours) at Time 2. Compared to the same period at Preschool, the index score was 0.06 for autism-related behaviours (a positive score indicates the presence of autistic behaviours) observed at Time 2. These results suggest that the major improvement in the first six months which was seen at EI, did not occur at Preschool.

As discussed earlier in the section 7.6, the age of the children and their cognitive abilities were factors that may affect the developmental gains children made over the year. Analyses of covariance (ANCOVA) using the age of start of the EI program as the covariate and using the IQ baseline as the covariate were conducted to determine whether there were still significant differences in the severity of autism as rated on the Ritvo-Freeman Real Life Rating Scale pre- and post- intervention. The results of this analysis are shown in Table 7.7 below.

Table 7.7

*Results of ANCOVA using age of start of EI and IQ baseline as the covariates in the areas of severity of autism by the Ritvo-Freeman Real Life Rating Scale (RLRS) scores.*

<table>
<thead>
<tr>
<th>Ritvo-Freeman RLRS scores</th>
<th>$\Lambda$</th>
<th>$N$</th>
<th>$F$</th>
<th>Degrees of Freedom</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>RLRS baseline scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- RLRS review scores (+age of start)</td>
<td>.20</td>
<td>12</td>
<td>39.45</td>
<td>1, 10</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>RLRS baseline scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- RLRS review scores (+IQ at baseline)</td>
<td>.70</td>
<td>11</td>
<td>3.86</td>
<td>1, 9</td>
<td>.08</td>
</tr>
</tbody>
</table>

Results from the ANCOVA analyses in Table 7.7 showed that the significant difference between RLRS baseline and review scores was independent of the influence of age but not independent of the cognitive abilities of the child.

Further pairwise Pearson correlation analyses revealed the following trends: (1) the lower the age of start in EI, the more reduction of autism-related behaviour was
observed after a year of intervention, \( r (N = 12) = .80, p=.002 \). The correlation between IQ at baseline and differences in RLRS baseline and review scores was not significant.

**Parent Coping**

Apart from the children with autism being assessed pre- and post-intervention after a year of intervention, their parents’ coping strategies were also measured at baseline and at review after a year. A total of 12 parents completed the questionnaires at both times.

Table 7.8  
*Results of Paired Sample Test between relative scores of WAYS at baseline assessment and scores at review assessment*

<table>
<thead>
<tr>
<th>Coping Strategies</th>
<th>TI-T2 difference score (T1score -T2 score)</th>
<th>N</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping baseline - confrontive coping review</td>
<td>.004 (.117 - .113)</td>
<td>12</td>
<td>t=.20</td>
<td>.84</td>
</tr>
<tr>
<td>Distancing baseline - distancing review</td>
<td>.074 (.103 - .096)</td>
<td>12</td>
<td>t=.31</td>
<td>.76</td>
</tr>
<tr>
<td>Self-controlling baseline - Self-controlling review</td>
<td>-0.19 (.128 - .148)</td>
<td>12</td>
<td>t = -1.10</td>
<td>.30</td>
</tr>
<tr>
<td>Seeking social support baseline - seeking social support review</td>
<td>- .010 (.171 - .181)</td>
<td>12</td>
<td>t = -5.17</td>
<td>.62</td>
</tr>
<tr>
<td>Accepting responsibility baseline - accepting responsibility review</td>
<td>-.001 (.086 - .087)</td>
<td>12</td>
<td>t = -.03</td>
<td>.98</td>
</tr>
<tr>
<td>Escape avoidance baseline - escape avoidance review</td>
<td>.007 (.062 - .055)</td>
<td>12</td>
<td>t = .34</td>
<td>.74</td>
</tr>
<tr>
<td>Planful problem-solving baseline - planful problem-solving review</td>
<td>-.023 (.198 - .222)</td>
<td>12</td>
<td>t=.84</td>
<td>.42</td>
</tr>
<tr>
<td>Positive reappraisal baseline - positive reappraisal review</td>
<td>.032 (.132 - .100)</td>
<td>12</td>
<td>t = 1.10</td>
<td>.30</td>
</tr>
</tbody>
</table>
Paired sample $t$-tests were used to investigate if there were significant differences between the pre- and post- measures of parental coping strategies. Results in Table 7.8 showed that no significant differences were found in parental coping strategies at baseline assessment and at review, 12-month after the child had intervention.

Pearson correlations were used to measure the relationships between the age of start of the child in EI and the score differences of parental coping strategies pre- and post-intervention. There were significant relationships between age of start in EI and: (1) the score difference for the strategy of positive reappraisal, $r (N = 12) = .65, p = .02$; (2) the score difference for confrontive coping strategy, $r (N = 12) = .60, p = .05$; and (3) the score difference for distancing strategy, $r (N = 12) = -.68, p = .02$. These results suggest that parents did more reappraisal, adopted more confrontive strategies and used less distancing strategies when their children were older when they commenced EI.

Pearson correlations were used to measure the relationships between the IQ at baseline and the score differences of parental coping strategies pre- and post-intervention. Only one significant relationship was found between IQ at baseline and the score difference of the accepting responsibility strategy, $r (N=11) = -7.3, p=.01$. The result indicated that the lower the IQ, the more the parent would use accepting responsibility as a coping strategy.

Pearson correlations also revealed the following significant relationships between score differences for confrontive coping and (1) baseline language abilities; and (2) baseline interpersonal and play skills. These results revealed that the better the receptive, expressive and total language abilities of the child at baseline, the more confrontive coping strategies the parents adopted (refer to Table 7.9).

Significant correlations were found between IQ gains and score differences for strategies of : (1) distancing and (2) positive reappraisal (refer to Table 7.9). The results suggest that parents adopted more positive reappraisal when their children made less IQ gains while parents adopted more distancing when their children make more IQ gains.

Further Pearson correlation analyses revealed the following significant relationships: (1) parents adopted more confrontive coping strategies at review when the child showed less reduction of autism-related behaviour after a year of intervention, $r (N = 12) = .64, p=.025$; and similarly (2) parents adopted more positive reappraisal strategies
at review when their child made less reduction of autism-related behaviour after a year of intervention, \( r (N = 12) = .61, p=.034 \). No other significant relationships were found between autism-related behaviours of the child and coping strategies of the parents.

Table 7.9

*Results of significant Pearson correlations between coping strategies of parents and key variables in the study*

<table>
<thead>
<tr>
<th>Coping Strategies</th>
<th>Variables</th>
<th>( N )</th>
<th>( r )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping (.004)</td>
<td>Total Language (baseline)</td>
<td>11</td>
<td>( r=.78 )</td>
<td>( .005 )</td>
</tr>
<tr>
<td>Confrontive coping (.004)</td>
<td>Expressive Language (baseline)</td>
<td>11</td>
<td>( r=.79 )</td>
<td>( .004 )</td>
</tr>
<tr>
<td>Confrontive coping (.004)</td>
<td>Receptive Language (baseline)</td>
<td>11</td>
<td>( r=.72 )</td>
<td>( .013 )</td>
</tr>
<tr>
<td>Confrontive coping (.004)</td>
<td>Vineland interpersonal (baseline)</td>
<td>12</td>
<td>( r=.72 )</td>
<td>( .009 )</td>
</tr>
<tr>
<td>Confrontive coping (.004)</td>
<td>Vineland play and leisure (baseline)</td>
<td>12</td>
<td>( r=.63 )</td>
<td>( .029 )</td>
</tr>
<tr>
<td>Confrontive coping (.004)</td>
<td>IQ (difference between baseline and review)</td>
<td>11</td>
<td>( r=-.60 )</td>
<td>( .05 )</td>
</tr>
<tr>
<td>Distancing (.074)</td>
<td>IQ (difference between baseline and review)</td>
<td>11</td>
<td>( r=.68 )</td>
<td>( .02 )</td>
</tr>
<tr>
<td>Positive reappraisal (.032)</td>
<td>IQ (difference between baseline and review)</td>
<td>11</td>
<td>( r=-.62 )</td>
<td>( .04 )</td>
</tr>
</tbody>
</table>

7.7 **Discussion**

In studying the effects of EI programs, one of the challenges discussed in Chapter 1 was to identify the factors that contribute to positive developmental outcomes. Duration and intensity of intervention, age, IQ, language level and autism severity were reported to
be predictive variables in some studies (Eikeseth et al., 2002; Gabriels, Hill, Pierce, & Rogers, 2001). Matson and Smith (2008) noted the importance of considering the effects of severity of ASD symptoms and intellectual functioning on treatment outcomes. There have been other studies that compared home-based ABA programs and autism-specific school-based programs (Eikeseth et al., 2002; Howard et al., 2005, Sheinkopf & Siegel, 1998). The recent study by Magiati, et al. (2007) indicated that home-based ABA programs as implemented in the community, and autism-specific nursery provision produced comparable outcomes after two years of intervention.

In the present longitudinal study, the age of start at the EI program, IQ gains/differences, improvement in social-emotional functioning and language gains were studied as they are important factors related to the outcomes of EI programs, as discussed above and in Chapter 3. This longitudinal study presented data on 12 children with ASD after a year of intervention, either in a generic centre-based EI program which catered for children with developmental problems including ASD, or in an EI centre-based program specific for children with ASD, or in a home-based ABA program. Two children did not complete 12-month of EI as planned. One child attended 8 months of centre-based EI as he then commenced school. One child had half-day autism-specific centre-based program for 10 months and then opted for individual speech therapy.

The original intention was to compare the program outcomes across the three categories of EI. However, over the 12 months, two children changed EI placements, preventing these comparisons. However, no matter which program the child was in, the data showed improvements in raw scores or age equivalent scores in many developmental areas for all 12 children, although standard scores changed little over time. Overall, there were no significant differences between baseline and review assessment scores in nonverbal cognitive abilities, language, interpersonal relationships, play and leisure skills and autism severity as rated by parents when the age of start in EI or the IQ at baseline was controlled. However, a significant pre- and post- intervention difference in severity of autism-related behaviour rated by the author independent of the influence of age was found. The result showed that children reduced their autism related behaviour after a year of intervention.
Moreover, specific trends related to changes from baseline assessment to review assessment (difference scores) were identified. Firstly, significant trends for (1) the lower the age at start, the larger the IQ gains; (2) the higher the age at start, the larger the expressive language gains, and (3) the lower the age of start, the more reduction of autism-related behaviour was observed in natural settings (i.e., home, childcare/preschool and /or EI settings). These results suggest that the age of commencement at EI is crucial to the gains that the children can make under EI treatment. Research evaluating age of EI intake as a predictor of developmental outcomes for children with autism primarily used educational placement as the primary outcome. Younger age at EI intake was related to placement in regular education at discharge (Harris and Handleman, 2000; Fenske, Zalenski, Krantz, and McClannahan, 1985). The present study revealed trends that younger age was related to gains in crucial child developmental areas, namely IQ and reduction of autism-related behaviour. Granpeesheh et al. (2009) also found that the younger children with autism showed a greater benefit from increased treatment hours when compared to older children with autism. However, as contrary to most literature findings, the present study found that the older the children at commencement of EI, the greater gains they made in expressive language after a year of intervention.

Secondly, IQ scores (both baseline and review scores) and language gains were significantly correlated, indicating that IQ measures can be good predictors of language improvements in children with ASD in EI. These results are consistent with other findings that the cognitive abilities of children with autism correlated with outcome of therapy (Szatmari, Bryson, Boyle, Streiner, & Duku, 2003). In the present study, a higher IQ score in both baseline and review was correlated with a better gain in language abilities after a year of intervention. The study of Gabriels, Hill, Pierce, & Rogers (2001) also showed that high functioning children with autism (with a higher IQ > 85) progressed over time with significant improvement in linguistic skills.

Thirdly, other patterns identified in the present study were: (1) highest gains in IQ over the year of intervention were from two younger children (aged 33 and 38 months) in an ABA home-based program and an autism-specific centre-based program respectively; (2) two children who were older (55 months and 62 months) and attended whole-day autism-specific centre-based programs had highest gains in interpersonal
relationships; and (3) three older children had the highest gains in expressive language were from an ABA home-based program (one child) and a whole-day autism-specific centre-based program (two children). Although group comparisons among the EI placements were not possible because of the small sample size, the patterns depicted from the profile of results showed that the children who did best were in home-based ABA programs or in autism-specific centre-based programs; older children had higher gains in interpersonal relationships and expressive language; and younger children had larger IQ gains after a year of intervention. There were few studies comparing home-based EI programs and autism-specific centre-based EI programs. In a more recent two-year follow-up study of community-based early intensive behavioural intervention and specialist nursery provision for children with ASD (Magiati, Charman, & Howlin, 2007), there were no significant group differences between the intensive behavioural home-based intervention and autism-specific nurseries for cognitive ability, language, play or severity of autism. Similarly, as discussed above, there were no significant differences between baseline and review assessment scores in nonverbal cognitive abilities, language, interpersonal relationships, play and leisure skills and autism severity as rated by parents when the age of start in EI or the IQ at baseline was controlled in the current study. However, correlation tests revealed that there were differential outcomes depending on the type of EI program that the child was enrolled in. Future research should consider the type of intervention as an important factor in effecting differential developmental outcomes in young children with autism.

Another significant finding was that children after attending EI for six months demonstrated a larger reduction in autism-related behaviours (sensory-motor, social, affect, sensory and language) than the reduction in similar behaviours in the following six months, and this effect appeared to be more prominent in an EI setting in the first six months than in the preschool setting.

However, because of the small sample size and that some families changed EI placements in the present study, further tests with a larger sample size and distinct groups are required to validate the results.

For parents, there were no significant differences in the pre- and post-intervention measures for parental coping strategies over the year during which their children were in
EI. However, there was some evidence that the parents did more reappraisal, adopted more confrontive strategies and less distancing strategies when their children were older i.e., near school age. These results are consistent with current literature that parents of children with autism focused on taking active steps to gain mastery of the course of events and generally adopt a more active coping style than parents of children without a disability (Berhr and Murphy, 1993; Taylor, 1983; Bristol and Schopler, 1984). Also there were trends that (1) the higher the IQ of the child at baseline, the less the parent would use accepting responsibility as a coping strategy; and (2) the better the receptive, expressive and total language abilities of the child at baseline, the more confrontive coping strategies the parents adopted. The results are consistent with Lee’s (2009) findings that parents of children with high functioning autism and good language skills tend to be practical and problem-focused.

The above trends are further discussed with the case studies in Chapter 8.
CHAPTER 8
A LONGITUDINAL STUDY OF TWELVE YOUNG CHILDREN WITH AUTISM IN EARLY INTERVENTION

INTRODUCTION

This chapter is a discussion of the 12 individual cases from Chapter 6. The progress of these 12 children with autism was followed over a period of 12 months from the time they first entered the EI program between 2000 and 2005. The following sections present the results of the case studies in the longitudinal study.

8.1 Results of the longitudinal study

The procedure of the study was described in Chapter 7 section 7.4 and the scores of the assessment results for individual children are listed in Appendix S. The assessment results include baseline and review measurement scores on cognition, language skills, interpersonal relationships skills, play and leisure skills, and severity of autism.

8.1.1 Case Study 1

John, aged 4 years (participation commenced in 2000)

John lived with his parents and his older brother (aged seven) who was at school. His parents were born overseas and John’s mother worked full-time as a manager, which required some travelling. John’s father stayed at home to care for him and his older brother. John was diagnosed with autism spectrum disorder by an autism team at a private hospital at the age of 3 years, 9 months, and received with a Childhood Autism Rating Scale (CARS) score of 33. The team consisted of a paediatrician, a clinical psychologist and a speech pathologist.

John’s preschool teacher expressed concerns early on about John’s limited language skills, reduced eye contact and poor social skills. John’s parents were also concerned about John’s level of development as compared to other children of his age, particularly with regard to his social communication and interactions. John’s father noted
that John seldom interacted with other children at the preschool and that he engaged in either solitary or parallel play. John was also observed to be echolalic, repeating both sides of the conversations that he heard. He did not initiate exploration of his environment, was mostly passive and engaged in solo activity. His affect was generally flat, and he acted on his own terms. His play skills and imitation skills were very limited. Both his vision and his hearing were assessed to be normal.

His medical and developmental history revealed that there were no problems reported at birth, and that early motor and speech development were reported to be normal up until the age of two years.

The results from the report of the autism assessment revealed that John had severe pragmatic difficulties and severely impaired receptive and expressive language skills. A cognitive assessment using the Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-R) was attempted by a psychologist as part of the team assessment but was abandoned because John was unable to follow instructions or to attend to the task at hand as reported. The results of the Vineland Adaptive Behaviour Scales assessment revealed deficits in the areas of communication, daily living skills and socialisation. John’s overall behaviour profile at the time of the diagnostic assessment included severely reduced eye contact, engagement in echolalia, inappropriate pragmatic utterances, reduced attention, limited play, and deficits in adaptive functioning in the areas of socialisation and interpersonal relationships. These features in his behavioural profile were considered to be consistent with a diagnosis of an autism spectrum disorder.

After the autism team assessment, John attended an EI program which catered for children with varying types and degrees of delay. He attended the program for two terms of an academic year (half a year) for three hours per week, and was transferred to an EI centre that specifically catered for children with autism for another two terms (half a year) for six hours per week. His parents chose to transfer John because John’s name came up on the waiting list of the autism-specific EI program for a full-day program per week. In addition to the EI program, John also attended a preschool program for 12 hours per week. When John was under assessment for 12 months in the longitudinal study, John’s father attended a parental educational course for young children with autism.
The baseline assessment was taken when John was four years old when he first started the EI program which catered for children with varying types and degrees of delay, and the review assessment was concluded after 12 months, when John was five years old. The details of the assessment scores are presented in Tables 8.1 to 8.4.

The baseline assessment revealed that John had significant deficits in his receptive and expressive language skills and his pragmatic skills were observed to be significantly delayed as well. The cognitive assessment was administered but a significant degree of effort was required to keep John’s attention on the task. The results of the Leiter-R visualisation and reasoning battery revealed that John’s non-verbal IQ was within the average range. On the Vineland Social and Emotional Scales, the developmental age that John attained on the interpersonal relationships scale was one year and eight months, and the developmental age that John attained on the play and leisure time scale was two years and two months.

On the Gilliam Autism Rating Scale (GARS) that was completed by John’s father, John attained an autism quotient in the average range for the probability of autism. His overall profile showed a relatively high score in the communication domain which indicated that John manifested most features of autism in this domain. This included repeating words out of context, reduced eye contact and failure to initiate conversation with peers and adults.

The descriptive data for the preschool observation at the baseline assessment showed that John frequently paced across the room, rarely initiated appropriate physical interaction, and did not respond appropriately to interaction attempts or activities in his environment. John isolated himself all of the time. He frequently ignored interaction attempts and changed from one activity to another without staying on any one task for long. The sensory responses noted included watching objects, staring, uttering repetitive vocalisations, non-communicative use of echolalia and immediate echolalia. Other observations included: (1) completely tuning out in a group setting; being oblivious to what was happening in the group; (2) ignoring the greeting attempts of the examiner; and (3) remaining in the home corner and being unable to initiate or participate in any sequential play. Conversely, some positive observations were also noted. These included that: (1) John was able to wash his hands independently; (2) when he completed a puzzle,
he said, ‘finished’ to himself; and (3) he was able to answer very simple questions posed by the teacher—for example, when the question asked was ‘What do you want?’ John replied ‘I want green’. John’s overall quantitative score on the autism real-life rating scale was 0.5.

The mid-year observation of John in his EI program showed that John was pacing less frequently across the room, had increased initiation of appropriate physical interaction with others and responded sometimes to appropriate interaction attempts or activities in his environment. He spoke to another child and responded to teachers’ questions appropriately. However, John was oblivious to the presence of the examiner and was singing to himself. At this time, he still frequently changed from one activity to another without staying on one task for long. He was able to choose a song with the help of ‘Compics’. He manifested fewer repetitive, stereotypical behaviours and was less inclined to line up objects in the supported setting. However, he still scrutinised objects and stared. There was some guided appropriate use of language in response to questions; for example, in response to ‘Do you need help?’ he replied, ‘Yes’, and to, ‘What else do we need?’ he answered, ‘Paper’. Most of the time, John rarely initiated communication. Echolalia and non-communicative vocalisations were still noted. His overall quantitative score on the autism real-life rating scale was 0.29.

After one year of intervention in two EI programs, John was observed in the preschool and also at the EI. In the preschool setting, John was aware of the examiner’s presence where previously he had not been. For example, he greeted the examiner. When John was left alone, he still wandered around and talked to himself, engaged in solitary play, and stayed in the tree house and the bathroom, away from the main group. When guided, he was able to follow instructions and respond appropriately. The teacher read a book to him and he was able to initiate some ideas appropriately, such as ‘very icy’ and he followed instructions to turn the pages of a book. His overall quantitative score on the autism real-life rating scale was 0.19. In the supported autism-specific EI program, John responded to interaction attempts and activities in his environment more frequently. He used objects appropriately and was led from one activity to another without much free time on his own. There was not a lot of communicative use of language, but there was less staring, scrutiny and no lining up of objects. While participating in the activities, he
was able to identify feelings. His overall score on the autism real-life rating scale reduced to -0.06, indicating that the number of his appropriate responses was greater than his inappropriate responses within this environment.

The review assessment showed that John still had significant deficits in his receptive and expressive language skills and his pragmatic skills were still observed to be delayed. The developmental age equivalent for John’s total language was two years and six months—an increase of eight months in developmental age from the baseline assessment. John was more compliant during the cognitive assessment. He was able to sit at the table and attend to tasks. The results of the Leiter-R visualisation and reasoning battery revealed that John’s non-verbal abilities were still within the average range compared to other children of his age and he attained an increase of five IQ points. On the Vineland Social and Emotional Scales, John attained an increase of 19 months in developmental age on the interpersonal relationships scale and an increase of 18 months in developmental age on the play and leisure time scale.

The review assessment using the GARS completed by John’s father showed that the autism quotient obtained was 14 points higher than the baseline assessment although the quotient score still placed John within the average range for the probability of autism. The profile showed that John’s scores on both the stereotypical behaviour and on the developmental domain were higher than the score he attained at the baseline assessment.

Parent

John’s father, his primary carer, completed the Ways of Coping assessment at both the baseline and the review assessment stages. The score differences indicated that John’s father increased his use of ‘accepting responsibility’ as a way of coping the most, followed by ‘self-control’ and ‘escape–avoidance’ as ways of coping. He had reduced his use of ‘positive reappraisal’ and ‘planful problem-solving’ as strategies of coping by the time of the review assessment of John.

8.1.2 Case Study 2

Jessie, aged 3 years, 7 months (participation commenced in 2000)

Jessie was living with her parents and her younger sister aged 12 months. Jessie’s mother was a secondary school teacher who was not working when Jessie’s younger
sister was born. Jessie had an uncle who, as a child, had learning and social difficulties and who had continued to display some odd behaviours. Jessie was referred by a paediatrician for an autism assessment as a result of concerns about her unusual speech patterns, limited imaginative play skills and attention difficulties. She was diagnosed with an autism spectrum disorder by an autism assessment team at the age of three years, two months. The assessment team consisted of two psychologists and a speech pathologist.

Reportedly, the main areas of concern for Jessie were limited interaction with peers; sensitivity to certain noises such as the sounds of air conditioners, fans and vacuum cleaners; toe-walking; and excessive tantrums. Jessie’s early language milestones were within the normal time range in the first two years. However, after two years of age, her language was found to be delayed. She was using much echolalia, both delayed and immediate, and could only follow a one-step instruction. Jessie also repeated sections from videos. She was described as having a very good memory, able to memorise the books that were read to her.

Five months after her diagnosis, Jessie commenced a home-based program supervised by an ABA program provider for 12 hours per week, which was implemented by a student therapist. A detailed ABA discrete trial learning program was devised for Jessie which targeted compliance, communication temptations, verbal imitation, fine motor activities, gross motor imitation, receptive instructions and turn-taking. Reportedly, following some initial tantrums Jessie made significant progress. In addition to the home-based ABA program, Jessie attended a two half-day, three-year-old preschool program and had one day per week at a childcare centre.

The baseline assessments were taken when Jessie began the home-based program at the age of three years, seven months. The assessment review was conducted after 12 months at the age of four years, seven months. The details of the assessment scores are presented in Tables 8.5 to 8.8.

Assessment included reviews of language and cognition which were administered in five short sessions, taking consideration of Jessie’s short attention span. During these tests, Jessie tended to leave the testing table and run around the house. A great deal of effort was required to engage Jessie to work on the tasks presented. Jessie’s non-verbal IQ was within the average range. The language assessment revealed significant deficits in
receptive and expressive language skills, and her pragmatic language skills were observed to be significantly behind. She was not able to greet people or to answer simple questions. She was only able to follow simple one-step instructions such as ‘come to the table’. On the Vineland Social and Emotional scales, her developmental age on the interpersonal relationships scale and on the play and leisure time scale was two years behind her chronological age.

On the GARS completed by Jessie’s mother, Jessie’s autism quotient placed her in the average range for the probability of autism. Her overall profile revealed that Jessie displayed most of the features of autism in her speech, including repeating (echoing) words, phrases and unintelligible sounds, failing to initiate conversations and using pronouns inappropriately.

The descriptive data for the childcare observations at the baseline assessment showed that Jessie was toe-walking and wandering around aimlessly. Her play was predominantly solitary and did not show any sequence. She stacked dinosaurs and puzzle pieces in play. She was oblivious to other children in a group and frequently ignored interaction attempts. When playing outside, Jessie played by herself on the monkey bar. Other sensory responses observed included staring, repetitive vocalisations, non-communicative use of echolalia and immediate echolalia, mouthing toys and stacking or lining up objects. Some positive observations noted included that Jessie could follow the instructions of the carer, such as ‘push it in’ or ‘go and play’, and followed her peers to line up to go outside. Her overall quantitative score on the autism real-life rating scale was 0.59.

After five months, Jessie’s mother took over the coordination and planning of the ABA home-based program because of the expense of outside coordination. Jessie’s mother attended a short course on ABA home-based programs and planned the discrete trial program herself using a book on discrete trial learning for reference. She reported that she found it difficult to evaluate the program and to include new trials. She then enrolled Jessie in a centre-based EI program that had a group specifically tailored for children with autism when a place for Jessie came up. Shortly after Jessie commenced this centre-based program, the home-based program was stopped because Jessie displayed disruptive behaviour during the ABA home-based program sessions.
The mid-year observation of Jessie was made in the group specifically for children with autism at the centre-based program. It was not possible to arrange a childcare observation. In the centre-based program, Jessie displayed fewer wandering and non-communicative behaviours compared to her presentation six months prior. Jessie recognised the examiner and commented on the examiner’s dress, ‘You’ve got stockings on’. She manifested more animation in her emotional expression. She smiled after she put the potato man toy together and presented this accomplishment to the observer. When playing outside, Jessie also showed interest in the play of other children, for example commenting on one boy, ‘He’s swinging high’. She was also able to wait for her turn and asked a child to push her when it was her turn.—she said, ‘Push me higher’. She also reciprocated and pushed another child when she finished her turn on the swing. Her teacher observed that Jessie was now able to use the knowledge learnt from rote and drill in her ABA home-based program functionally in a natural environment. Her overall quantitative score on the autism real-life rating scale was 0.08—a notable reduction compared to the baseline score obtained at childcare.

After one year of intervention, Jessie was observed in two settings: in a childcare centre and in the centre-based EI program. In the childcare setting, Jessie greeted the examiner and told her, ‘I’m going to play some games’. Jessie was found to isolate herself sometimes, but she was also observed talking with other children. Reportedly, she initiated interaction with adults comfortably at this time. She concentrated well when she was doing a painting. She referred to the observer standing next to her while doing the painting. She answered appropriately when questions were asked. She also followed the childcare routine well, such as going to the bathroom independently and taking off her art smock and putting it away. Her overall quantitative score on the autism real-life rating scale at childcare (0.14) had reduced notably since baseline. In the supported, centre-based EI program, Jessie was more interactive. She asked the assistant to help her with cutting and managed to do some cutting on her own. Her functional use of language was evident—for example, she said, ‘Can I have more glue?’ and ‘I need the glue’, and when she drew a face, she said, ‘Jessie made a face’. She showed good concentration sitting at the table to complete a task for more than 15 minutes. She joined other children in play, but it was more parallel play than cooperative play. Her overall quantitative score on the
autism real-life rating scale at EI had further reduced since mid year to -0.15, indicating that the number of Jessie’s appropriate responses was greater than the number of inappropriate responses.

Her test behaviour during the review assessment was similar to that at baseline. Although she sat for longer at the table, she was very easily frustrated and would often leave in a tantrum. Her mother believed that the assessment process resembled the table-top activities undertaken in the ABA program, in response to which Jessie had developed very disruptive behaviours. Reportedly, Jessie was compliant with assessment at the centre-based EI program and did not display disruptive behaviours. Jessie still had significant deficits in her receptive and expressive language skills but her pragmatic skills were observed to have improved. She greeted the examiner and was able to respond to the question, ‘Would you pass the box of tissues to me?’ The developmental age equivalent for Jessie’s total language had increased by one year. Jessie’s non-verbal IQ was still within the average range and had increased by five points (see Appendix Table 8.5). On the Vineland Social and Emotional Scales, there was little gain in her developmental age over the 12 months on both the interpersonal relationship scale and the play and leisure scales (see Appendix Table 8.5).

The GARS was again completed by Jessie’s mother, and her autism quotient obtained was seven points higher than at the baseline assessment yet still in the average range for the probability of autism (see Appendix Table 8.6). This profile showed that more stereotypical behaviour was reported at the review assessment than at baseline.

Parent

Jessie’s mother completed the Ways of Coping assessment at the baseline and again 12 months later. The score differences indicated that Jessie’s mother had increased her use of ‘self-control’ as a way of coping the most, followed by ‘escape–avoidance’ as ways of coping. She had reduced her use of ‘positive reappraisal’ and ‘planful problem-solving’ as strategies for coping over the 12 months.
Case Study 3

Sam, aged 4 years, 8 months (participation commenced in 2000)

Sam lived with his parents and his older sister aged eight. Sam’s parents ran a business and worked from home. There was a family history of Asperger Syndrome and schizophrenia. Sam’s mother became concerned about Sam having Asperger Syndrome after he had not been making progress in developing his receptive and expressive language skills, or his cognitive, social and emotional skills. He was initially seen by a psychologist and a speech pathologist at the age of three years, nine months and was examined by a paediatrician four months later. These specialists all supported a referral to a public hospital for an autism team assessment. The presenting problems were delayed speech, unusual behaviours including lining up toys, looking at things in an unusual manner, swiping toys past his eyes and high-pitched screaming when frustrated. Sam also displayed difficulty managing change. He showed a preference for playing alone and had rapid mood swings.

The hospital autism assessment team consisted of a child psychiatrist, a psychologist, a speech pathologist, an occupational therapist and a parent worker. At the age of 4 years, 2 months, Sam was diagnosed with autism with a CARS score of 33. Sam’s developmental history indicated unremarkable developmental milestones except that his language development was delayed. Reportedly, the onset of problems was noted before the age of two when Sam was already presenting with language delay and a number of unusual behaviours such as looking at objects from odd angles, banging and lining up toys.

After a month’s of attendance at a generic EI program, Sam started an ABA home-based program for an average of nine hours per week. The program was coordinated and supervised by an ABA program consultant who was a psychologist and was implemented by a trained student therapist. In addition to the home-based program, Sam attended a four-year-old preschool program. Sam commenced school after six months in the ABA home-based program. In school, he had an aide in the classroom. The home-based ABA program was run consistently for the whole year during which Sam was observed.
The baseline assessment was undertaken when the home-based program was set up for Sam at the age of 4 years, 8 months. The assessment review was conducted after 12 months at the age of 5 years, 8 months. The details of all assessment scores are included in Tables 8.9 to 8.12.

The baseline assessment was administered in six sessions taking into account Sam’s non-compliance. In the first session, Sam refused to sit at the table and rolled on the floor when attempts were made to engage him. The administration of the test had to be quickly paced to keep him on task. The results of the Leiter-R visualisation and reasoning battery revealed that Sam’s non-verbal IQ was within the high average range compared to other children his age. The results of the speech and language assessment showed that Sam’s performance was more than two standard deviations below the mean for both the receptive and the expressive language skills. On the Vineland Social and Emotional scales, his developmental age on the interpersonal relationships scale and on the play and leisure time scale were more than three years behind his chronological age.

On the GARS completed by Sam’s mother, Sam was in the average range for the probability of autism. The items endorsed with higher frequency were: avoiding eye contact, making high-pitched sounds, using pronouns inappropriately, repeating words and phrases repeatedly, inappropriately answering questions about a statement or brief history, banging toys and lining up objects.

The descriptive data gathered from the preschool observation at the baseline assessment showed that Sam displayed some prosocial behaviours including appropriate physical interaction with the preschool assistant, throwing rubbish into a rubbish bin, following simple instructions, sitting well in a circle and in a line, and maintaining some good eye contact for a short period of time. Some parallel play was also observed. Inappropriate behaviours noted included putting his hand in his food, putting his name card very close to his eyes, screaming, singing ‘la la la’, dashing from one end of the room to the other, displaying very little interaction with peers, flapping arms, isolating himself from the group, and lying on the floor during group time. During outside play time he was solitary most of the time, walking alone, or touching and looking at the colours of tyres on the playground equipment and examining them intently. His overall quantitative score on the autism real-life scale was 0.59.
Sam’s mother reported that the home-based program was designed to address his behavioural problems. The strategies employed included redirecting his attention to the task to reduce self-stimulation, breaking tasks down to minimise frustration, building Sam’s self-confidence by using a prompt question such as ‘What’s wrong?’ to pre-empt a major tantrum eruption, and encouraging independent work.

The mid-year observation of Sam was undertaken during the prep grade of school when he had just started. Sam had an aide in the classroom with him for five hours per day. He listened and followed his teacher’s instructions to put his book away. He was able to do pasting at a table. He sat well in a group with other children, tuned in and listened. He was able to come to the front of the group to do a ‘show and tell’ with verbal prompts from the teacher. His teacher reported that he was able to play hide-and-seek alongside a friend, was able to respond to the bell for the change of lessons, was able to sit and stay quiet at assembly time and after training, and was able to go to the canteen, ask for food, say thank you and hand over the money. It was noted that his play remained sensory: he liked touching toys with his hands, feeling their texture and smelling them. It was also observed that when a child took away his picture, Sam cried loudly and did not know how to respond. When the teacher comforted him, he stopped crying. His overall quantitative score on the autism real-life rating scale had reduced to 0.19.

After one year of intervention, Sam was observed at the same school again. By this time, Sam was able to play card games with other children in a group with the teacher’s assistance. He could scan cards for correct picture pieces. He also initiated conversation and could maintain a conversation on a topic for some time. He showed a reasonable degree of eye contact most of the time and answered the teacher’s questions appropriately. When he wanted to go to the toilet, he said, ‘I need to go to the toilet’, and he allowed another boy to accompany him to the toilet. He responded to the teacher’s instruction to sit on the floor. When working in a group on a story, he watched, did not volunteer information and was sometimes distracted, but he put up his hand like other children in response to the teacher’s questions. He also read with the group. When the teacher was guiding the children through a work task on the white board, Sam volunteered to read out the sentence and was able to place ‘talking marks’ in a sentence. He was very eager to complete the task required in front of other children.
During the observation period, Sam was able to respond to peers when he was spoken to and was seen to ignore a peer only once. He was easily distracted but his attention was returned to tasks quickly. He also made ‘blurt’ noises but he was well monitored by his aide and he stopped making these noises when he was reminded. Arm flapping was no longer observed. His overall quantitative score on the autism real-life rating scale for this observation was -0.01.

Test behaviour at the review assessment stage showed significant improvement. Sam was able to sit at the table to work on tasks with concentration. He was able to comprehend instructions without difficulty and his attention span was significantly longer compared to his presentation at the baseline assessment. The review assessment revealed that he had made significant improvements in his speech and language skills, achieving a developmental age of three months above his chronological age and a gain of 37 months on total language age equivalent compared to his status at the baseline assessment. His IQ score on the Leiter-R remained stable. He also made significant gains in his social and emotional developmental areas. His gain on the Vineland interpersonal relationships scale was 27 months and his gain on the Vineland play and leisure scale was 15 months.

The review assessment using GARS completed by Sam’s mother showed that the autism quotient obtained was 12 points lower than the baseline assessment although the review quotient score still placed Sam within the average range for the probability of autism. This profile indicated that Sam had significantly reduced his autism features in the areas of communication and social interaction. The items endorsed showed that Sam seldom avoided eye contact, rarely laughed or cried inappropriately, and seldom withdrew from a group. Flapping of hands and dashing across rooms were rare occurrences.

**Parent**

Sam’s mother completed the Ways of Coping assessment at both the baseline and the review assessment phases. The score differences demonstrated that Sam’s mother had increased her use of ‘escape–avoidance’ as a way of coping and had reduced her use of ‘positive reappraisal’ and ‘planful problem-solving’.
8.1.4 Case Study 4

*Benjamin; aged 5 years, 2 months (commenced in 2001)*

Benjamin lived with his parents and his older sister, aged seven. His father was working in the information and technology industry and his mother was a housewife. At the age of four years, six months, Benjamin underwent a psychological assessment on the recommendation of a paediatrician. The report indicated a diagnosis of Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS) with a CARS score of 26. Four months later, he was seen by a speech pathologist whose report indicated that Benjamin’s unusual level of development and current functioning pointed to a diagnosis of autism spectrum disorder.

At the age of five years, two months Benjamin began attending an EI program specifically aimed at children with autism for one full day per week. He attended the program regularly during the year in which he was monitored.

The baseline assessment was taken when Benjamin was five years, two months and the assessment review was conducted after 12 months when he was aged six years, two months. The details of the assessment scores are presented in Tables 8.13 to 8.16.

Benjamin warmed quickly to the activities prepared for him in the room prior to the assessment. He presented as cheerful and cooperative although his eye contact was minimal. He was easily distracted but his attention could be returned to tasks when prompted. The results of the Leiter-R visualisation and reasoning battery revealed that Benjamin’s non-verbal IQ was within the high average range compared to other children of his age. On the Preschool Language Scale-3, the results revealed that Benjamin’s performance was three standard deviations below the mean for his total language skills. On the Vineland Social and Emotional Scales, his developmental age on both the interpersonal relationships scale and the play and leisure time scale was more than three years behind his chronological age.

On the GARS completed by Benjamin’s mother, Benjamin obtained an autism quotient which placed him in the average range for the probability of autism. The items endorsed with a higher frequency were: turning in circles; spinning objects; making high-pitched sounds; repeating words or phrases over and over; failing to initiate conversations with peers or adults; using ‘yes’ and ‘no’ inappropriately; using pronouns
inappropriately; avoiding eye contact; laughing and crying inappropriately; and becoming upset when routines are changed.

The descriptive data drawn from the preschool observation at the baseline assessment showed that Benjamin engaged in solitary play with his train during play time. He was oblivious to the interactive group play of the other children. Benjamin’s play consisted of pushing the train along the floor and placing it close to his eyes. When prompted by his assistant, Benjamin joined a group of boys putting train tracks together. Benjamin offered the group of boys a train track piece without making eye contact or speaking. He then took away a boy’s train without asking and the boy cried. Sometimes Benjamin watched what the others were doing and tried to imitate them. Most of the time, his play was solitary even though he was with the group. He rolled a truck along the track and lay on the floor to look closely at the truck at eye level. He was careful that the train track did not break and he copied a child by placing a traffic light near the tracks. Again he held the traffic light close to eye level. When it was pack-up time, he helped packing up and walked around and said, ‘it’s pack-up time’. At mat time, Benjamin carried out the actions of a nursery rhyme. However, he blurted out the name of the song loudly and inappropriately, ‘Naughty pussy cat’, and had to be quieted down by the teacher. Benjamin’s excitement at the song was greater than that of the other children. Benjamin was fine when the CD changed to another song yet he continued to be excited by the other songs. It was observed that, unlike the other children who looked to their teacher most of the time, Benjamin only looked to his teacher occasionally and ignored smiles from his peers. He was able to choose a friend with whom to go to the toilet when instructed by his teacher. Again he did not look at him and the boy told Benjamin what he would do on the way such as, ‘Benjamin, I’ll open that for you’. Benjamin responded with a ‘yep’ but did not make any eye contact. During snack time, Benjamin rocked on his chair and a boy pushed Benjamin’s chair in for him. Benjamin took the initiative to comment on the food of a boy sitting next to him and it was observed that he stamped his feet. His overall quantitative score on the autism real-life scale was 0.11.

The mid-year observation of Benjamin was undertaken at both the preschool and the EI centre. At preschool, Benjamin sat with the other children at mat time. He sat a little too close to one child and sometimes stared blankly when the other children
volunteered to speak about what they were going to do in the holidays. It was also observed that Benjamin quite often bit the edge of his sleeves. During free time, he wandered around the room. Finally, he settled in the block corner to build a road for cars. He was very competent at building this road and told the examiner about it. He did not hold cars and trains close to his eye level and examine them as he had done six months previously. However, he still kept himself separated from the other children who interacted freely in informal groups. One or two children dropped by the block corner and he played alongside them. When a boy came to play with him, he appeared anxious but he did ask for cars for the road. The teacher commented that ‘car and road’ was Benjamin’s favourite game, and that with assistance his car play could be extended with garage and petrol stations. After the car game, Benjamin wandered around again and found some colour containers and placed them on the drawing table appropriately. His overall quantitative score on the autism real-life scale reduced to 0.04, indicating that there was a reduction in the number of inappropriate responses.

At the EI centre, Benjamin displayed appropriate responses to interaction attempts and to activities in the room. He initiated conversation with a child sitting next to him at the table, asking ‘do you want this?’, while they were undertaking a pasting activity. He also responded to his teacher when he was asked questions. However, there were times when he would stare into space. He held up a toy car for close scrutiny once and left his seat to be away from the table once. During mat time, he concentrated well on the story and he was interested in the visuals that were displayed with the story. His overall quantitative score on the autism real-life scale was -0.08. This negative score indicates that the autistic features are nearly outweighed by Benjamin’s level of appropriate responses in the EI supported setting.

After 12 months at preschool, Benjamin was observed to be playing interactively with a group of boys during free time. He was running and chasing them. The boys said that they were playing ‘Spiderman’. Benjamin asked the group, ‘Would you like to play spider man with me?’ Benjamin was more a follower in the group play and copied what the boys did, like jumping over a toy. However, being part of this group was contrasted to his behaviour at the baseline assessment, when he was alone all of the time. At work time, while other children moved to the work table, Benjamin refused to go to the table.
and said he needed two or three minutes. However, when the teacher approached him and physically prompted him, he was compliant and went to the work table on his own. At mat and story time, he concentrated very well without looking blank. He looked at the picture book that the teacher held up with a good level of attention. At times it was observed that he sucked his fingers, moved close to his peers’ heads, put his hand over his mouth and rocked his body. However, he appeared not to be conscious of what he was doing and was paying attention to the story while he was engaging in these self-stimulating activities. His overall quantitative score on the autism real-life scale was -0.09.

While at the EI program designed specifically for children with ASD, Benjamin was observed to be chatting with his peers at the work table. He initiated conversation with a child: ‘You can have this one too, and blue makes green (referring to yellow); ‘What does that make?’; ‘That’s my favourite colour too’; And ‘Shall we make this colour turn to green?’ He answered questions from the teacher—for example, replying with, ‘I’ve finished’. When the teacher was mixing red and blue, Benjamin suggested, ‘How about yellow and red?’; and when the teacher asked him, ‘What does it look like now [referring to the mixed colour]?’ he answered, ‘purple’. However, Benjamin was easily distracted and he also made ‘grrr’ noises while looking at dinosaur pictures. During outside time, Benjamin said ‘hi’ to a child and waved. He also made a shooting action with his hand when talking to a child. Benjamin followed instructions well in activity transition. At the end of the session, Benjamin’s mum came in and he needed to be prompted to say ‘Hi mum’. He took the initiative to tell his mother about the pot for father’s day although he was not looking at her at the time. He also gave a cuddle to his teacher but the cuddle was instrumental. His overall quantitative score on the autism real-life scale was -0.15. At both the preschool and the EI settings, the overall quantitative score was further reduced from that of earlier observations. These scores indicated that Benjamin had further improved in terms of the level of his appropriate responses and had further reduced his autistic behaviours in these settings.

The review GARS completed by Benjamin’s mother showed that the autism quotient obtained was 10 points lower than that obtained at the baseline assessment. There was a marked decrease in the frequency of items in the communication domain and
the social interaction domain. Benjamin still used pronouns inappropriately at the review assessment. However, he was observed to initiate conversations with peers or adults whereas initially he had failed to initiate such conversations at the baseline assessment. Benjamin’s overall score placed him in the below average range for the probability of autism at the review assessment.

Benjamin’s language skills had improved by the time of the assessment review. Benjamin was able to converse at ease with the examiner during the warm-up time before the formal assessment. He was also able to maintain a conversation. His attention level was good and he had no problems following instructions. He showed interest in the tasks presented to him, whereas at the baseline assessment he showed limited interest, especially with the verbal tasks. The results of the Leiter-R visualisation and reasoning battery revealed that Benjamin’s non-verbal IQ score was raised by seven IQ points, putting him within the above average range compared to other children of his age. The results of Benjamin’s overall language skills revealed that there was a 22-month gain after 12 months of EI when he was assessed again. The scores of the Vineland Social and Emotional Scales also showed marked improvement. Benjamin improved by 34 months on the interpersonal relationship scale measured, and by 21 months on the play and leisure time scale measured. Benjamin’s improvement on the interpersonal relationship scale could be attributed to his marked language improvement. Whereas previously he was unable to perform, Benjamin was reported to be able to respond verbally to social small talk initiated by adults, to identify people by characteristics when asked to do so, to maintain a conversation with others on topics of mutual interest and to remember the birthdays of family members.

**Parent**

Benjamin’s mother completed the Ways of Coping assessment at both the baseline and the review assessments. The score differences indicated that Benjamin’s mother had increased her use of the positive coping strategies ‘planful problem-solving’ and ‘positive reappraisal’, and had reduced her use of ‘distancing’, ‘escape–avoidance’ and ‘accepting responsibility’.
Case Study 5

Joshua, aged 4 years, 11 months (participation commenced in 2001)

Joshua lived with his parents and his younger sister, aged three years. His mother was a teacher and his father was a computer programmer. He was diagnosed with a mild autism spectrum disorder with a CARS score of 31 by a paediatrician when he was 4½ years old. It was noted that Joshua’s speech had been delayed since he was 18 months old and that he had poor comprehension, poor eye contact, and engaged in solitary play and had some preoccupations with toys. Joshua was also described as a very sensitive boy who experienced separation difficulties at preschool. Occasionally when he was frustrated, he became aggressive towards other children. He also had difficulty waiting for his turn or engaging with other children appropriately. He tended to become self-absorbed when others were around and he often preferred his own company. However, he was affectionate and cuddly with his parents and would seek their company. He loved computer games and had a particular interest in trains.

Five months after his diagnosis, Joshua commenced at an EI program for children with specific developmental needs for half a day per week in addition to his 12-hour preschool program. He attended the 12-hour preschool program regularly for 8 months before he commenced at a pre-prep grade (preschool program) in a private early learning centre 4 days per week. The baseline assessment was taken when Joshua started the early intervention program at the age of 4 years, 11 months. The assessment review was conducted after 12 months when he was at the age of 5 years, 11 months. The details of the assessment scores are presented in Tables 8.17 to 8.20.

The baseline assessment, which included the speech and language assessment and the cognitive assessment, was administered at the EI centre and in Joshua’s home. Joshua easily warmed up to the construction activities. During the formal assessment, Joshua showed a good level of attention although he was a little hesitant. Some effort was required to engage Joshua, but overall he was compliant. The results of the Leiter-R visualisation and reasoning battery revealed that Joshua’s non-verbal IQ was within the high average range compared to other children of his age. On the Preschool Language Scale-3, the results revealed that Joshua’s performance was one standard deviation below the mean for his total language skills. On the Vineland Social and Emotional Scales, his
developmental age on both the interpersonal relationships scale and the play and leisure time scale was more than 20 months behind his chronological age.

On the GARS completed by Joshua’s mother, Joshua obtained an autism quotient which placed him in the below average range for the probability of autism. The items endorsed with higher frequency were: avoiding eye contact, repeating words out of context, echolalia, failing to initiate conversations with peers or adults, and being withdrawn in group situations.

At baseline observation at preschool, Joshua was mostly engaged in solitary play and he engaged in self-talk during free play. He attempted to play alongside a group of boys in the block corner, all of whom had quite advanced social skills, and Joshua was not included in their play. When Joshua made a road with the blocks, he said, ‘I can do this’. One boy said to him, ‘I didn’t say you can play with me’. However, when a boy approached Joshua and asked him, ‘Do you want that car?’, Joshua did not respond to the question, instead saying what was on his mind—‘I got another block’. After staying for a while in the block corner, Joshua wandered about the room. He attempted to interact with the other children but did so in an immature manner: for example, he landed his bottom on another child and said, ‘ah’. Overall, the autistic behaviour observed included pacing, isolation of self, ignoring interaction attempts, being agitated by noises, and staring. Joshua showed some communicative use of language and occasionally responded to communication attempts and to activities in his environment. His overall quantitative score on the autism real-life scale was 0.24.

Joshua’s mid-year observation was carried out both at the preschool and at the EI centre. At preschool, Joshua was with a group of boys during free time. Joshua was observed to make some appropriate attempts to interact with some of the boys but his attempts were not reciprocated. It was observed that the conversational and social skills of the other boys were more advanced than those of Joshua. Joshua subsequently withdrew to the book corner by himself. A girl joined him later and he showed some interest in her book. He then moved to another group of boys who were at the computer. Joshua stood behind these boys and observed what they were doing. When the teacher read a story with him, Joshua took the initiative to say, ‘Rudolph sliding down the mountain’. Joshua could not keep his attention till the end of the story and he was
distracted a number of times by the piece of string he was holding. His overall quantitative score on the autism real-life scale was 0.09 for his mid-year presentation at the preschool. At the EI program, Joshua played well with his sister with the train set before the other children arrived at the centre. He appeared to be relaxed and showed some excitement at times when he was playing with the train set. He was confident in his conversation with his sister. The language sample collected included the phrases: ‘Can I have that person?’; ‘What are you doing?’; ‘Smash’; ‘Did he get hit?’; ‘What happened to me?’. When the other children arrived, Joshua continued to interact appropriately with them. He initiated conversation with a boy, saying, ‘Do you like trains?’ However, he backed away when the room became too noisy as more children arrived. His overall quantitative score on the autism real-life scale was -0.04, indicating that Joshua had displayed a greater number of appropriate responses than inappropriate responses.

Joshua was moved to a pre-prep program at a private early learning centre (preschool program) instead of repeating a second year at the local preschool after 8 months at the preschool. At the 12-month review, Joshua was observed at his new pre-prep setting. He had an aide in the classroom. Joshua was in the work corner completing a string activity quietly when the examiner and the second observer arrived. The teacher had drawn him in with some other boys. Joshua said very softly to a boy next to him, with no eye contact, ‘You need buttons’, and the teacher helped by asking Joshua, ‘Are you telling Matthew that he needs buttons, Joshua?’ Joshua replied, ‘Yes, he needs buttons’, looking at the boy. He then started working on his rocket. Reportedly, space was a subject that Joshua had suggested for the theme of the week’s project, and the teacher accepted his suggestion. She reported that, with his input into the project, Joshua’s self-esteem was raised and the other children were more willing to approach him, especially on tasks or conversation related to space. Joshua embarked on some work on his rocket alongside other children, cutting a tin sheet and offering a button to a friend. Then he stayed inside his rocket instead of working on it. He initiated conversation with a boy while inside the rocket: ‘Put fuel then the rocket blasted off; ‘Blast off’; ‘Mine doesn’t have wheels’; ‘You don’t need wheels’; ‘Why do you take all the stuff off?’; and ‘Is it easier to blast off?’ Then Joshua changed the topic of the conversation: ‘Excuse me, you have a string attached to your shoe’. The boy looked puzzled and went away. Joshua
continued to shout at the boy, ‘Look at my rocket!’, ignoring another child who was trying to speak to him. He remained inside his rocket. The teacher reported that Joshua initiated conversation with other children, had a sense of humour and coped well with a full-day program of physical education, music, library and classroom work. Some autistic features remained. These included: fixing on wire (small parts of objects) or on a word; occasionally a complete shutdown, then moving himself to the corner of the room; and reduced eye contact. However, Joshua could be redirected most of the time with the teacher or the aide’s assistance and he responded well to a timer to stay on tasks. His overall quantitative score on the autism real-life scale was -0.04.

The review assessment using the GARS was also completed by Joshua’s mother. It showed that the autism quotient obtained was 11 points higher than the score obtained at the baseline assessment. The standard scores obtained were the same for the communication subtest at both the baseline and the review assessment. In the stereotyped behaviours subtest, Joshua’s mother reported a greater number of stereotyped behaviours, markedly higher levels of staring, vocalisation for self-stimulation, restricted eating and sniffing. In social interaction, Joshua was rated as less withdrawn and aloof in group situations. However, he was rated as more resistant to physical contact from others, doing certain things repetitively and becoming upset when routines were changed. The profile showed that Joshua’s score on stereotyped behaviours was markedly increased by three standard score points and his social interaction score had also increased by two points. Joshua’s overall score placed him in the category of average in the probability of autism at the review assessment.

Joshua’s language skills, especially his expressive language abilities, had improved by the time of the review assessment. Joshua was able to converse with the examiner at ease during the warm-up time before the formal assessment. He was also able to maintain a conversation. His attention level was good and he had no problems following instructions. The results of the Leiter-R visualisation and reasoning battery revealed that Joshua’s non-verbal IQ score was reduced by 13 IQ points and the review assessment score put him still just within the high average range compared to other children of his age. The results on Joshua’s language skills showed that there was nearly a ½ standard deviation improvement on auditory comprehension, a ¾ standard deviation
improvement on expressive communication and a ½ standard deviation on total language after 12 months when he was assessed again. On the scores of the Vineland Social and Emotional Scales, his results also showed marked improvement. Joshua improved by 25 months on the interpersonal relationship scale measured by developmental age and improved by 28 months on the play and leisure time scale also measured by developmental age.

Parent

Joshua’s mother completed the Ways of Coping assessment at both the baseline and the review assessment phases. The score differences indicated that Joshua’s mother had increased her use of the coping strategies ‘positive reappraisal’, ‘planful problem-solving’ and some ‘confrontive coping, and had reduced her use of ‘distancing’, ‘escape–avoidance’ and ‘seeking social support’ as strategies of coping.

8.1.6 Case Study 6

Corey, aged 4 years, 10 months (participation commenced in 2001)

Corey lived with his parents, three older brothers and a sister who were in their 20s, and his younger brother, aged 2½ years, who had recently been diagnosed with ASD. His older half and full siblings had no developmental problems. Corey’s mother had been concerned about Corey’s behaviour since he turned 4 years of age. Corey often threw tantrums when things did not go his way. He also had some minor rituals such as having pillows and toys arranged in a certain way at bedtime and had to be the first in everything. At preschool, it was reported that Corey had enormous social problems, with a tendency to be both verbally and physically abusive towards other children and staff. Corey’s eye contact was described as variable and he was not consistent in showing empathy. There were times when he was empathic, such as spontaneously enquiring about a child who might have fallen over, but at other times he seemed to have no insight into how other people felt. Reportedly, Corey’s cognitive development was within age expectations. He was diagnosed with a mild Asperger Syndrome at 4 years of age by a developmental paediatrician and a psychologist.

His developmental history revealed that Corey was born at full term. There were no problems in infancy, and Corey fed and slept well, and was a cuddly baby. His motor
milestones were reported to be within the normal range, and his language development was reported to be advanced. Corey was putting words together at 15 months. As well as having some minor rituals, Corey was fussy about food.

Ten months after the diagnosis, Corey commenced in a centre-based intervention program specifically for children with autism for one full day per week. He also attended a 4-year-old preschool program three half-days per week. The baseline assessment was taken when Corey had just commenced at the EI program at the age of 4 years, 10 months. Corey attended 8 months of EI regularly before he commenced school. The assessment review was conducted at the age of 5 years, 10 months when he was at school. The details of the assessment are presented in Tables 8.21 to 8.24.

During formal assessment at baseline, Corey was often distracted by his own thoughts and his attention had to be returned to tasks. He needed a couple of breaks before he could complete the tests. The results of the Leiter-R visualisation and reasoning battery revealed that Corey’s non-verbal IQ was within the average range compared to other children of his age. The speech and language assessment revealed that Corey’s scores were one standard deviation above the means on receptive language skills, expressive language skills and total language. On the Vineland Social and Emotional Scales, Corey’s developmental age on the interpersonal relationships scale was 7 months behind his chronological age and on the play and leisure time scale it was 8 months behind his chronological age.

On the GARS completed by Corey’s mother, the autism quotient Corey obtained placed him within the very low range for the probability of autism. His overall profile showed that Corey avoided eye contact, stared at times, used pronouns inappropriately, did certain things ritualistically and became upset when routines were changed.

The preschool observation at the baseline showed that Corey displayed appropriate responses to activities in his environment and in general used objects appropriately. He also initiated or responded to conversation. However, some obsessive and repetitive behaviours were evident, and he isolated himself most of the time. Corey was very interested in the theme of space which was the current theme at the preschool. He made himself a space truck and ‘flew it to the moon’ repetitively; and he seemed to be happy flying his space truck around by himself. When a boy approached him and offered
him an action figure, he took the figure and said, ‘Thank you’. When a girl was playing
with a magic light, he was interested in the light and asked the girl if he could have a look
at it. However, most of the time he was self-absorbed in his space play in the corner and
was quite oblivious to what the other children were doing in the room. When he was
playing with his space truck repetitively, he engaged in self-talk and seemed to be making
up a story, saying, ‘I’m in space’ and ‘I kill the baddies’. During transition time, he came
up very close to other children and did not observe his or their personal space. During
mat time, he followed the teacher’s instructions and took his name tag and sat down.
However, while waiting for the other children, he was playing with some name tags with
another child when he suddenly hit the child. He was stopped by an assistant. Reportedly,
Corey required assistance in learning about boundaries and he had difficulty
understanding subtle social rules such as not invading the personal space of others. His
overall quantitative score on the autism real-life scale was 0.05.

Corey was observed at preschool and at the EI centre after 6 months of EI.
Compared to his presentation at the baseline, Corey responded more frequently to
interaction attempts and used language to communicate appropriately. During the
observation at preschool, Corey engaged in less repetitive play and was more interested
in other children. On one occasion he asked some of the other children to play with him,
saying, ‘Come on! Let’s go to the sandpit.’ However, no children followed him. Corey
then went over to the climbing ropes and mixed well with the children there. Before
morning tea, he lined up well and stayed in line to wait to wash his hands. After washing
his hands, he took his lunch box and sat down at the table with the other children. He
looked frustrated when he opened his lunch box and he did not eat the food. He poured a
full cup of milk for himself and left very little for others. He still wore his hat inside and
forgot to take it off. Earlier on, before he went outside he required prompting from his
aide to put his hat on. His overall quantitative score on the autism real-life scale at mid-
year at preschool had reduced to -0.04, indicating that the number of appropriate
responses outweighed the number of inappropriate ones.

At the EI centre, Corey followed the routine in the room well. He readily engaged
in activities in the room, responded to interaction attempts most of the time and seldom
isolated himself. He also initiated appropriate physical interaction with others such as
pulling a boy’s arm and saying, ‘Come over’. He did not engage in self-absorbed repetitive play and was interested in involving himself with other children in outside play. In the room, he sat well during story time and raised his hand to answer questions. His overall quantitative score on the autism real-life scale at mid-year at EI had further reduced to -0.15.

After attendance at EI for eight months, Corey commenced school. The observation was conducted at this school. Corey was in a Prep Grade with over 20 children and he did not have integration support. Corey used language well for communication. He initiated and responded to communication attempts both verbally and non-verbally. He also responded to activities in the classroom. However, he displayed some stereotypical behaviour such as rocking, and at times he stared into space, seemingly in his own world. The most obvious symptom that was observed after he commenced school was his distractibility. When he sat for a writing exercise, he was fidgety and easily distracted. He had some difficulty following the instructions for writing tasks. He required assistance from the teacher either to return his focus to tasks because of his distractibility or to assist him with writing. Corey’s attention span was short compared to that of the other children in the room. At times he tended to disturb others, either talking to them while they were working orsometimes pulling faces at them. During mat time, he joined the others on the floor but did not join in the action song. He kept fidgeting until the teacher had him sit at the front. Corey’s behaviour seemed to have regressed since he commenced school and his overall quantitative score on the autism real-life scale after 12 months had increased from -0.15 (mid-year) to -0.08, indicating that the number of appropriate responses again outweighed the number of inappropriate responses, however, the effect was less compared to mid-year.

At the review cognitive and speech assessments, Corey worked well on a one-to-one basis. Compared to the baseline assessment results, there was a gain of four IQ points (moving from the Average category to the Above Average category) in non-verbal abilities and a gain of 16 months in language abilities measured by developmental age. On the Vineland Social and Emotional Scales, Corey attained an increase of 19 months on the interpersonal relationships scale and an increase of 9 months on the play and leisure time scale measured by developmental age.
The review assessment using GARS completed by Corey’s mother showed that the autism quotient Corey obtained placed him in the low range for the probability of autism. The autism quotient was 15 points higher than the GARS score obtained at baseline. At review, Corey had increased his adoption of some stereotyped behaviours such as becoming more restricted in his diet and showing some self-injurious behaviour. Corey also displayed more unreasonably fearful behaviour, threw more tantrums when being given commands and started lining up things during play. Although Corey had gains in non-verbal IQ and in language abilities, his behaviour seemed to have regressed as rated both by his mother on GARS and by the examiner at the school observation. His autistic behaviour had become more pronounced once he commenced school where he received no extra support.

Parent

The score differences showed that over the 12 months since baseline, Corey’s mother had increased her use of ‘seeking social support’, ‘confrontive coping’ and ‘planful problem-solving’ as ways of coping. She had reduced her use of ‘accepting responsibility’ and ‘escape–avoidance’ strategies as ways of coping.

8.1.7 Case Study 7

*Michael, aged 4 years, 7 months (participation commenced in 2001)*

Michael lived with his parents and his infant brother. There was a family history of ASD on the maternal side. Michael’s father ran his own business. Michael was first seen by a speech pathologist when he turned 3 years of age because of his delayed speech. The speech pathologist expressed a number of concerns about Michael including around his poor social interaction, echolalia, difficulty moving from one activity to another and reduced eye contact. The speech pathologist recommended a paediatric consultation and a psychological assessment to investigate the possibility of an ASD. Both the developmental paediatrician and the psychologist confirmed that Michael’s presentation met the diagnostic criteria of Asperger Syndrome and that his CARS score placed him within the mild to moderate autistic range.

Michael had received some outreach assistance from an EI centre specifically catering for the needs of children with an ASD before he commenced a full-day program
there each week. The baseline assessment was taken when Michael commenced the program at the age of 4 years, 7 months and the assessment review was conducted after 12 months at the age of 5 years, 7 months. Michael attended the full-day per week program regularly at the EI centre and a second year of preschool program during the year in which he was under assessment. The details of the assessment scores are presented in Tables 8.25 to 8.28.

The baseline assessments were administered at the EI centre and in Michael’s home. During formal assessment, Michael was easily distracted and often left his seat. He needed to be redirected to tasks often both at home and at the EI centre. The results on the Leiter-R visualisation and reasoning battery revealed that Michael’s nonverbal IQ was within the high category range when compared to other children of his age. On the PLS-3, Michael’s score was one standard deviation above the mean on receptive language skills, within the average range on expressive language skills and a ½ standard deviation above the mean on total language skills. On the Vineland Social and Emotional Scales, his developmental ages on the interpersonal relationships scale and the play and leisure time scale were more than 20 months behind his chronological age.

On the GARS completed by Michael’s mother, he obtained an autism quotient which placed him in the average range for the probability of autism. The items endorsed with higher frequency were: avoiding eye contact, having a restricted diet, whirling in circles, making high-pitched sounds, repeating words or phrases over and over, repeating unintelligible sounds, behaving in an unreasonably fearful manner, using toys and objects inappropriately, doing certain things repetitively, and throwing tantrums when demands were placed on him.

The descriptive data for the preschool observation revealed that Michael responded to interaction attempts and activities in the preschool room and used objects appropriately. He initiated verbal communication although his speech was not always understandable. The behaviour that set him apart from other children was that he tended to isolate himself and he stared into space at times. At the table where Michael was working on a pasting activity; he was happy to be engaged in conversations with others. However, his eye contact was observed to be fleeting and he often did not share eye contact with the others. At times, his conversation was off topic—for example, he
mentioned his white socks for no apparent reason. He transitioned to the mat time smoothly and sat in front of the teacher. During the action song, he did not follow the actions very well and kept his hands down a lot and stared. Before snack time, the teacher organised children to go to the toilet in pairs. Michael said, ‘I want to choose a friend’. Some kids said ‘no’ to him and he looked worried. The teacher finally organised a threesome to go to the toilet with him. During afternoon tea, Michael was not able to unwrap his food. A girl put her arms around him which he allowed, and another boy said to him, ‘You’re a baby’. Michael turned to the boy and said, ‘No, not a baby’. He wandered away from the group and had a vague and disengaged look in his eyes. When the teacher asked the children to pack up afternoon tea, he followed the instructions appropriately. His overall quantitative score on the autism real-life scale at the baseline was -0.18, indicating that overall the number of Michael’s appropriate responses outweighed the number of inappropriate ones.

The mid-year observation of Michael was undertaken at both preschool and the EI centre. At preschool, Michael’s presentation was similar to that at baseline. Michael responded to interaction attempts and activities in the room appropriately. He initiated verbal communication with his peers; however, he talked to himself a lot and sometimes repeated a sentence a couple of times. He was quite self-absorbed when he was working on tabletop activities (putting shapes of trees on a sheet). He followed the classroom routines well. He took the sheet off the easel by himself and transited to different activities with ease. However, at times Michael seemed to be at a loss and required assistance. His overall quantitative score on the autism real-life scale at the mid-year preschool had reduced to -0.20.

At EI, Michael displayed more appropriate verbal communication although it was observed that he still talked to himself. However, the duration of talking to himself was shorter and the frequency was less when compared to preschool. He adapted to change and transited smoothly from swimming to classroom activities. When he was building a spaceship with big blocks, he was very much absorbed in the activity. After he finished the spaceship, he asked the assistant to have a look:——‘Look at what I have done!’—and continued to tell the assistant what he had built. Then he sat inside the constructed
spaceship and pretended to drive it. His overall quantitative score on the autism real-life scale at the mid-year EI observation was -0.30.

After 12 months of EI, Michael was observed at both the EI centre and preschool. At preschool, Michael’s teacher reported that Michael had reduced his level of self-talk and did well in ‘show and tell’ time; however, sometimes he found it hard to take turns. During the observation, Michael greeted the examiner with good eye contact and was interested in group games during outside time. He lined up for a ball game that he liked, to wait for his turn. He followed the routine well to come back into the room for ‘show and tell’ time. He was a bit scared when shown a shell crab brought into class by another child. When given a chocolate, the other children ate it but Michael asked the teacher if he could put the chocolate into his bag. He was observed to be interactive with the other children and they seemed to like him, whereas 6 months previously he was not well liked. His eye contact was more focused although he still stared a bit. His overall quantitative score on the autism real-life scale at the end-of-year preschool observation had reduced to -0.37.

At EI, Michael was very relaxed and initiated appropriate interaction with his peers and with the examiner. He was pleased to see the examiner at the centre and approached the examiner to show his bag and his watch. His EI teacher reported that Michael had made huge progress in his social interaction—observing personal space, learning consequences of actions by observing others, and being more controlled in his emotions. During outside time, at one point he was jumping with a couple of boys. When the two boys were reprimanded for jumping, he stayed down and did not jump anymore. He played ‘hide and seek’ with a group of boys and when he was hiding behind a bush, he said to the examiner, ‘I stay here so that you won’t see me but I need to see you’. During mat time inside, he sat well for the story and was attentive. He raised his hand and answered a ‘why’ question correctly. His overall quantitative score on the autism real-life scale at the end-of-year EI observation had reduced to -0.41, indicating that Michael displayed many more appropriate responses than inappropriate responses in a supported EI setting.

The GARS in the review assessment was completed by Michael’s mother. The results showed that the autism quotient obtained was 8 points lower than the score
obtained at the baseline assessment. Michael’s mother reported that Michael displayed less turning in circles, less high-pitched sounds, less repeating words and phrases, did not look through people and behaved in a less unreasonably frightened manner.

At the review cognitive and speech assessments, Michael’s attention span was longer and he concentrated better on tasks. There was a gain of 4 IQ points (remained in the high category) in nonverbal abilities and a gain of 30 months in language abilities measured by developmental age. On the Vineland Social and Emotional Scales, Michael attained an increase of 37 months on both the interpersonal relationships scale and the play and leisure time scale measured by developmental age.

Parent

Michael’s mother completed the Ways of Coping assessment at both the baseline and review assessment stages. The score differences showed that Michael’s mother had increased her use of the ‘seeking social support’ strategy the most, followed by ‘positive reappraisal’ and ‘confrontive coping’. She had reduced her use of ‘distancing’ and ‘self-control’ strategies as ways of coping.

8.1.8 Case Study 8

Danny, aged 3 years, 1 month (participation commenced in 2003)

Danny was the first child of his parents and at the time during which Danny participated in the longitudinal study, his mother was pregnant. Danny’s parents became concerned about Danny’s lack of speech, limited eye contact and little interest in his environment when he was 2 years old. Danny was diagnosed with an ASD by a paediatrician at the age of 2 years, 10 months. At the age of 3 years, 1 month, Danny commenced at an EI centre that catered for children with developmental needs including autism. He attended the generic EI program for 10 months and was then transferred to an EI centre specifically catering for children with autism. Danny’s mother reported that she and her husband decided to move Danny because they felt that Danny was quite low functioning and his behavioural profile was typical of a child with autism. They were hopeful that the specific focus on autism in the new centre might help Danny to improve his overall functioning.
The baseline assessment was taken when Danny commenced at the generic EI centre at the age of 3 years, 1 month and the assessment review was conducted after 12 months at the age of 4 years, 1 month. The details of the assessment scores are presented in Tables 8.29 to 8.32.

At the baseline assessment, Danny presented as a nonverbal child with a flat affect and very limited abilities. The examiner attempted to assess Danny with standardised language and cognitive assessments but had very little success. Danny responded only on his terms and could not attend to any tasks presented to him. It was not possible to engage Danny. Danny did not make any eye contact with the examiner and brushed off all the test items on the table. Based on Danny’s presentation, it was estimated that Danny’s language and cognitive development were severely delayed.

On the Vineland Social and Emotional Scales rated by Danny’s parents, his developmental ages on the interpersonal relationships scale and on the play and leisure time scale were nearly 3 years behind his chronological age.

On the GARS completed by Danny’s mother, Danny obtained an autism quotient which placed him in the average range for the probability of autism. The items endorsed with higher frequency were: avoiding eye contact, restricted diet, sniffing objects, flapping hands, staring, not imitating others in play, being withdrawn in group situations, looking through people, laughing inappropriately, using toys or objects inappropriately, throwing tantrums in response to requests, and lining up objects.

At baseline, Danny did not attend a playgroup or a 3-year-old preschool group. He only attended the EI program catering for children with developmental needs. Danny was observed at this EI centre. During the baseline observation, Danny displayed some sensory motor stereotypical behaviours such as flapping, rocking and pacing. Socially, he totally ignored interaction attempts and isolated himself all the time. When expectations were placed on him, he often threw tantrums. He uttered repetitive vocalisations but they were non-communicative. Danny stared a lot and scrutinised details in objects. Danny mostly reacted on his own terms and made no eye contact with others. He required a lot of assistance with attending to tasks. After much prompting, he came and sat at the table. However, he threw a tantrum when he was required to do a matching game. He cried when being prompted through a shopping game. Danny finally settled at the puzzle table.
He took out three pieces of puzzles and the assistant praised him for doing so. He showed no reaction to this and wandered off to the painting activity. Reportedly, Danny loved colours. He painted with colour brushes on a sheet, stayed for more than 10 minutes, and with assistance moved away from the easel to the pasting table. He did not protest and was compliant. At the pasting table, it seemed that he did not want to do any pasting and he threw the shapes on the floor and required redirection from the teacher to other tasks. His overall quantitative score on the autism real-life scale at baseline was 1.08.

Danny was not observed at mid-year because at that time there was a crisis in Danny’s family and observation was not possible. After 10 months of EI at a generic centre, Danny moved to an EI centre which specifically catered for children with an ASD for 2½ hours per week and he also commenced at a 3-year-old preschool program with aide support. The aide support was provided by respite care of an agency.

Review observations were conducted both at the preschool and at the EI centre after 12 months of EI. When the observer arrived at the EI centre, Danny sat with a group of four children and responded well to the action song. He looked at the teacher telling the story with a good level of attention and followed prompts to clap hands, touch the soft toy animals and stand up. Danny was quite excited by all the motions and babbled with excitement. He could use sign language to say ‘more’. He also identified his own photo and took it to his seat. He transitioned well to the swimming pool, followed the other children and was undressed and dressed with ease by his mother. When in the pool, he enjoyed the water and splashed about. He was happy, smiled at his mother and clapped his hands. Danny became frustrated when he could not follow what he needed to do in the water game, yet he calmed down quickly when he was guided by his swimming instructor. When he did not want to do the activities in the water, he yelled out. After swimming, he changed with the assistance of his mother and went back to the classroom. He followed instructions well to take his snack box and had a snack with the other children. Throughout the observation, Danny displayed much less stereotypical behaviour compared to his behaviour at baseline. Although still rare, he displayed some initiations of communication using signs. Danny uttered repetitive vocalisations but they were noncommunicative. His overall quantitative score on the autism real-life scale at the
baseline had reduced to 0.42, indicating that Danny was showing fewer inappropriate responses.

At preschool, Danny settled very well with the assistance of the aide. Apart from pacing, he displayed no other stereotypical behaviours such as rocking or flapping during the period of observation. He displayed appropriate responses to activities in the room and responded to interaction attempts. At mat time, he sat well with a good level of concentration and looked at his teacher with interest. His teacher and aide had insisted on eye contact and Danny’s eye contact had improved. During singing, Danny went blank sometimes as he could not follow the words; however, he imitated some actions. He followed the group to wash his hands and to put his lunch box in his bag without needing any aide support. The teacher reported that a great deal of work was put into assisting Danny to follow instructions and routines, and to learn to wait. Compics were used. During table activity, Danny sat down and did block building with the help of the aide. He was sensitive to noises and covered his ears when the room became too noisy for him. He stared sometimes, but again it was possible to return his attention to tasks very quickly. His overall quantitative score on the autism real-life scale at the baseline had further reduced to 0.14, indicating more appropriate behaviour at preschool compared to EI. Overall, Danny had improved significantly in all aspects after 12 months of EI. He had learnt to respond to others in communication. He also tended less to act on his own terms and more to follow instructions. When things did not go his way, he did not throw tantrums immediately and waited for help. His mother reported that the preschool program was very supportive of Danny’s needs and the availability of the aide had helped with extending Danny’s skills.

On the GARS review ratings by Danny’s mother, the results revealed that the autism quotient obtained was still within the average range for probability of autism. However, the quotient score was 19 points lower than that obtained at baseline. In terms of stereotyped behaviours, Danny’s mother reported less avoidance of eye contact, less sniffing of objects, and less rapid darting and rocking. Whereas Danny was nonverbal at baseline, he began to repeat words verbally or used signs. In social interactions, Danny showed more emotion and he used toys or objects more appropriately. He threw fewer
tantrums when requests were placed on him, and was able to show some affection towards others such as kisses and hugs.

Although Danny was not assessable at baseline, he was assessable at review. The results of the language assessment showed that Danny’s language skills were more than three standard deviations below the mean. On the Leiter-R visualisation and reasoning battery, Danny’s nonverbal IQ was within the low category range compared to other children of his age. On the Vineland Social and Emotional Scales, Danny was more than 3 years behind his chronological age in interpersonal relationships, and play and leisure time.

_parent_

Danny’s mother completed the Ways of Coping assessment at both the baseline and the review assessment stages. The score differences showed that Danny’s mother had increased her use of ‘accepting responsibility’, ‘seeking social support’ and ‘self-control’ as ways of coping. She had reduced her use of ‘planful problem-solving’ and ‘positive reappraisal’ strategies as ways of coping.

8.1.9 Case Study 9

_Abbey, aged 4 years, 4 months (participation commenced in 2005)_

Abbey lived with her parents and a younger sibling, aged one year, eight months. Abbey’s father was a bus driver and her mother was a housewife. The family was of a Greek background, and both English and Greek were spoken at home. However, Abbey’s mother felt that Abbey’s language skills were better in English than in Greek. Some concern about Abbey’s speech development was raised once Abbey turned two, and when Abbey commenced speech pathology intervention, some autistic features in her communication skills were observed. These included difficulty using language to interact meaningfully during the sessions, echolalia and use of stereotypical phrases. It was also noted that Abbey’s level of eye contact was reduced and it was frequently observed that she would neither initiate nor maintain eye contact during interactions. Abbey was then referred by a paediatrician to a hospital for assessment by an autism assessment team. Abbey was diagnosed with a moderate autism spectrum disorder with a CARS score of
35 at the age of three years, four months. It was reported that Abbey’s mother was upset about the diagnosis but intended to work towards helping Abbey.

Her developmental history revealed that Abbey was born at term after an uneventful pregnancy. There were no major concerns about Abbey’s early motor developmental milestones, yet Abbey’s speech development was delayed. At the age of 3 years 4 months, her speech included many single words but lacked phrases and sentences. However, by the age of two Abbey could count up to 40 in English and about 20 in Greek, and she had learnt the entire English alphabet.

Eleven months after the diagnosis, Abbey commenced a centre-based EI program specifically aimed at children with autism for 2½ hours per week. She also attended a four-year-old preschool program three half-days per week. The goals set for Abbey by the family service coordinator at the EI centre in conjunction with her parents were focused on one-to-one speech therapy, following instructions, toilet training, social language development through group sessions, and social development. In addition, one-to-one speech therapy was offered to Abbey for one hour per week on the basis of a private fee. After ten months of group sessions plus the one-on-one speech therapy, Abbey’s mother withdrew abbey from the group session at the EI centre because she felt that her daughter was not benefiting from this therapy as the group catered for children whose development was more than delayed than Abbey’s. After this point in time, Abbey only received weekly one-on-one speech therapy sessions from the EI centre.

The baseline assessment was taken when Abbey had just commenced at the centre-based program at the age of four years, four months. The assessment review was conducted after 12 months when Abbey was aged five years, four months. The results of the assessment scores are presented in Tables 8.33 to 8.36.

During testing in the baseline assessment, Abbey sat very well for the test and she enjoyed working on the items presented. Although Abbey was enthusiastic about the testing, she was stilted in her manners. Her greetings were formal and during testing she repeatedly asked for items on which she had already performed. She also insisted on sitting in the same chair in every session for both the cognitive and the speech and language assessments. During the assessment, Abbey’s level of concentration was good.
The results of the Leiter-R visualisation and reasoning battery revealed that Abbey’s non-verbal IQ was within the very high range compared to other children her age. However, the speech and language assessment revealed significant deficits in receptive and expressive language skills. Her intonation was flat and her speech also evidenced echolalia and stock phrases such as ‘I am very well, thank you’ in conversation. On the Vineland Social and Emotional Scales, Abbey’s developmental age on both the interpersonal relationships scale and the play and leisure time scale was more than two years behind her chronological age.

On the Gilliam Autism Rating Scale (GARS) completed by Abbey’s mother, the autism quotient Abbey obtained placed her in the low range for the probability of autism. Her overall profile showed that Abbey avoided eye contact, repeated words, failed to initiate conversations with peers and adults, and remained aloof in group situations.

The descriptive data drawn from the preschool observation at the baseline assessment indicated that Abbey engaged mostly in solitary play during outside time. She explored the playground by herself. She climbed the equipment and wandered off to a climbing rope around which other children were gathered. She was somewhat excited by the rope and flapped her hands. She pointed to the rope, jumped up and down and said in a monotonous voice, ‘now it’s Abbey’s turn’. She had a turn on the rope but did not move away when it was another child’s turn. When she was prompted to allow another child to have a turn, she did not respond but wandered away to ride a tricycle. Then she pushed a wheelbarrow around. While she was engaged in these activities, she talked to herself and showed little interest in the people around her. The teacher commented that when Abbey commenced at preschool she had no independent skills and was fearful. However, she imitated well and copied what she needed to do with full prompts from the teachers. Further, the teacher said that Abbey displayed both immediate echolalia and delayed echolalia. Abbey did not cope well with changes in routine, showed no response to interaction attempts by peers and often stared into space. She knew numbers, colours and shapes. Her overall score on the autism real-life rating scale was 0.5.

The mid-year observation of Abbey at preschool showed that she was more animated than when she was first observed six months previously. She greeted the examiner and looked happier although she still wandered around in the playground by
herself. In the classroom, she did some pretend cooking in the home corner but did not interact with the other children. She noticed the cue for pack-up time and joined the other children in packing up. During snack time, she sat on the mat and ate her snack independently but did not engage in conversations with the other children. She initiated talking to a helper and showed the examiner her empty drink pack and said, ‘this one goes to the rubbish bin’. The teacher observed that Abbey initiated interaction with other children when the activities were more structured; however, she tended to interact with the same adults or children each time. She also stated that Abbey responded to but seldom initiated conversation. Abbey had also learnt to make choices when she was asked to do so. After snack time, it was observed that Abbey looked a bit lost and stared into space. Then she went to the home corner and put out the playing cards on her own. Her overall score on the autism real-life rating scale reduced to 0.27.

The mid-year observation of Abbey at the EI centre revealed that during story time at the mat, Abbey showed good attention skills when the picture book was read. She followed the teacher’s instructions well whether sitting or moving around the room. Abbey greeted the examiner and said ‘hello’, although with a blank look. When she sat at the table to work, she turned to the teacher and asked for a pen. She cut shapes with scissors independently and showed the examiner what she was cutting. She talked to herself while doing this activity and was oblivious to the noise of the other children in the room. She used some jargon when she talked to herself. Once finished with the cutting, she glued the shapes on paper. When the teacher approached her and asked about the shapes she was pasting, she labelled them as ‘big’, ‘bigger’ or ‘biggest’. Her teacher reported that Abbey’s conversation centred on things that have visual cues such as pictures. For example, she was interested in naming the colours of the baskets. Although she stared into space quite often, she was aware of what was happening in her surroundings. When she was eating her fruit she said, ‘yummy grapes’, and when the child sitting next to her left, she looked at the chair and said, ‘she is gone’. Her overall score on the autism real-life rating scale reduced further to 0.08, indicating that Abbey had begun to display less inappropriate responses.

After 12 months, Abbey was observed at preschool. During this observation, Abbey was more interested in the environment than when she was first observed. She ran
to the climbing equipment, examined a bucket on her way and responded when a boy showed her a toy. However, during free play, there were times when she isolated herself from the others. Instead of joining the other children, she sat on the edge of a tunnel by herself and stared into space. During inside time, when activities were more structured, Abbey interacted socially more with other children. She was capable of having a short conversation with another. During snack time, she took her mat and sat with a group of girls, yet she talked to herself while with these other children. She screwed up her face a bit and said, ‘I didn’t like sandwiches’. She was prompted to eat her sandwich by the assistant. The teacher reported that Abbey had improved socially on a one-to-one basis and was more communicative and chatted with other children. However, in a bigger group, although she fitted in, she sometimes got lost and could not follow what was going on in the group, especially in the case of a more informal group. Her overall score on the autism real-life rating scale was 0.04.

The cognitive and speech assessment review revealed that Abbey was able to attend to tasks and to concentrate. Compared to her baseline assessment scores, Abbey’s non-verbal IQ was still within the very high range compared to other children her age; however, there was a decrease of four IQ points. The speech and language assessment revealed that Abbey’s comprehension score had improved by one standard deviation but her expressive language score had not improved significantly. Her pragmatic language skills were observed to show some improvement, as she used appropriate greetings when prompted and some eye contact. The developmental age equivalent for Abbey’s total language was four years at the time of the review—an increase of 16 months. On the Vineland Social and Emotional Scales, Abbey attained an increase of 19 months in developmental age on the interpersonal relationships scale and an increase of 12 months in developmental age on the play and leisure scale.

The review assessment using the GARS completed by Abbey’s mother showed that Abbey was in the very low range for the probability of autism. The autism quotient was 15 points lower than that at baseline assessment. Abbey had improved her eye contact and her initiation of conversation with peers, and had reduced her echolalia and aloofness in group situations.
Parent

Abbey’s mother completed the Ways of Coping assessment at both the baseline and the review assessment phases. The score differences indicated that Abbey’s mother had most of all increased her use of ‘self-control’ and ‘planful problem-solving’ as ways of coping. She had reduced her use of ‘confrontive coping’, ‘distancing’ and ‘escape–avoidance’ as strategies of coping by the time of the review of Abbey.

8.1.10 Case Study 10

_Lachlan, aged 2 years, 9 months (participation commenced in 2005)_

Lachlan lived with his parents and his four older half-siblings, two on his mother’s side and two on his father’s side. There is a family history of ASD. Lachlan’s father is an architect and his mother is a full-time housewife. There were major concerns about Lachlan’s speech and language development, play skills and social interaction—problems which had been particularly evident in the crèche setting. He was diagnosed with an ASD by his paediatrician and a psychologist at the age of 2 years, 5 months. A speech assessment was also conducted.

Four months after the diagnosis, Lachlan started a home-based ABA program supervised by the psychologist who had assessed him. The psychologist was an ABA program provider who helped Lachlan’s mother to devise an ABA home-based program for Lachlan for 12 to 15 hours per week. Lachlan’s mother gathered the ABA program materials and devised a detailed discrete trial learning program catered to Lachlan’s needs. The program was implemented by Lachlan’s mother as it was difficult to find a therapist located in the country area in which they lived. The program targeted verbal and non-verbal imitation skills, matching, categories, following instructions, emotions, general knowledge and play. Reportedly, Lachlan displayed some behavioural problems initially but was able to attend to tasks in the program after one month. In addition to implementation of the discrete trial learning (DTL) program, after six months Lachlan’s mother added activities from the Relationship Development Intervention (RDI) for young children to the home-based program. Lachlan also attended childcare with a preschool program three days per week. The ABA home-based program was ongoing during the 12 months in which monitoring took place.
The baseline assessments were taken when Lachlan began the home-based program at the age of 2 years, 9 months. The assessment review was conducted after 12 months when Lachlan was aged of 3 years, 9 months. The details of all assessment scores are presented in Tables 8.37 to 8.40.

During testing, Lachlan was easily distracted but his attention could be focused back onto tasks. Lachlan’s non-verbal IQ was within the average range. The language assessment revealed significant deficits in receptive and expressive language skills. His level of eye contact was poor and limited play skills were evident. On the Vineland Social and Emotional Scales, his developmental age on both the interpersonal relationships scale and the play and leisure time scale was more than 1½ years behind his chronological age.

On the GARS completed by Lachlan’s mother, Lachlan’s autism quotient placed him in the low range for the probability of autism. His overall profile showed that Lachlan displayed some features of autism including restricted eating, repeating (echoing) words, failure to initiate conversations, some repetitive behaviours and withdrawn behaviour in groups.

The descriptive data for the childcare observation at baseline showed that Lachlan mostly wandered around aimlessly by himself during outside time in the yard. He was fascinated by the sunlight coming through the leaves of the trees and kept staring at them. When he went over to the wooden table, he rubbed its surface with sand. He grabbed a truck from another child without asking and rolled the truck along the edge of the table. When Lachlan was prompted by his carer to undertake some sand play, he responded by picking up the bucket and making sand castles. He showed some intense interest in the bugs in the sand castles. After playing at the sand pit by himself for awhile, he showed interest in other children. When Lachlan heard someone cry, he went over and asked, ‘What happened?’ It was also observed that Lachlan mainly interacted with his carers, especially with a particular male carer he liked. Lachlan had just commenced a toilet training program and he responded well to stickers, carers’ praise and ‘hi-five’ gestures. His carers were concerned that Lachlan had a limited diet and would not eat the food offered at the childcare centre. His overall quantitative score on the autism real-life rating scale was 0.84.
The mid-year observation of Lachlan was also undertaken at the childcare centre. Lachlan recognised the examiner although he had not seen her for six months. It was snack time and he ate the food he brought from home while other children ate the snack provided by the centre. When he finished his snack, he packed up his snack box, pushed his chair under the table and went over to the construction table. The other children were still eating their snacks at the tables. He then asked his carer to take his train out for him from his special drawer in the cupboard. He maintained good eye contact when he spoke to his carer. The carer explained that Lachlan did not like other children touching his constructions so he had his special drawer to store his train. Lachlan was very interested in constructing his own train, and when other children approached him he was not keen on letting them join in his play and he asked them not to touch his train. He talked to himself while doing his construction. However, he was able to move away from his special interest—train construction—to the play corner to play alongside the other children who were exploring toys. He approached a girl with whom he wanted to play the drum. He demanded the drum stick in a very direct way: ‘Give it to me’. Shortly after, Lachlan found another stick in the box and took away the drum and played it by himself. Compared to his presentation six months previously, Lachlan had more interest in other children and engaged in interactive play with the others, although this play was short-lived and he mainly followed the others. His overall quantitative score on the autism real-life rating scale had reduced to -0.1, indicating that Lachlan was displaying more appropriate responses compared to his presentation at the baseline assessment.

After one year of intervention, Lachlan was observed in the childcare centre again. At this time, Lachlan engaged in a lot of parallel play but he was more interactive with his peers than he was 6 or 12 months prior. During the play with the kitchen set, he initiated saying, ‘my turn’. He collected a couple of small containers and counted them, ‘one, two, three, four’, and put them into the oven. He also responded appropriately when he was approached by other children. When a child walked past him and nearly tripped over, Lachlan said, ‘You stop. Be careful’. There were times when Lachlan preferred to play by himself. He lined up trucks and rolled a truck along the side of the sand pit. When a child tried to take the truck away from him, he did not let go. During story time, when the teacher asked who wanted to pull down the picture in the story book, Lachlan raised
his hand, waited for the teacher’s call and went to pull down the picture appropriately. He also followed the instructions to line up and washed his hands before eating, and asked for help when he was unable to turn on the tap. During snack time, Lachlan did not eat the food offered by the centre and instead only drank water. His overall quantitative score on the autism real-life rating scale at the EI had further reduced since mid year to -0.11, indicating that Lachlan had made some significant improvement in his social relating since he commenced the EI therapy.

Lachlan showed some improvement in his behaviour during the 12-month assessment period. He was able to sit still and work on the items presented; however, his attention span was still relatively short and when he refused to continue at some points, it was not easy to return his attention to tasks. Lachlan’s non-verbal IQ score on the Leiter-R had improved by 20 IQ points (moving from the average category to the high category). The developmental age equivalent for Lachlan’s total language had increased by 16 months. On the Vineland Social and Emotional Scales, there was a gain of 16 months in developmental age on the interpersonal relationships scale and a gain of 20 months in the play and leisure time scale over the 12 months of participation in the home-based ABA program and childcare.

The GARS was again completed by Lachlan’s mother, and Lachlan’s autism quotient was 3 points lower than at the baseline assessment, which still placed him within the low average range for his autism—similar to that at baseline. However, his overall profile showed that over the 12 months, Lachlan engaged in less pacing and staring. He was significantly less echolalic in his speech, more likely to initiate conversation with others, more likely to imitate others in play and less repetitive and ritualistic in behaviour. *Parent*

Lachlan’s mother completed the Ways of Coping assessment at both the baseline and 12 months later. The score differences indicated that Lachlan’s mother had most increased her use of ‘planful problem-solving’ as a way of coping, followed by ‘distancing’, and she had reduced her use of ‘positive reappraisal’, ‘confrontive coping’ and ‘seeking social support’ as strategies for coping.
8.1.11 Case Study 11

Lucas, aged 4 years, 3 months (participation commenced in 2005)

Lucas was an only child whose parents were both doctors. His father worked full-time as a GP and his mother worked part-time and pursued further study. Lucas had become increasingly withdrawn since the age of around 3 years. He seemed to be in his own world most of the time and only joined in activities with his parents when forced to do so. Lucas was seen by two paediatricians and one psychiatrist. He was subsequently diagnosed with an ASD at 3 years, 5 months by a developmental paediatrician, and then was assessed by a speech pathologist. The results of the speech and language assessment revealed that Lucas had very significant difficulties in receptive, expressive and pragmatic language skills. Lucas’s mother reported that both she and her husband were quite devastated by the diagnosis of ASD and were worried about their son’s future. They had inquired about ABA home-based and EI centre-based programs. After some research and two weeks with ABA programs, they stopped their involvement in the ABA home-based program as they doubted its effectiveness after their friends’ child did not show any progress after one year in an ABA program. They were also concerned about the expenses involved. After they stopped their son’s participation in the ABA home-based program, Lucas was accepted into an EI centre which catered for children who had developmental needs including ASD. Lucas also attended a 4-year-old preschool program with aide support.

The baseline assessment was conducted just before Lucas commenced EI at the age of 4 years, 3 months. The assessment review was conducted after 12 months when Lucas was at the age of 5 years, 3 months. The details of the assessment scores are presented in Tables 8.41 to 8.44.

During the baseline assessment, Lucas was very quiet and showed limited eye contact. His general affect was flat. He was compliant and followed the instructions of the examiner well. The results of the Leiter-R visualisation and reasoning battery revealed that Lucas’s non-verbal IQ was within the average range compared to other children of his age. The results of the speech and language assessment revealed that Lucas’s performance was nearly 3 standard deviations below the mean for both receptive and expressive language skills. On the Vineland Social and Emotional Scales, his
developmental age on both the interpersonal relationships scale and the play and leisure
time scale was more than two years behind his chronological age.

On the GARS completed by Lucas’s mother, Lucas obtained an autism quotient
which placed him in the low range for the probability of autism. The items endorsed with
higher frequency were: making high pitched sounds; avoiding eye contact; failing to
initiate conversation; repeating unintelligible sounds over and over again; answering
questions inappropriately; being withdrawn; and behaving in an unreasonably fearful,
frightened manner.

The descriptive data drawn from the preschool observation at the baseline showed
that Lucas isolated himself most of the time, showed limited response to activities in his
environment and ignored interaction attempts. Lucas was with his integration aide at the
sandpit when the examiner arrived. His aide prompted him to greet the examiner but he
hid his face in his hands. Lucas spent quite a lot of time at the sandpit by himself. At
times, he threw sand at other children and was directed away by his aide. When prompted
by the aide to play with his peers, he ran after them. Then he sat on the swing and stared
into space. After that, he jumped on a piece of wood. Lucas was very isolated in the
playground. When Lucas’s teacher asked the children to line up to go inside, Lucas
followed her instructions and lined up with the other children; however, he then rushed
into the room without following the routine of washing his hands. He was called back by
his aide to wash his hands. He was able to get his lunch box independently and sat down
to eat his snack. He half gestured his aide to help him to unpeel the cheese stick and his
aide was able to interpret what he wanted. He ate his cheese and grapes quietly without
interacting with the other children. His overall quantitative score on the autism real-life
scale was 0.55.

The mid-year observation of Lucas was undertaken at the preschool and at his EI
centre. At preschool, Lucas seemed to respond more appropriately to the activities in his
environment after six months. He involved himself in painting and tried out different
colours. He required prompting from his aide to put his name on his painting. He
understood the ‘finish’ visual sign and he took off his smock independently. He was also
in the process of learning to use the PECS cards introduced by the EI centre. He was
practising making choices. He was prompted by his aide to choose what to do next after
the painting activity and he picked up the card for block building. He seemed to want to join a group of boys in block building and he pulled the hands of his aide to signal that he did. This showed that Lucas was interested in interacting with other children although he did not know how to approach them. Lucas was capable of holding a simple conversation with the other children when assisted by his aide, which included answering ‘yes’ and ‘no’. However, he had echolalia in his speech. When his aide asked him about the block, ‘Where does that go?”, Lucas repeated the question. When he was doing puzzles, he responded to prompts by his aide to put the puzzles together. When he completed the puzzles, he put the finish sign in the box and gave a ‘hi-five’ to his aide. During the observation, it was also noted that he mouthed a piece of puzzle and he looked blank sometimes. Overall, he was less isolated and more interactive with others than he was before he had commenced EI. His overall quantitative score on the autism real-life scale reduced to 0.19, indicating that Lucas displayed fewer inappropriate responses compared to his behaviour at baseline.

Lucas was observed at the EI program at mid-year. When the examiner arrived, Lucas was receiving some PECS training from the speech pathologist. Lucas was involved and interactive with the speech pathologist. After training, he was directed to play a game with another boy. With prompts, he was able to take turns and to wait. However, he displayed limited eye contact. He then moved on to other activities including making a potato head and a pasting activity. He was able to choose between colours and said ‘Pink’ when offered a couple of colour sticks. He had a friend at EI and he commented on some of the work his friend had made: ‘Beautiful, John’. He also took the initiative to ask his friend to play with him: ‘Come to the corner’. However, sometimes when Lucas spoke his speech was unintelligible, and his facial expression, on the whole, was quite flat. Although he was keen to play with his friend, he was quite reluctant to play with the other children even when prompted. He would rather stand and watch. His overall quantitative score on the autism real-life scale reduced to -0.01, indicating that Lucas made some appropriate responses in the EI setting.

After one year of intervention, Lucas was observed at the same preschool and during EI. At preschool, Lucas displayed a more communicative use of language and continued to respond appropriately to activities in his environment. His responses to
interaction attempts were sometimes appropriate, but sometimes there was no or only a very brief response to communication attempts. Lucas could engage himself in reading books but he flipped through the books quickly, then saying, ‘Finished’. When reading books with his aide, he showed some interest in the pictures and responded to questions with one- to two-word answers. He was then prompted by his aide to choose another activity. He chose drawing and went over to a table and drew a picture of a train. When other children came to join the table, Lucas was quite oblivious to their presence and kept working on his train. After drawing, he was directed to do dots on paper with the other children at the table. When a boy spoke quite loudly behind his back, he turned around and said, ‘Sh!’ When the teacher came to the table and put away the pens, he protested, ‘No, I am making spots’. Although he was speaking to his teacher, he made no eye contact. There were times when Lucas stared into space and needed to be focused back on tasks by his aide or teacher. Towards the end of the observation session, Lucas followed the room routine to select new library books and put them into his library bag. His overall quantitative score on the autism real-life scale was 0.04.

The observation after 12 months of intervention revealed that at the EI centre Lucas responded quite frequently to interaction attempts and activities in his environment and that his responses were predominantly appropriate. He also initiated and responded to communication. His EI teacher reported that his language skills and socialisation had improved significantly. During the 30-minute observation, Lucas followed the room routine very well. He followed instructions to throw a ball and say his name in the ‘hello’ song, sat with the group and concentrated well. He enjoyed the game of musical chairs and in general followed the rules of the game, yet he required prompts to sit on the chair. His general affect was less flat compared to his behaviour of 12 months previously. He was also a little excited by the rhythmic music in the musical chairs game. At times, he still stared into space, isolated himself and made no response to communication attempts. Overall, his communicative and social behaviours outweighed his non-communicative behaviours and his overall quantitative score on the autism real-life scale further reduced to -0.07.

The review assessment revealed that Lucas’s IQ score on the Leiter-R was the same as his score at the baseline assessment. He did not make much progress in his
language skills or interpersonal and play skills, as revealed by his scores on the speech and language assessment and the Vineland Social and Emotional Scales. However, during clinical observation, Lucas communicated with his limited speech in a quite appropriate way, being able to approach other children and engage with them in play when prompted after 12 months of EI. His test behaviour did not show significant improvement. He displayed limited eye contact and did not show much interest in the test items presented. However, he was quite compliant and followed the examiner’s instructions.

The review assessment using GARS completed by Lucas’s mother showed that the autism quotient obtained by Lucas’s mother was similar to the score obtained at baseline. However, in the items endorsed by his mother, there was some decrease in ratings compared to the ratings at the baseline assessment: making less high-pitched sounds, responding more when his name was called, and less repetition of unintelligible sounds.

Parent

Lucas’s mother completed the Ways of Coping assessment at both the baseline and review assessment phases. The score differences showed that Lucas’s mother had reduced her use of ‘positive reappraisal’ significantly, followed by a reduction in her use of ‘escape–avoidance’ and ‘confrontive coping’. She had increased her use of ‘planful problem-solving’ after Lucas had been in EI for 12 months.

8.1.12 Case Study 12

Liam, aged 3 years, 2 months (participation commenced in 2005)

Liam lived with his parents, his older sister, aged 4 years, and a baby brother, aged 12 months. There were no concerns about his sister’s development. Liam’s mother was a social worker and was on maternity leave at the time when Liam joined the longitudinal study. Liam’s parents raised concerns about his development when Liam was 2 years old. At that time, Liam could express no words and only babbled. He displayed some difficult behaviours including hyperactivity, running away, lengthy tantrums and anxiety in social situations. Consultation with a developmental paediatrician resulted in a diagnosis of an ASD at the age of 2 years, 3 months. The diagnosis was confirmed by a psychologist and a speech pathologist.
His developmental history revealed that Liam was born by planned caesarean. For the first 6–7 months he was very difficult to settle, cried a lot and woke frequently. He was more settled at 13 months. His motor milestones were all age appropriate, yet his language development was always slow. He babbled at 10–12 months and then stopped. At the time when he was diagnosed with an ASD, he made sounds but not in an attempt to communicate. He did not respond to his name but he pointed to indicate his needs. Liam was extremely anxious in a novel social situation. Playgroup attendance was discontinued because of his distress. He enjoyed tactile sensations such as sand, dirt and water. However, he was sensitive to the touch of fabrics and for 6–8 months had experienced distress when dressing. After some time waiting, he commenced at an EI centre which catered specifically for children with autism for 2½ hours per week. He also attended a playgroup for 3 hours per week.

The baseline assessment was taken just before Liam commenced at the EI program at the age of 3 years, 2 months, and the assessment review was conducted after 12 months at the age of 4 years, 2 months. The details of the assessment are presented in Tables 8.45 to 8.48.

The cognitive and speech and language assessments were conducted at Liam’s home. During the assessment, Liam’s attention span was very short and he preferred to respond on his own terms and hence was not compliant. Liam required a lot of breaks during the assessment and a great deal of effort was required to engage him in the tasks.

The results on the Leiter-R visualisation and reasoning battery revealed that Liam’s nonverbal IQ was within the below average range compared to other children of his age. The speech and language assessment revealed significant deficits in receptive and expressive language skills. On the Vineland Social and Emotional Scales, his developmental ages on the interpersonal relationships scale and on the play and leisure time scale were more than two years behind his chronological age.

On the GARS completed by Liam’s mother, the autism quotient Liam obtained placed him in the average range for the probability of autism. His overall profile showed that Liam avoided eye contact, stared, had a restricted diet, repeated words over and over, spoke with flat affect, failed to initiate conversation, remained aloof in group situations,
used toys inappropriately, did certain things repetitively, became upset when routines were changed, and lined up objects.

The descriptive data gathered from the playgroup observation at the baseline assessment showed that Liam mouthed objects, had minimal communication with others, did not respond to communication attempts, and isolated himself most of the time. In the classroom, Liam darted from one end of the room to the other. He had some parallel play with others at the equipment but he was mostly by himself, either at the corner working on something or sitting by himself observing others. It was noted that he mouthed a ball on three separate occasions. At one point, he picked up a piece of plastic tomato and offered it to a mum in the playgroup. Towards the end of the observation, he said, ‘lunch’ and sat down to have a sandwich by himself. While he was eating, he looked across to a group of girls who were singing and clapping, and copied their actions. His overall quantitative score on the autism real-life scale at the baseline was 0.42.

Liam was only observed at the EI centre at mid year as he was to commence a preschool program soon and he had stopped participating in the playgroup program. Liam was noted to respond to the activities in the classroom appropriately. He tended to isolate himself less in this structured and supported program. He appeared quite enthusiastic to participate in an activity that involved choosing colour sticks on a stick tree. He was animated and named two colours: ‘orange’ and ‘pink’. He walked away from the tree in the middle of the activity and when he was brought back, he screamed. However, he settled quickly and stayed to complete the activity. Then Liam moved onto painting and he was able to take the smock and the brush and painted some spots on paper. He was able to say, ‘spots’ after he splashed in a couple of dots. During group time, he was able to follow pictorial instructions. He was also able to take turns in the ‘hello’ song. In another turn-taking game, Liam was able to take his turn and responded to the question ‘Whose turn?’ with ‘My turn’ a couple of times. However, in the middle of another song, he suddenly screamed. The teacher explained that the previous week the CD had not been running well and had made a clicking noise at the particular point that Liam screamed on this occasion. He also displayed limited eye contact and was not interested in what his partner was doing in a joint game. His overall quantitative score on the autism real-life scale at the EI mid-year observation had reduced to -0.16.
Observation after 12 months was undertaken after Liam had been participating in a preschool program for over 6 months with aide support. Overall, Liam had improved significantly in his ability to respond to interaction attempts and activities in the room compared to his behaviour 12 months earlier at the playgroup. During outside time, Liam played alongside other children in the playground. He was animated and displayed some good eye contact. He looked happy when he was inside the tunnel and when he stood at the top of the slide, he asked for help to gain his balance. In the tree house, he engaged in some imaginative play with other children although his role was passive. During mat time, the plan was for him to sit for 10 minutes. Liam did sit well for the first 10 minutes on a sensory cushion and reached the target. He then became fidgety and moved on to one-to-one time with his aide to read a story. They read a story which Liam seemed to enjoy inside a plastic castle. His overall quantitative score on the autism real-life scale at the observation at review assessment had further reduced to -0.11, indicating that Liam’s number of appropriate responses was more than his inappropriate responses.

The review assessment at the EI centre revealed that Liam was able to communicate in 3 to 5 word phrases. During mat time, he said, ‘Hi, my name is Liam’. During story time, he was not very interested in the book. However, he sat well holding a shaker. At table activities, he was able to choose the colour of the sheets and name the colours. He cut the sheets independently and followed instructions to get the glue and turn over the sheet. He was able to provide appropriate responses when asked simple questions such as ‘What’s next?’ Liam was also able to sit at the table to complete his work and he showed some interest in the work of a child sitting next to him. In turn-taking games, Liam was able to say his turn and also the turn of another child. He was animated when he participated in a game with another child and his eye contact had improved. His overall quantitative score on the autism real-life scale at the review observation had further reduced to -0.14.

In the review GARS completed by Liam’s mother, Liam scored 6 points higher on the autism quotient compared to that obtained at baseline. In the communication subtest, Liam’s mother reported that, compared to baseline, Liam repeated words out of context in a higher frequency. He also responded more inappropriately to simple commands and ‘yes’ and ‘no’ questions, and used pronouns inappropriately. The reason for these higher
ratings in autistic features in relation to communication at the review assessment may be because Liam was using language more compared to baseline, and that consequently his autistic features related to communication became more pronounced.

At the review cognitive and speech assessments, Liam’s attention span had improved, but compared to other children of his age it remained short. Compared to the baseline assessment results, the results of the review assessments showed that Liam’s nonverbal IQ had improved and was within the average category. However, there were still significant deficits in his receptive and expressive language abilities compared to other children of his age. There was a gain of 17 IQ points and a gain of 8 months in language abilities measured by developmental age. On the Vineland Social and Emotional Scales, Liam attained an increase of 7 months on the interpersonal relationships scale and an increase of 6 months on the play and leisure time scale measured by developmental age.

**Parent**

Liam’s mother completed the Ways of Coping assessment at both the baseline and review assessment stages. The score differences showed that Liam’s mother had increased her use of ‘seeking social support’ and ‘distancing’ strategies, and she had reduced her use of ‘confrontive coping’ as a way of coping.

### 8.2 Discussion

The age of commencement at EI program, the duration and intensity of intervention, IQ, language level, autism severity and types of EI programs of the 12 children participating in this study were analysed in relation to gains in the main developmental areas of the child, namely, cognition, language abilities, interpersonal relationship skills, and play and leisure skills (see Chapter 7 for results and discussion). In this chapter, themes in relation to socio-economic status of the families, severity of autism (parental perception versus examiners’ observation), and coping strategies adopted by parents were identified. Individual differences were further discussed.

Socio-economic status (SES) of the family was found to be a factor affecting the placement of children in ABA home-based programs in the questionnaire surveys (the study and the follow-up study) of this research (see sections 5.9 and 6.10). Families that
engaged in an ABA program appeared to be from a higher socioeconomic background and that remained unchanged overtime. In the longitudinal study, parents of the three children involved in ABA programs were from a higher socioeconomic background. Sam’s parents ran a business; Lachlan’s father was an architect and Jessie’s mother was a teacher. Parents of the other nine children participated in other forms of EI were from a variety of occupations – bus driver, manager, doctor and computer programmer, housewife, and stay-at-home father. Results in the longitudinal study supported the findings in the questionnaire surveys that higher SES families were more able to afford the cost of running an ABA program.

In Chapter 7, results revealed that out of the 11 children who completed pre- and post- cognitive assessments, two younger children (Liam, aged 3 years, 2 months and Lachlan, aged 2 years, 9 months) made more gains (>10 IQ points) than the other nine older children who made IQ gains less than 10 points. Joshua, aged 4 years, 11 months, was the only child who made a negative gain of more than 10 IQ points at review. It was noted that at baseline, Joshua had a high nonverbal IQ score (94th percentile), and his total language abilities were 5 months behind his chronological age and his interpersonal skills and play skills were more than 2 years behind his age. After 12 months at review, Joshua failed to show gains on the nonverbal cognition test. However, Joshua made some good improvement (more than 15 months by developmental age) in language abilities, interpersonal skills and play skills.

Two other trends identified which had significant correlations in Chapter 7 were: (1) the older the child, the more gain in interpersonal relationship was obtained after a year of intervention; and (2) older children have a higher expressive language gain. Out of the 12 children under assessment, two children (Michael, aged 4 years, 7 months and Benjamin, aged 5 years, 2 months) had a gain of more than 30 developmental months in interpersonal relationship after a year of intervention. Michael had a baseline IQ of 122 and Benjamin had a baseline IQ of 105. Both children attended a whole-day autism-specific centre-based program. Out of the 11 children who completed the pre- and post-language assessments, three children had a gain of more than 30 developmental months in expressive language skills after a year of intervention – Sam, aged 4 years, 8 months, and also Michael and Benjamin as reported above. Sam had a baseline IQ of 119 and
attended a home-based ABA program. He made a modest gain of 15 developmental months in interpersonal relationship. Sam, Michael and Benjamin all have a non-verbal IQ from the average to the high category and they belong to the high functioning group of children with ASD. They all made significant gains in expressive language skills but Michael and Benjamin made more gains in interpersonal relationship (>30 developmental months). One major difference between the three children is the EI placement. While Michael and Benjamin attended a whole-day autism specific centre, Sam attended a home-based ABA program. In the survey studies from this research, results revealed that social competence was the highest program outcome for centre-based program while it was a modest program outcome for home-based ABA program (see section 6.9 for detailed results). The longitudinal case studies further supported these findings. Michael, Benjamin and Sam were older children and were all cognitively high functioning. While Sam made significant gains in expressive language skills, he made less gain in interpersonal relationship as compared to Michael and Benjamin. It is speculated that the type of EI placement may be a major factor that affects the specific developmental outcome of the children with autism.

In the longitudinal study, the index scores from the Ritvo-Freeman Real Life Rating Scale (RLRS) provide data for the behaviours indicative of autism at pre-intervention, mid-intervention and post-intervention. The rating scale was completed by the examiner with ratings from a second observer in 20% of the observation sessions. A trend analysis compared the index scores for these three points of observation times (T1 – baseline, T2 – mid-intervention and T3 – review) over the 12-month when the child had intervention and time demonstrated a significant quadratic trend (results see Chapter 7 section 7.6, figure 7.11). The significant trend suggests that children after attending EI for six months, demonstrated a reduction of autism-related behaviours (sensory-motor, social, affect, sensory and language) and that the effect level tapered off during the next six months. However, ratings by parents on the GARS at pre- and post-assessments did not reveal similar significant differences in scores. Parents’ perception of their child did not demonstrate a significant reduction of autism-related behaviours in the areas of stereotyped behaviours, communication, social Interaction and developmental after their
child had a year of intervention. The following case analyses may provide some pointers to the differences of the Ritvo-Freeman RLRS scores and GARS scores.

Out of the 12 parents who had a child under assessment in the longitudinal study, five parental ratings at review indicated a higher overall GARS score with a baseline and review difference (gain) from $+6$ to $+15$ points indicating more autistic behaviours were observed by parents at review. However, the Ritvo-Freeman RLRS ratings by the examiner showed a negative score in overall rating, suggesting a decrease of autistic symptoms at review by the examiner’s observations (also supported with the second observer in 20% of the observation sessions). An examination of the subtest scores is summarised in Table 8.1 on page 218. Individual GARS subtest scores and Ritvo-Freeman RLRS ratings can be found in Appendix S. The increase in GARS scores was found in the subtest of (1) stereotyped behaviours in four children (John, Jessie, Joshua and Corey), (2) social interaction in two children (Corey, Joshua) and (3) communication in one child (Liam). One possible explanation is that the parents of these four children had gained more knowledge about autism through parental education and skills training programs/seminars, information provided by EI centres or agencies supporting the welfare of the parents and the child, and/or information on autism from different sources such as books and the internet. Because of increased knowledge, these parents were more aware of the autistic symptoms of their children at review than when their children first entered EI at baseline. For Corey, his increase of stereotyped behaviours was also noted in the Ritvo-Freeman RLRS ratings by the examiner. At review, his score on sensory motor responses was higher than that of the baseline score, indicating more repetitive behaviours. In the case of Corey, he received less EI (8 months) than other children as he commenced school after 8 months of EI. On the other hand, six GARS parental ratings showed a decrease in overall ratings at review showing that their children displayed less autistic symptoms at review. Out of the six children, five children (Sam, Benjamin, Michael, Abbey and Lachlan) showed a decrease of autistic symptoms in the subtest score of communication. The results were consistent with similar reduction of autistic symptoms measured by the language subscale in the Ritvo-Freeman RLRS ratings by the examiner in all the five children. In fact, Sam (aged 4 years, 8 months), Michael (aged 4 years, 7 months) and Benjamin (aged 5 years, 2 months) were the three older children.
who had made significant gains of more than 30 months (measured by developmental age) in expressive language skills measured by standardised tests at review. Overall, there are areas of agreements between GARS scores and Ritvo-Freeman RLRS scores and there are areas of disagreements. Both GARS and Ritvo-Freeman RLRS are established instruments to rate the autistic symptoms. In the present study, GARS was used by the parents and Ritvo-Freeman RLRS was used by the author. GARS scores represented the parental view of the child’s autistic symptoms which mostly will be based on the child’s behaviour at home or with the family. Ritvo-Freeman RLRS was used mostly in a preschool or EI setting by the examiner. Another speculated reason for the differences was some children with autism may exhibit more autistic behaviours at home after attending preschool or EI where they were expected to follow group rules and behave in a socially appropriate way. At home, these children may be more “off guard” and show more of their autistic self whereas their autistic behaviour may have reduced in a more structured and supported setting such as preschool or EI.

For ways of coping of parents, analyses in Chapter 7 revealed that the pre- and post-rating differences of parents after their children had a year of intervention were not significant. Further analyses indicated that significant relationships were found between two factors (age of start in EI, IQ baseline); and the use of certain coping strategies. Parents of older children (near school age) tended to do more positive reappraisal, adopted more confrontive strategies and used less distancing strategies. Also the lower the child’s IQ, the parent tended to use “accepting responsibility” more as a coping behaviour (refer to section 7.6). In the case studies in this chapter, relationships cannot be identified between parental perceptions of their child’s autistic behaviours and the coping strategies they adopted. Out of the five parents who perceived increase in autistic behaviours in their children reacted differently with their coping strategies at review. Parents of John, Jessie and Liam increased the use of “escape-avoidance”, “self-control” and “distancing” and reduced the use of “planful problem-solving”, “positive reappraisal” and “confrontive coping” while parents of Joshua and Corey increased the use of “positive reappraisal” and “planful problem-solving” and “confrontive coping” and reduced the use of “distancing”, “escape-avoidance” and “seeking social support”.

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However, when the age of start of EI of their child was taken account of, the results of the case studies support the findings in Chapter 7 section 7.5 that the older the children, parents tended to use more positive reappraisal, adopted more confrontive strategies and used less distancing strategies. Both Joshua and Corey (>4 years) are school aged while John, Jessie and Liam were younger (≤ 4 years).

A similar pattern was observed when parents perceived a decrease in autistic behaviours in their children. Except for the parent of Sam (>4 years), three parents (Benjamin, Michael, Abbey) with an older child (>4 years) increased the use of “positive reappraisal” and “planful problem-solving” and reduced the use of “distancing” and “escape-avoidance”. Parents (Danny, Liam, Lachlan) with a younger child (<4 years) tended to increase the use of “distancing” and “accepting responsibility” and “seeking social support”. One tentative explanation is that parents with older children were confronted with their children transitioning to primary school and they needed to be proactive to adopt a planful problem solving approach at this time while parents of the younger children did a lot of planning when their child was first diagnosed and now after 12 months of intervention, they might sit back and feel that there was less they could do at this point in time and resort to using other coping behaviours such as “distancing” and “escape-avoidance” to relieve their stress. For this group of parents, it might be the time that they need the support to help them to raise a child with ASD and to deal with the day-to-day challenges with renewed energies. This aspect of the findings has not been reported in the literature so far. It needs support with a larger sample.

8.3 Conclusion

To combine the discussion in Chapter 7 and that of the present chapter, results in the longitudinal study showed improvements in raw scores or age equivalent scores in cognition, language, interpersonal relationships, play and severity of autism, although standard scores changed little over time for most children. There were no significant pre- and post- assessment differences when IQ at baseline and age of start at EI were taken into account. These results are similar to findings of a two-year follow-up study of
### Table 8.1
**Examination of scores for the 12 case studies**

<table>
<thead>
<tr>
<th>Case Studies</th>
<th>Pre- and Post-GARS score difference</th>
<th>Subtest(s) of autistic behaviours in GARS</th>
<th>Pre- and Post-RLRS Score difference</th>
<th>Ways of Coping at review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1: John</td>
<td>+ 14</td>
<td>Increase in stereotyped behaviours</td>
<td>-0.56</td>
<td>Increase use of “accepting responsibility”, “self-control” and “escape-avoidance”</td>
</tr>
<tr>
<td>(4 yrs)</td>
<td></td>
<td></td>
<td></td>
<td>Reduce use of “positive reappraisal” and “planful problem-solving”</td>
</tr>
<tr>
<td>Case 2: Jessie</td>
<td>+ 7</td>
<td>Increase in stereotyped behaviours</td>
<td>-0.27</td>
<td>Increase use of “self-control”, and “escape-avoidance”</td>
</tr>
<tr>
<td>(3 yrs, 7 mths)</td>
<td></td>
<td></td>
<td></td>
<td>Reduce use of “positive reappraisal” and “planful problem-solving”</td>
</tr>
<tr>
<td>Case 3: Sam</td>
<td>- 12</td>
<td>Decrease in autistic symptoms in communication and social interaction</td>
<td>-0.6</td>
<td>Increase use of “escape-avoidance”</td>
</tr>
<tr>
<td>(4 yrs, 8 mths)</td>
<td></td>
<td></td>
<td></td>
<td>Reduce use of “positive reappraisal” and “planful problem-solving”</td>
</tr>
<tr>
<td>Case 4: Benjamin</td>
<td>- 10</td>
<td>Decrease in autistic symptoms in communication and social interaction</td>
<td>-0.26</td>
<td>Increase use of “positive reappraisal” and “planful problem-solving”</td>
</tr>
<tr>
<td>(5 yrs, 2 mths)</td>
<td></td>
<td></td>
<td></td>
<td>Reduce use of “distancing”, “escape-avoidance” and “accepting responsibility”</td>
</tr>
<tr>
<td>Case 5: Joshua</td>
<td>+ 11</td>
<td>Increase in stereotyped behaviours and autistic symptoms in social interaction</td>
<td>-0.28</td>
<td>Increase use of “positive reappraisal”, “planful problem-solving” and “confrontive coping”.</td>
</tr>
<tr>
<td>(4 yrs, 11 mths)</td>
<td></td>
<td></td>
<td></td>
<td>Reduce use of “distancing”, “escape-avoidance” and “seeking social support”.</td>
</tr>
<tr>
<td>Case 6: Corey</td>
<td>+ 15</td>
<td>Increase in stereotyped behaviours and autistic symptoms in social interaction</td>
<td>-0.13</td>
<td>Increase use of “seeking social support”, “confrontive coping” and “planful problem-solving”.</td>
</tr>
<tr>
<td>(4 yrs, 10 mths)</td>
<td></td>
<td></td>
<td></td>
<td>Reduce use of “accepting responsibility” and “escape-avoidance”</td>
</tr>
<tr>
<td>Case Studies</td>
<td>Pre- and Post- GARS score difference</td>
<td>Areas of autistic behaviours in GARS</td>
<td>Pre- and Post- RLRS Score difference</td>
<td>Ways of Coping at review</td>
</tr>
<tr>
<td>--------------</td>
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<td>-------------------------</td>
</tr>
<tr>
<td>Case 7: Michael (4 yrs, 7 mths)</td>
<td>- 8</td>
<td>Decrease in autistic symptoms in communication</td>
<td>-0.59</td>
<td>Increase use of “seeking social support”, “positive reappraisal” and “confrontive coping”. Reduce use of “distancing” and “self-control”</td>
</tr>
<tr>
<td>Case 8: Danny (3 yrs, 1 mth)</td>
<td>- 19</td>
<td>Decrease in autistic symptoms in social interaction and stereotyped behaviours</td>
<td>-0.32</td>
<td>Increase use of “accepting responsibility”, “seeking social support” and “self-control” Reduce use of “distancing”, “planful problem-solving”</td>
</tr>
<tr>
<td>Case 9: Abbey (4 yrs, 4 mths)</td>
<td>- 15</td>
<td>Decrease in autistic symptoms in communication and social interaction</td>
<td>-0.46</td>
<td>Increase use of “self-control” and “planful problem-solving”. Reduce use of “confrontive coping”, “distancing” and “escape-avoidance”</td>
</tr>
<tr>
<td>Case 10: Lachlan (2 yrs, 9 mths)</td>
<td>- 3</td>
<td>Decrease in autistic symptoms in communication, social interaction and stereotyped behaviours</td>
<td>-0.95</td>
<td>Increase use of “planful problem-solving” and “distancing” Reduce use of “positive reappraisal”, “confrontive coping” and “seeking social support”</td>
</tr>
<tr>
<td>Case 11: Lucas (4 yrs, 3 mths)</td>
<td>-2</td>
<td>Decrease in autistic symptoms in communication</td>
<td>-0.62</td>
<td>Increase use of “planful problem-solving” Reduce use of “positive reappraisal”, “confrontive coping” and “escape-avoidance”</td>
</tr>
<tr>
<td>Case 12: Liam (3 yrs, 2mths)</td>
<td>+ 6</td>
<td>Increase in autistic symptoms in communication</td>
<td>-0.56</td>
<td>Increase use of “seeking social support” and “distancing” Reduce use of “confrontive coping”</td>
</tr>
</tbody>
</table>
community-based early intensive behavioural intervention and specialist nursery provision for children with ASD (Magiati et al., 2007).

However, in both studies, some interesting results were found. In the study of Magiati et al., a difference approaching significance in favour of the intensive behavioural home-based intervention was found towards Vineland daily living skills standard scores, with a large effect size. Also intake IQ and language level were found to best predict overall progress. In the present study, significant correlations were found between (1) age of start at EI and IQ gains after a year of intervention; and (2) age of the child and gains in interpersonal relationship and expressive language skills. There were the trends of (1) the lower the age of start at EI, the larger the IQ gains (case studies of Liam and Lachlan); (2) the older the child, the more gains in interpersonal relationship (case studies of Michael and Benjamin); and (3) older children have a higher expressive language gain (case studies of Sam, Michael and Benjamin). In the present study, age of the child seems to be a good predictor of developmental gains in the areas of IQ, interpersonal relationship, and expressive language gains. The results are consistent with the literature, the lower the age of start, the higher the IQ gains (Harris and Handleman, 2000; Fenske et al. 1985; Granpeesheh et al., 2009). Ingersoll et al. (2005) examined the impact of their centre-based developmental intervention on the expressive language of young children (2 to 3 years of age) with autism. Two of the three boys showed maintenance of higher rates of expressive language at 1-month follow-up. The present study further finds that older children (4 to 5 years of age) make more gains in expressive language (>30 developmental months) after a year of intervention. Apart from older age of start at EI, Sam, Michael and Benjamin all have a non-verbal IQ from the Average to the High Average category and they belong to the high functioning group of children with ASD. In chapter 7 section 7.6 figure 7.9, results showed that higher IQ measures are significantly related to more expressive language gains in children with ASD in EI. Paul et al. (2008) in a two year follow up study of 37 young children with ASD (15-25 months of age) found that higher average nonverbal cognitive level is a predictor for better expressive language outcome in the preschool period. Results of the case studies showed that older age of start at EI and an average to high average IQ are predictors of expressive language gains.
Another profile characteristic depicted in Chapter 7 was that children in either home-based ABA programs or in autism-specific centre-based programs seemed to gain higher developmental outcomes. The three case studies of Benjamin, Michael and Sam further illustrated that while Sam (home-based ABA program) made similar significant gains in expressive language skills compared to Michael and Benjamin (whole-day autism specific centre-based program), he made less gain in interpersonal relationship as compared to Michael and Benjamin. The type of EI program seems to have an impact on the child’s developmental outcomes. The results of these three case studies are consistent with findings in the surveys in the present study in that children in ABA programs made less gains in social competence.

The case studies of Sam, Lachlan and Jessie further provided data to support that SES of the family may be a factor as to whether the home-based ABA program was chosen as a therapy for the child. All three families in a home-based ABA program in the case studies were from a higher SES background.

One interesting phenomenon in the longitudinal study was that the GARS scores completed by parents and the Ritvo-Freeman RLRS scores by the examiner were not consistent. While Ritvo-Freeman RLRS scores (rated by the examiner) revealed an overall significant reduction of autism-related behaviours at review, the GARS scores (rated by parents) were varied at review. Some GARS scores indicated an overall reduction of autism-related behaviours and some GARS scores revealed identification of more autism-related behaviours. There were no significant correlations found between parental perceptions of the child’s autistic behaviours and the coping strategies parents adopted. One possible explanation was that because of increased knowledge of autism, the parents were more aware of the autistic behaviour of their child at review than when their child first commenced at EI. Another reason was that GARS scores represented the parental view of the child’s autistic symptoms which mostly would be based on the child’s behaviour at home or with the family, while Ritvo-Freeman RLRS was used mostly in a preschool or EI setting by the examiner.

For ways of coping of parents, significant relationships were found between two factors (age of start in EI, IQ baseline); and the use of certain coping strategies. Parents of older children (near school age) tended to do more positive reappraisal, adopted more
confrontive strategies and used less distancing strategies. Also the lower the child’s IQ, the parents tended to use “accepting responsibility” more as a coping behaviour.

Because of the small sample size involved in the longitudinal study, further tests with a larger sample size and observation of the child in multiple settings are required to validate the results. Moreover, the parental perception of the severity of autism of their child is an area worth further studying. In this study, results revealed that the parental perception of their child’s severity of autism may not be consistent with the child’s presentation at a group setting and the child’s standardised assessment scores. Studies in parental perception to-date emphasize on how parents described the features that alerted them to the child's early signs of ASD (McConkey, Truesdale-Kennedy, & Cassidy, 2009; Gray & Tonge, 2001; Young, Brewes & Pattison, 2003). Few studies compared parental perception and the examiner’s ratings/standardised test ratings of the child when he/she is in therapy. Further studies in this area will help to identify whether parents need assistance in evaluating their child’s behaviour related to ASD when their child is undergoing therapy.
CHAPTER 9
DISCUSSION, METHODOLOGICAL ISSUES AND LIMITATIONS

9.1 Introduction

The present project commenced in November 1998. At that time, young children with autism in Victoria generally entered one of the following types of early intervention (EI) programs: (1) centres that cater for young children with varying types and degrees of developmental delay; (2) centres specifically for children with autism; (3) home-based applied behaviour analysis (ABA) programs; or (4) individual specialist therapies. The home-based (ABA) programs in this study were mostly based on the principles of ABA (Lovaas, 1987). In Victoria in 1998, the ABA home-based programs had been established for just over two years at the time of commencement of this project. The research consisted of three studies – a survey of centre-based EI programs and home-based ABA programs in 1998, a six-year follow up survey in 2004 and a 12-month longitudinal study of children with autism in centre-based EI programs or home-based ABA programs with recruitment beginning in 2000. This chapter summarises the discussion of results of the survey, the follow-up survey and the longitudinal study; and highlights the findings that add to the knowledge of effective outcomes of different EI options.

9.2 Discussion of results of the survey study and the follow-up survey study

9.2.1 Summary and discussion of aims and results of the survey studies

The aims of the survey studies were

1) To examine the approaches of the EI programs and the effects of different types of EI on the developmental outcomes for children with autism and other developmental delays participating in a range of programs.

2) To examine whether the models, approaches and goals adopted by EI programs, both home-based and centre-based, had differential effects on the developmental outcomes of young children with autism/developmental delay.
3) To examine whether the trend in EI program outcomes would differ after a significant period of time. It was expected that over time the government policy or funding for children with autism might affect service provision the EI sector. A follow-up survey was undertaken six years after the initial questionnaire survey was conducted.

9.2.2 Critical elements of effective EI programs

The literature reveals that there are large individual differences in response to different types of EI and that identifying prognostic indicators presents considerable challenges (Yoder & Compton, 2004). There have been few comparative studies on children with autism in home-based EIBI programs, generic EI programs or autism-specific EI programs at the time when the first survey commenced in 1998. Nonetheless, a number of critical elements were identified by researchers that can have an impact upon the developmental outcomes of children with autism after a significant period of EI, either in autism specific centres, more generic centres for children with developmental delays and home-based EI programs. These include the age of commencement, the intensity of intervention, models and theories adopted, and family involvement (Rogers, 1996; Dawson & Osterling, 1997; Guralnick, 1998; Hurth, Shaw, Izeman, Whaley, & Rogers, 1999; Iovannone, Dunlap, Huber, & Kinkaid, 2003; Hume, Bellini, & Pratt, 2005).

Age of Commencement

The results of the present studies reveal that home-based ABA programs were provided for children who were predominantly diagnosed with ASD from a very young age, under 3 years of age. Children in the EI centres were all between 3 and 5 years of age and all EI centres had at least one child with an ASD. The results were consistent with the literature that children entering ABA programs are mostly very young children and these children have a significantly improved developmental outcomes (Fenske et al., 1985; Green, 1995; Harris & Handleman, 2000). The early age that parents generally introduced their children to home-based ABA programs in the present studies may be perceived by parents as a factor that maximises developmental outcomes.
Intensity of EI Programs

For intensity of programs, most well validated, autism-specific EI programs involved at least 15 hours per week and up to 40 hours per week of focused treatment with a low child-to-adult ratio (Birnbrauer & Leach, 1993; Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993; McClannahan & Krantz, 1994; Rogers, 1996, Dawson & Osterling, 1997).

In the present studies, EI centres (including two autism-specific centres) reported that children spent between 1 and 30 hours per week in their programs with a mean of 8.6 hours in 1998. In 2004, EI centres reported that children spent between 1.5 and 16.5 hours per week in their programs with a mean of 4.5 hours. There was an average drop of 4.1 hours, which amounts to an average drop of 48% in intensity of services in terms of hours per week provided to children with autism and other developmental needs. This drop is significant considering some researchers (Gabriels, Hill, Pierce, Rogers & Wehner, 2001; Sheinkopf & Siegel, 1998; Smith, Buch & Gamby, 2000) argued that intensity of EI (defined by hours per week) is a critical factor affecting program outcomes. A report on service delivery of autism in Victoria (Crewther et al. 2003) indicated that EI service providers in Victoria varied regarding their perception of the optimal number of hours for a child accessing their service. One-third of service providers believed that 2–4 hours a week of EI was optimal. However, another third of service providers believed that 6–10 hours was optimal. The number of hours per week perceived as optimal by practising service providers in Victoria was far less than the recommended 20 hours per week over two or more years for young children with autism to make major gains (Prior & Roberts, 2006). Although hours per week of EI is considered to be the measure of intensity of EI and a factor affecting program outcomes, there seems to be no consensus among program providers, especially in centre-based programs in Victoria, on the optimal level of hours per week to maximise effective developmental outcomes for children with autism and other related disorders. Victorian children were receiving considerably fewer hours than recommended in the literature at both time points.
In home-based ABA programs, the number of hours per week is highly recognised as a critical factor affecting program outcomes. The ABA DTT is a major feature reported as being used in home-based ABA programs in the present studies. Up to 40 hours per week of focused treatment with low child-to-adult ratio is highly recommended in ABA DTT (Lovaas, 1987; McEachin, Smith, & Lovaas, 1993). Other studies (Birnbrauer & Leach, 1993; Fenske et al., 1985; Gabriels, Hill, Pierce, Rogers, & Wehner, 2001; Harris et al., 1991; Luiselli et al., 2000; Rogers & DiLalla, 1991; Sheinkopf & Siegel, 1998; Smith, Buch, & Gamby, 2000; Reed, Osborne & Corness, 2007) revealed that low-intensity EI programs containing fewer hours (in the range of 12–25 hours) and reduced duration (for 7 to 37 months) can yield valuable outcomes for children with ASD, compared to positive outcomes typically achieved by more intensive interventions which implement 40 hours of therapy per week over two to three years (e.g. Lovaas, 1987).

In 1998, about a third of families ran their home-based ABA programs for between 20 and 40 hours per week. In 2004, only one family ran their program for 25 hours per week. Comparing the intensity measured by hours per week in 1998 and in 2004, there was a drop in families who committed 20 or more hours to a home-based ABA program. A possible reason for this is that running an intensive home program requires a high degree of commitment in terms of money and time, which is not sustainable for some families. More recent research has revealed 18 hours per week of focused treatment with low child-to-adult ratio enabled effective program outcomes in IQ, language and adaptive behaviour (Buch, & Gamby, 2000; Reichow & Wolery, 2009). Parents engaging in home-based ABA programs in the follow-up study might be aware of more recent literature and be comfortable with less hours of intervention and still perceive positive outcomes in their children across a range of developmental areas.

Philosophies of EI programs

Guralnick (1997) has stated that the source of positive outcomes for children with autism and other developmental delays may be due to curriculum content, a functional approach to problem behaviour and family involvement, rather than to program philosophy (that is, the elements involved in the ‘mechanism’ of early intervention), that
are producing the positive outcomes. In the present survey and the follow-up survey, results showed that overall program effectiveness of EI centres was not significantly affected by theoretical models adopted. These results are consistent with Guralick’s view. Research on educational approaches to the management of autism in young children indicated that individualised instructions and family involvement are the most effective approaches in early intervention (Autism Society of American, 1998; Dempsy & Foreman, 2001). A study of areas of agreement in program practices (Rogers et al., 1999) revealed that individualisation was rated highly by programs. Rogers et al. reported that even programs that have a strong philosophical basis stressed the importance of individualising therapeutic approaches. Overall, findings in the present study showed that no matter which model or theory the centres adopted, a general trend toward an individualised plan for each child; family engagement in planning, receiving information, and child therapy; and support in general settings for the child was reflected in the goals stated by the EI centres.

In both surveys, EI centres reported on the goals that they set for the programs. Some centres set more general goals such as providing every child with the opportunity of meaningful learning, providing comprehensive and flexible programs to meet the needs of families involved, or providing information, support and guidance to families. Other centres set more specific goals including preparing children for mainstream school; improving receptive and expressive communication; and behavioural management. In the follow-up survey, there was a greater emphasis on documenting individualised goals for the child and a plan for family support.

The present studies found that the setting of more specific, individualised goals had effects on the outcomes of EI programs. There were medium to large effect sizes between the two sets of program goals in EI centres in both surveys. In the first survey, the outcomes of social competence, attention span and self-help skills were all higher for EI centres that adopted specific program goals; with social competence differing significantly between general and specific program goals. In the follow-up survey, the program outcome was higher for following instructions in EI centres that adopted general goals, and the outcome was higher for expressive language in centres that adopted specific goals. The combined results revealed that outcomes were comparatively higher
in several developmental areas for EI centres that adopted specific goals. To date, there are few studies comparing programs goals in relation to program outcomes. The present study provides some indicators for future research.

**Parental Involvement**

Family cohesion or the adaptability and problem-solving abilities of families are considered important mediating factors for children’s developmental outcomes (Guralnick, 1997). The child’s needs often cannot be easily isolated from his or her family context (Carpenter, 2001). Research suggests that the extent to which families have adequate formal and informal support systems is highly associated with successful adaptation (Crnic & Stormshak, 1997; Dunst, Trivette, & Deal, 1994; Hauser-Cram, Warfield, Shonkoff, & Krauss, 2001). Bailey et al. (2006) have stated that EI services ought to promote positive adaptation and reduce potential negative impacts.

In the present studies, results showed that a majority of families, whether their children were in centre-based EI or home-based ABA programs attended parental training sessions. They either rated parental involvement as “effective” or “very effective”. However, the profile of perceived effectiveness of parental involvement changed over time. In 2004, significantly more EI centres rated parental involvement as “very effective” whereas there was a small drop of respondents from home-based ABA programs who perceived parental involvement as “very effective”. A possible reason was a greater emphasis on documenting individualised goals for the child in the program and a plan for family support for centre-based programs in 2004 and that all centres reported they had offered parental training sessions. These might have an impact on the perceived effectiveness of parental involvement by centre respondents in 2004. For home-based ABA programs, only one family reported that parents acted as therapists in 2004 whereas almost half reported that they acted as therapists in 1998. The involvement of parents as therapists might have an impact on the perceived effectiveness of their involvement. However, the sample of home-based ABA programs in 2004 was small and the results should be treated with caution.
9.2.3 *Differential Developmental outcomes*

Overall, children either maintained their skills or showed improvements on the program measures. In the present studies, the developmental outcome in social competence was the highest among the eight developmental areas examined (ability to follow instructions, attention span, receptive language ability, expressive language ability, level of developmental delay, self-help skills, rhythmic habit patterns, social competence) in centre-based programs in both 1998 and 2004. The results showed that centre-based EI programs demonstrated consistent positive outcomes in helping children with autism and other developmental disorders to achieve a higher level of social competence after a 24-month period. However, comparing results in 1998 and 2004, children participating in EI in 1998 made significantly more progress in the areas of social competence and receptive language than children involved in EI in 2004. As intensity of EI (expressed in terms of hours per week) has been identified as a critical factor affecting program outcomes, a speculative factor for the lower gains in social competence and receptive language in 2004 may be related to the nearly 50% decrease of program hours per week in EI centres in the year as compared to 1998.

Home-based ABA programs demonstrated consistent positive outcomes in helping children with autism and other developmental disorders to achieve a higher level of self-help skills after a 24-month period in both 1998 and 2004. Home-based ABA program is characterised by a one-to-one therapist to child ratio adopting discrete trial learning (DTT approach). At both times (1998 and 2004), DTT was used by most home-based ABA programs while it was used by few of centre-based programs. Results of the present studies suggest that the DTT approach has consistent success in helping children in home-based ABA programs in achieving self-help skills.

In addition, autism-specific EI centres reported better outcomes than the generic EI centres in specific developmental areas. In the 1998 survey, centre-based outcome effects were highest in the two centres that catered specifically for children with autism in the areas of social competence, language abilities and self-help skills. In 2004 survey, both autism specific centres had a higher improvement on receptive language abilities for children in the program than the more generic EI centres. These results are compatible with the results found in the longitudinal study where formal assessments were used to
measure interpersonal relationships and language abilities in children with autism in different EI placements. Results were discussed in section 9.3.

In the literature, there were few studies comparing home-based ABA programs and generic EI programs. However, there were a few studies in the literature comparing home-based ABA programs and autism-specific school-based programs (Eikeseth et al., 2002; Howard et al., 2005; Sheinkopf & Siegel, 1998; Magiati, Charman, & Howlin, 2007). The direct comparison of different EI programs was further discussed in section 9.3. The above results from the present survey studies indicated that there were significant and consistent perceived differential developmental outcomes of centre-based and home-based ABA EI programs for children with autism and other developmental disorders. Children with autism have core deficits in their ability to socialise. Centre-based EI offers the group intervention for the training of social skills for young children with autism while the home-based ABA program, which is on a one-on-one basis, does not offer similar opportunities for training of social skills in a supported group setting. Although home-based ABA programs were perceived to help to improve the self-help skills of young children with autism significantly, centre-based programs seem to offer the important set of skill training that targets lack of social competence, which is a core deficit in autism.

9.2.4 Profile of EI programs

Between 1998 and 2004, there were several prominent State and Commonwealth documents that may have impacted upon the service delivery of centre-based EI programs. There was the Victorian State Disability Plan 2002-2012 which advocates promoting inclusion and participation of people with a disability. The document “Autism in Victoria: An Investigation of Prevalence and Service Delivery for Children Aged 0-6 years” (2003) outlined the prevalence rate of autism in Victoria and recommended empowerment for parents and children with ASD. The “Early Childhood Intervention Services Vision and Key Priorities” (2003) document outlined policy directions including acknowledging that families with children with a disability or developmental delay are partners in the service system. These documents may have impacted upon the service delivery of EI for children with developmental needs including autism, in terms of intake
of children with autism, and inclusion of parents as partners both in planning and treatment of their children with developmental needs.

There was a significant increase in intake of children by EI centres, in particular, children with autism in 2004 compared to 1998. The increase in intake of children with autism may be a response to the increase in prevalence rate in autism as revealed by the Autism in Victoria (2003) document. However, there was a considerable drop of intensity of services measured by hours per week at centres. The impact of the considerable drop of intensity of hours was discussed in section 9.2.3. For parental involvement, all centres offered parent training sessions in 2004 and significantly more EI centres rated parental involvement as “very effective” in 2004 compared to 1998. In 2004, there was a greater emphasis on documenting individualised goals for the child in the program and a plan for family support. These results are most likely positive responses to the documents stated above which advocated empowerment of parents with children with autism and having parents as partners in the service system.

In home-based ABA programs, families engaged in ABA programs were from a higher socio-economic status and this remained unchanged over time; the fact the home-based programs adopted the DTT approach was also the same over time. However, a greater range of program hours per week was reported in 1998 than in 2004. In 1998, the home-based ABA program had been running for 2 years in Victoria and families at that time might want to try the program as close to the maximum number of hours recommended by the Lovaas’s study that they could afford. In 2004, the home-based ABA program had been established for 8 years and no families were running their programs for more than 25 hours per week. Reasons for the drop of intensity of hours were discussed in section 9.2.2. Compared to 1998, significantly fewer families reported that parents acted as therapists in the program. A possible reason was that more ABA therapists would have been trained and were more available for families.

9.2.5 Conclusions for survey studies

Overall, the present survey studies revealed a number of significant findings. The combined results of the survey and the 6-year follow-up survey revealed that there were significant and consistent perceived differential developmental outcomes of EI programs
for children with autism and other developmental disorders. After a 24-month period, centre-based EI programs consistently demonstrated a higher level of social competence while home-based ABA programs consistently demonstrated a higher level of self-help skills. The perceived differences in program outcomes may be related to the different sets of skills that are targeted by the centre-based EI programs and the home-based ABA programs. As the core deficit in young children with autism is the inability to socialise, centre-based programs seem to best offer the set of skill training that target lack of social competence in autism.

For intensity of EI, there was an average drop of 48% (from 8.6 hours to 4.5 hours) in intensity of services in terms of hours per week provided to children with autism and developmental needs in EI centres. This drop of service hours seems to have important implications for program outcomes. Firstly, the lower gains in social competence and receptive language in 2004 may be related to the nearly 50% decrease of program hours per week in EI centres. Secondly, the hours per week in EI centres were far less than the 20 hours per week for young children recommended by researchers to make major gains. For home-based ABA programs, comparing the hours per week in 1998 and in 2004, there was a drop of number of families who committed 20 or more hours to the program. Financial commitment and recent research which revealed effective outcomes for 12 to 18 hours per week in EI may have contributed to the drop of hours in the follow-up study. The “Helping Children with Autism” package, an initiative of the Australian Government, which offers financial support to young children with a diagnosis of autism was put in place in 2009. With the grant given by the government, more families are now able to access home-based ABA programs and commit more hours if they want to. Further research will reveal commitment of families to ABA programs.

Consistent with the literature, philosophies of EI programs did not affect overall program outcomes of EI centres. However, the present studies found that the setting of goals, whether they were specific or general goals, had differential effects on the outcomes of EI programs. Child outcome of social competence was significantly higher in EI centres that adopted specific goals in the study in 1998. Government policy changes were also found to have possible impact upon the intake of children with autism, practice of EI and parental involvement in the centre-based EI programs. In 2004, there was a
significant increase in intake of children with autism. This may be a response to the increase in prevalence rate in autism as revealed by the Autism in Victoria (2003) document. For parental involvement, there were significantly more EI centres rating parental involvement as “very effective” in 2004. Also there was a greater emphasis on documenting individualised goals for the child and a plan for family support. These changes were likely to be a result of advocating parental empowerment and having parents as partners in the service system stated in State and Commonwealth documents.

The perceived differential program outcomes revealed in the survey studies have implications for the treatment of young children with autism. It seems that the centre-based EI programs and the home-based ABA programs bring their best outcomes in different developmental areas. In practice, young children with autism may benefit the most if they are involved in both types of intervention, namely the centre-based EI and the home-based ABA program. To enhance program effectiveness, parents should be involved as partners in the service and individual goals should be set for the child.

9.3 Discussion of Results of the longitudinal Study

The perceived differential developmental outcomes in centre-based EI programs and home-based ABA programs for children with autism and other developmental disorders as revealed in the present survey studies were not directly comparable. Therefore, a longitudinal study was conducted to compare program outcomes for young children with autism in treatment under different EI options, namely, generic centre-based programs, autism specific centre-based programs and home-based ABA programs, across a 12-month period. When the longitudinal study commenced in 2000, there were few studies comparing home-based EI programs and autism-specific centre-based/school-based EI programs. Subsequently, there was some research in this area (Eikeseth et al., 2002; Howard et al., 2005; Magiati, Charman, & Howlin, 2007). The recent study by Magiati et al. (2007) indicated that home-based ABA programs as implemented in the community and autism-specific nursery provision produced comparable outcomes after two years of intervention.

Twelve young children with autism participated in the longitudinal study from 2000 to 2005. Their mean age was 49 months (range 33 months to 62 months). The
child’s age of start at the EI program, IQ gains/differences, improvement in interpersonal relationships and play skills, and autism severity were studied as they are important factors related to the outcomes of EI programs (Ozonoff & Cathcart, 1998; Smith, Eikeseth, Klevstrand, & Lovaas, 1997; Eikeseth et al., 2002; Gabriels, Hill, Pierce, & Rogers, 2001). Parent coping was also examined.

9.3.1 Program outcomes and significant factors affecting outcomes

Overall, there were no significant differences between baseline and review assessment scores in nonverbal cognitive abilities, language, interpersonal relationships, play and leisure skills and autism severity rated by parents when the age of start in EI or the IQ at baseline was controlled. However, a significant pre- and post-intervention difference in severity of autistic behaviours rated via observation in EI centres or preschool settings was found. The result suggests that children have reduced their autism related behaviour after a year of intervention. Another significant finding was that children after attending EI for six months demonstrated a larger reduction in autism-related behaviours (sensory-motor, social, affect, sensory and language) than the reduction in similar behaviours in the following six months, and this effect appeared to be more prominent in an EI setting in the first six months than in the preschool setting.

The present survey studies revealed that home-based ABA programs were provided for children from a young age, under 3 years of age. The longitudinal study further revealed that younger age was related to gains in crucial developmental areas of the child, namely IQ, and reduction of autism-related behaviour. A significant trend of the lower the age of start at EI, the larger the IQ gains and the more reduction of autism-related behaviour in natural settings (i.e., childcare/preschool and/or EI settings) was identified. These results suggest that the age of commencement at EI is crucial to the gains that the children can make under EI treatment.

However, contrary to most literature findings that younger age was related to more gains in developmental areas (Fenske et al., 1985; Green, 1995; Harris & Handleman, 2000), the present study found that older children (4 to 5 years of age) made more gains in expressive language (>30 developmental months) after a year of intervention.
Apart from older age of start at EI, results of the present longitudinal study show that higher IQ measures were significantly related to more expressive language gains in children with ASD in EI. This is consistent with literature findings that higher average nonverbal cognitive level is a predictor for better expressive language outcome in the preschool period (Paul et al., 2008). Analyses of the case studies further suggest that older age of start at EI and an average to high average IQ are predictors of better expressive language gains over a 12-month period.

Results further show that IQ scores (both baseline and review scores) and language gains were significantly correlated, indicating that the higher IQs predict better language gains after treatment. IQ measures may be good predictors of language improvements in children with ASD in EI. These results are consistent with other findings that the cognitive abilities of children with autism correlated with outcome of therapy (Szatmari et al., 2003) and in other studies that children with autism with normal IQs progressed more over time with significant improvement in linguistic skills (Gabriels et al., 2001; Paul et al., 2008).

Home-based ABA programs and centre-based programs were not directly comparable in the survey studies. However, results from the survey studies show that autism specific centres reported higher perceived gains in developmental areas of social competence and language abilities than the generic EI centres. In the longitudinal study, group comparisons among the EI placements were not possible because of the small sample size and that some families changed EI setting during the year. However, the patterns depicted from the profile of results show that children did well in home-based ABA programs and in autism-specific centre-based programs. Highest gains in IQ over the 12-month EI were from two younger children (< 40 months) in an ABA home-based program and an autism-specific centre-based program respectively. Two children who were older (> 50 months) and attended whole-day autism-specific centre-based programs had highest gains in interpersonal relationships; and three older children (> 50 months) who had the highest gains in expressive language abilities were from an ABA home-based program and a whole-day autism-specific centre-based program.

Similar to the results in the two survey studies, autism-specific EI centres seem to generate better outcomes than the more generic EI centres in fostering gains in social
development as measured in the area of interpersonal relationships in the longitudinal study. Children in autism-specific centres and home-based ABA programs made good gains in IQ, interpersonal relationships and expressive language abilities. These results have given pointers to further investigations with a large sample in the future.

9.3.2 Parental Involvement

In the survey studies, parental involvement in home-based ABA programs and centre-based programs was examined. In the longitudinal study, parental coping strategies were studied. For parents, there were no significant differences in the pre- and post-intervention measures for parental coping strategies over the year during which their children were in EI. However, there was some evidence that the parents did more reappraisal, adopted more confrontive strategies and less distancing strategies when their children were older i.e., near school age. These results are consistent with current literature that parents with children with autism focused on taking active steps to gain mastery of the course of events and generally adopt a more active coping style than parents of children without a disability (Berhr and Murphy, 1993; Taylor, 1983; Bristol and Schopler, 1984). Also there were trends that (1) the higher the IQ of the child at baseline, the less the parent would use accepting responsibility as a coping strategy; and (2) the better the receptive, expressive and total language abilities of the child at baseline, the more confrontive coping strategies the parents adopted. The results are consistent with Lee’s (2009) findings that parents of children with high functioning autism and good language skills tend to be practical and problem-focused.

Results of the survey studies revealed a trend of involving parents as partners in service provisions for their young children with autism. In the longitudinal study, the overall picture was that parents with children with autism focused on taking active steps to gain mastery of the course of events and generally adopt a more active coping. Service providers should recognise this need for parents to be active partners in treatment of their child. The active and informed partnership provides a process for parents to become involved and empowered to cope with having a child with autism. This is important to the overall wellbeing of the parents.
9.4 Nature of the Research, Methodological Issues and Limitations

There were several limitations in the present studies. In the survey studies, these limitations related to the nature of outcome data, statistical problems and differences in sample sizes. In the longitudinal studies, these limitations related to the sample size, the nature of the quasi-experimental pre-post design and possible experimenter bias. Each of these methodological issues is addressed below.

9.4.1 The survey and the follow-up survey

Rating Scales and Outcome data

The children’s outcome data across the eight developmental levels, i.e., level of developmental delay, receptive language ability, expressive language ability, social competence, self-help skills, attention span, ability to follow instructions, rhythmic habit patterns, were rated on 4-point Likert scales ranging from severe delays or limitations to normal development, by co-ordinators in centre-based programs and parents in conjunction with the program providers in home-based ABA programs. It was expected that the co-ordinators or program providers would be special education trained workers who would have an understanding of children’s developmental levels. Thus the use of 4-point Likert scales ranging from severe delay or limitation through to age appropriate development were considered to have a common understanding among those completing the surveys. However, in any future follow-up research, it would be preferable to use a more objective documentation of this terminology.”

The children’s developmental outcomes in the above developmental areas were perceived outcomes rather than outcomes measured by standardised tests in cognitive abilities, speech and language skills and autism behavioural rating scales. This limitation was addressed to some extent via the longitudinal study using standardised, norm-referenced assessments and ratings of naturalistic observations. Hence comparisons could be drawn from pre- and post-intervention assessments to ascertain the extent of the improvement in child’s outcomes across a number of developmental areas.

While outcome measures from home-based ABA programs were overall from children with autism, outcome measures from centre-based EI programs were largely from a mixed group of children with autism and other disabilities, except for those from a
small number of EI centres which only catered for children with autism. This situation cannot be avoided as children with autism mostly enrol in more generic EI programs.

The perceived child outcomes and the outcomes being reported from a mixed group of children with autism and other disabilities in centre-based programs limited the meaningful interpretation of outcomes specifically for children with autism but they give meaningful outcomes about children with developmental delays including autism. Moreover, results of the two autism specific centres provide some useful data for meaningful comparisons with data of the generic EI centres.

Sample Size and statistical limitations

While the sample sizes of the centre-based EI programs were the same in both the survey in 1998 and the follow-up survey in 2004, there was a significant difference in sample sizes for home-based ABA program between the survey and the follow-up survey, six years later. A much smaller number of respondents were recruited in the follow-up survey. This approach was most likely due to a change in the recruitment method through ABIA in accordance to their policy changes that the researcher could not control which was discussed in section 6.5. Nevertheless while the sample size of 8 in the 2004 survey for home-based ABA program was considerably smaller than the sample size of 50 in the 1998 survey for home-based ABA program, the statistical results generated from a sample of 8 are meaningful. Norman (2010) stated that “it is the assumption of normality of the distribution of means, not of the data” (p.628) that is important as “the Central Limit Theorem shows that for sample sizes greater than 5 or 10 per group, the means are approximately normally distributed regardless of the original distribution”(p.628).

For centre-based EI programs, the EI centres could not be exactly matched for repeated measures in statistic analysis as ethical approval was for anonymous questionnaires at both collection times. The fact that the centre-based EI could not be matched at time 2, did limit the statistical power and meaningful statistical comparisons between data of the survey and those of the follow-up survey.
9.4.2 Longitudinal Study

Quasi-experimental design and sample size

In the longitudinal study in which young children with autism received EI treatment for 12 months, it was not ethical to keep a control group of young children with autism for a period of 12 months without any treatment. Children with autism needed to have EI as soon as they were diagnosed and when a place became available. It was not possible to assign children with autism randomly into different types of EI programs as the families had a choice about which EI program they sent their children to. Over the 12 months, some children changed EI placements and some children went to school.

Recruiting adequate numbers of young children with autism to meet the inclusion criteria proved difficult. Because of the small number of children assigned to each of the EI program types, statistical comparisons between types of EI programs were not possible.

However, the pre-post design of the longitudinal study provided useful descriptive information about the samples of young children with autism in different types of EI programs. The evaluation also offered information about differences between types of EI programs, whether change had occurred in each of the program types, and if it had occurred, the magnitude of change over time. Although causal relationships among child outcomes and key elements and types of EI programs could not be established because of the nature of the design and the small number in each program type, trends were identified among child outcomes and critical child, family and program variables.

Experimenter bias

Another methodological issue was potential for experimenter bias. The researcher assessed most of the children and observed all the children in the home and/or EI settings. This may have led to unconscious biases towards the expected outcomes and the knowledge of the children in the case studies. To control for potential bias in observation, a second observer was present in observing some of the children in the natural settings including preschool and EI. Interobserver agreement was established at baseline, midway observation and the review assessment in the course of the procedure of conducting the observations in the present study. Statistics like the Cohen’s weighted kappa provides...
for the incorporation of ratio-scaled degrees of disagreement (or agreement) such that disagreements of varying gravity (or agreements of varying degree) are weighted accordingly (Cohen, 1968). While it is worthwhile to examine the nature of disagreement with the weighted kappa for the observation in this study, this was not the focus of the research and thus is beyond the scope of the present study.

9.5 Future Directions

Differential rate of improvement

Studies on child outcomes have investigated the impact of intensity of intervention in terms of hours per week and duration of intervention in terms of months and years (Lovaas, 1987; Birnbrauer & Leach, 1993; Gabriels, Hill, Pierce, Rogers, & Wehner, 2001; Harris et al., 1991; Sheinkopf & Siegel, 1998; Luiselli et al., 2000; Smith, Buch, & Gamby, 2000; Sallows & Graupner, 2005). Few studies have looked at child outcomes after fixed intervals of time such as 6 months, 12 months, 18 months and 24 months and compared results to see if there were differential outcomes. In the first survey study where there were a significant number of families involved in the home-based ABA programs, there was no simple linear relationship between program hours per week and length of time the program has been running that would indicate optimal child outcomes. There was a general trend of more hours per week being associated with more effective program outcomes, however, programs that had been running for 19 to 24 months were least effective. More program hours per week was associated with less effective program outcomes at 19 to 24 months, with a similar trend occurring at 7 to 12 months. Further investigations with larger, multi-site studies that are standardised with respect to participating children with autism, intervention procedures and measures are necessary to examine the trends of the relationship between program hours and length of time and if there is an interaction effect between the two factors – hours per week and duration of the intervention.

A significant finding in the longitudinal study was that children after attending EI for six months demonstrated a larger reduction of autism related behaviours than the reduction of similar behaviours in the following six months and the effect appeared to be more prominent in an EI setting in the first six months than in the preschool setting.
However, it is difficult to draw conclusions because of the small sample size. Further investigations with a larger sample size will confirm if the trend applies to a bigger group and if factors can be identified for the “plateau” effect of improvement after a critical period of time such as 6 months. This will be important for further improving program effectiveness throughout the young child’s developmental years.

**Relationship between key factors**

Matson and Smith (2008) noted the importance of considering the effect of factors such as severity of ASD symptoms, intellectual functioning, and comorbid psychopathology on treatment outcomes. Granpeesheh et al. (2009) found that an increase in treatment hours and a decrease in child age predicted an increase in the number of mastered behavioral objectives in EIBI programs. The current studies revealed that there were differential outcomes depending on the type of EI program that the child was enrolled in. Children in centre-based programs had a significantly better outcome in social competence whereas children in home-based ABA programs acquired better self-help skills and the ability to follow instructions after a 24-month period in both the survey and the follow-up survey. In the longitudinal study, there was a trend that children produced better outcomes in home-based ABA programs and autism specific centre-based programs. The present longitudinal study also looked at the age of child and the type of EI program that the child was in. A trend of higher gains in IQ in younger children in ABA home-based program and autism specific centre-based program; and also another one of higher gains in interpersonal relationships and language in older children in autism centre-based programs and ABA home-based program and a whole-day autism specific centre-based program, were found. Future research should consider the type of intervention as an important factor that interacts with other key variables such as the child’s age, the intensity of treatment hours, the pre-intervention cognitive and language levels in effecting the differential outcomes for young children with autism.

### 9.6 Concluding Comments

Results of the present project have added knowledge to child outcomes from EI programs. All children make gains after receiving EI, however, children in different types
of EI programs, whether centre-based (autism specific versus generic) or home-based (ABA), may achieve different outcomes. Centre-based EI programs demonstrated consistent positive outcomes in helping children with autism and other developmental disorders to achieve a higher level of social competence after a 24-month period and home-based ABA programs demonstrated consistent positive outcomes in helping children with autism and other developmental disorders to achieve a higher level of self-help skills after a 24-month period in both 1998 and 2004. The first six months of EI, particularly within an EI setting, appeared to have a greater impact in reducing autism related behaviours in young children with autism. Results also showed that in ABA home programs, there was no simple linear relationship between program hours per week and length of time the program had been running that would indicate optimal child outcomes. There was a general trend of more hours per week being associated with more effective program outcomes; however, there were critical time intervals in which more hours per week did not produce more effective program outcomes. Further research is required to examine the trends for the relationship between program hours and length of time and if there is an interaction effect between the two factors – hours per week and duration of the intervention. The present longitudinal study also identified, firstly, a trend for higher gains in IQ in younger children in ABA home-based program and autism specific centre-based program; and secondly, a trend for higher gains in interpersonal relationships and language in older children in autism centre-based programs and ABA home-based program and a whole-day autism specific centre-based program. Future research should consider the type of intervention, whether it is centre-based (autism specific versus generic) or home-based (ABA versus developmental) or other forms of EI as an important factor that interacts with other key variables including the child’s age, the intensity of treatment hours, the pre-intervention cognitive and language levels in EI in effecting the differential outcomes for young children with autism.
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Appendix A – Survey Questionnaire (centre-based program)

Questionnaire: A study of approaches and methods of practice in early intervention in autism and related disorders

To be completed by the coordinator of the early intervention program in your centre.

We would like the person who has the capacity of overseeing the early intervention program in the centre to fill out the questionnaire.

Thank you very much for your co-operation.

Helen Chau
RMIT University
Questionnaire: A study of approaches and methods of practice in early intervention in autism and related disorders

Today’s date is: ________________

1. Please fill out the following information about children in your program:
   a. number of girls: ____
   b. number of boys: ____
   c. number of children with single parent: ____
   d. number of children with both parents: ____

2. What are the types of disabilities your early intervention program targets? (Please ✓ appropriate boxes)
   - *autism spectrum disorders
   - global delay
   - specific developmental disorder
   - delay in motor development
   - Down Syndrome
   - Fragile X
   - Others: (Please specify ____________________________)

3. From your records can you give the number of children diagnosed with the following disorders that have been included in your programs?

<table>
<thead>
<tr>
<th>Year</th>
<th>*Autism spectrum disorders</th>
<th>Global Delay</th>
<th>Specific language delay</th>
<th>delay in motor development</th>
<th>Down Syndrome</th>
<th>Fragile X</th>
<th>Others: (_______)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Autism spectrum disorders include autism, PDDNOS (Pervasive Development Disorder Not Otherwised Specified) and Asperger’s Syndrome

4. What is the staff/child ratio for your program (if applicable)?

   ____________________________

5. Please give the number (eg 2,3) of the following specialized staff involved in your program:
   - ☐ special education trained teacher
   - ☐ speech pathologist
☐ occupational therapist
☐ social worker
☐ psychologist
☐ child care worker
☐ Others : (please specify _________________________________)

6. Have your teachers attended a training program/staff development in 1998 ?
☐ Yes ☐ No

If Yes, please name the course(s) attended :

1998: __________________________________________

__________________________________________________________________

7. What types of therapy are offered through your program ? (please ✔ appropriate boxes)

☐ educational - please tick below the methods used in the program :
  ☐ Discrete trial learning
  ☐ Incidental teaching
  ☐ Activity-based structural teaching
  ☐ Others : (Please specify): ____________________________

☐ sensory integration
☐ speech therapy
☐ 1 : 1 teaching
☐ behavioural management
☐ Others (please specify) : ____________________________________

8. Can you list the goals/objectives/expected outcomes of your programs ?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
9. What are the theories or models that guide your program delivery? (e.g. behavioural model, developmental model)

Please provide a brief description: ________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

10. Do parents in your program implement or follow up on the program provided at home?

☐ Yes   ☐ No (go to Q.11)

a. Can you briefly describe what the parents do at home?

____________________________________________________________________
____________________________________________________________________

b. How do you rate the effectiveness of parental involvement?

☐ very effective   ☐ moderately effective

☐ not very effective   ☐ ineffective

11.a) Does your program offer parent training sessions?

☐ Yes. Please answer b) & c)  ☐ No. Go to Q. 12

b) What types of training does the session offer? (please ✓ appropriate boxes)

☐ toilet training

☐ sleep problems

☐ educational

☐ speech training

☐ behavioural management

☐ others: please describe ________________________________
12. a) Does your centre offer assessment for each child at different points in program involvement?
- Yes (go to Q.13)
- No. Please answer b) below.

b) Is the child referred to an agency for assessment processes?
- Yes
- No

13. If your centre offers assessment for children, what are the assessment processes?
- Individual educational test(s) (please name the test(s) used): ________________________________
- Completion of developmental checklist
- Standard psychological and speech tests (please name the test(s) used):
  - WPPSI (Wechsler Preschool & Primary Scales of Intelligence)
  - The Reynell Developmental Language Scales
- Others (please specify): ________________________________

14. Please give information on the following features in your program:

a). How many hours does each child spend (on average) in your early intervention program per week? ___________

b). Are there any communication/language training strategies in your program?
- Yes
- No (go to Q.14c)

If Yes, please ✓ the following:
- Verbal imitation
- Receptive and expressive language skills
- Conversation skills (please give examples: ) ____________________

- Story telling
- Picture exchange
- Compic
- Makaton sign language
- Others (please specify): ________________________________

c). Are strategies for improving children’s social competence included in your program?
- Yes
- No (go to Q.14d)

If Yes, please describe: ________________________________
d). Are strategies for eliminating maladaptive behaviour included in your program?

☐ Yes  ☐ No

If yes, please describe:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

15. Please select One group of children (age between 3 to 5) who began the program in early 1997 and are still under the program and fill out their characteristics below (if there is no such group, please select at random 8 to 10 children eg. the first ten children in the records who are still in the program):

At beginning of 1997 school year

a. number of children in the group in total: _____
   i. number of boys: _____
   ii. number of girls: _____

b. age range: ___ to ____ years old

c. How many hours did the group spend (on average) in your early intervention program per week? _____

d. What is the staff/children ratio (if applicable)? _________
For the following ☐s please write down the number of children belonging to that category:

eg. ☐ severe ☐ moderate ☐ mild ☐ none

**Characteristics at beginning of 1997**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Severe</th>
<th>Moderate</th>
<th>Mild</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Level of developmental delay</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b. Receptive language ability</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c. Expressive language ability</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>d. Social competence</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>e. Self help skills</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>f. Behavioural styles</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>i. Attention span</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>ii. Ability to follow instructions</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>iii. Rhythmic habit patterns (repetitive, nonfunctional and inappropriate behavioural patterns eg body rocking or head banging)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Data for Term 4 (current situation) of the group:**

a. Number of children in the group in total: _____
   i. Number of boys: _____
   ii. Number of girls: _____

b. Age range: ____ to ____ years old
c. How many hours does the group spend (on average) in your early intervention program per week? _____ hours

d. What is the staff/children ratio of the program? _____

For the following ☐s please write down the number of children belonging to that category:

eg. ☐ severe ☐ moderate ☐ mild ☐ none

Current characteristics in Term 4 1998

<table>
<thead>
<tr>
<th></th>
<th>☐ severe</th>
<th>☐ moderate</th>
<th>☐ mild</th>
<th>☐ none</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
<td>☐ age-appropriate</td>
</tr>
<tr>
<td>h.</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
<td>☐ age-appropriate</td>
</tr>
<tr>
<td>i.</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
<td>☐ age-appropriate</td>
</tr>
<tr>
<td>j.</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
<td>☐ age-appropriate</td>
</tr>
<tr>
<td>k.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>☐ severe limitation</td>
<td>☐ moderate limitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ mild limitation</td>
<td>☐ age-appropriate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv.</td>
<td>☐ minimal</td>
<td>☐ a lot of prompting required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>☐ a little prompting required</td>
<td>☐ independent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v.</td>
<td>☐ severe</td>
<td>☐ moderate</td>
<td>☐ mild</td>
<td>☐ none</td>
</tr>
</tbody>
</table>
e. Are there any children in the group above have a home program using the principle of Applied Behaviour Analysis (ABA) based on Lovaas research?

☐ Yes, there are. (Please go to Questions. f, g, and h)

☐ No, there is none. (Please end your questionnaire here)

f. What are the diagnoses of the children having an ABA program? (Please indicate the number of children having the diagnoses in the box eg ☐)

☐ Autism Spectrum Disorders

☐ Others (please specify): ___________________


g. Do you think the home ABA program benefits the child in the above group?

☐ Yes. Please specify in what way:

__________________________________________

__________________________________________

☐ No. Specify comments of any:

__________________________________________


h. At the centre, have the teachers or workers observed any side effects on the child connected with the home ABA program?

☐ Yes. Please specify:

__________________________________________

☐ No.

THE END
Thank you
Appendix B

Explanatory Statement on Research Project: A study of approaches and methods of practice in early intervention in autism and related disorders

Dear program coordinator,

My name is Helen Chau and I am a PhD student in the Department of Psychology and Intellectual Disability Studies, RMIT University. My research project is "A study of approaches and methods of practice in early intervention in autism and related disorders" and my supervisors are Dr. Amanda Richdale and Dr. Susana Gavidia-Payne.

What is the project about?

The main aim of the project is to examine the relationships among program features, child and family characteristics, and goals or treatment outcomes in early intervention programs. Factors studied will include intensity of the program, teacher:student ratio, curriculum, language training strategies, techniques for dealing with unwanted behaviour, techniques for improving social skills, specific child characteristics such as age-of-start, severity of disability, social competence and family factors such as parent involvement and stress. Recent research indicates that program features, and child and family characteristics are important factors relating to treatment outcomes in early intervention. This study is important as it will provide information for educational and clinical practice concerning the mechanisms through which interventions have their effects in relation to the nature of the developmental delays the programs are designed for. A study of these factors will help identify variables and mechanisms which result in effective treatment outcomes.

How can you help?

The first stage of the project is a questionnaire study on early intervention programs. You are invited to fill out this questionnaire. The total time required is about one hour. Participation in the questionnaire is voluntary. Participants are free to withdraw from the project, or withdraw data, at any time prior to data analysis. The questionnaire is anonymous and participants will not be individually identified. Research data may be included in conference presentations or articles submitted for publications. Your contribution to the study is very much appreciated. Please send the completed questionnaire to me in the self-addressed envelop provided before 1st December. At the end of the research project participants will be informed of the main findings.

Should you have questions regarding this research, please do not hesitate to inform me direct at Tel: (03) 9925 7376 or my supervisor, Dr Amanda Richdale at Tel: (03) 9925 7366 or you may prefer to contact the Secretary of Faculty of Applied Science Human Research Ethics Subcommittee or the Secretary to the RMIT Human Research Ethics Committee c/o University Secretariat at Tel: (03) 9925 1745.

Yours sincerely,

Helen Chau
(PhD student)

Dr Amanda Richdale
(Supervisor)

Dr. Susana Gavidia-Payne
(Supervisor)
Appendix C

**Questionnaire (home program version) : A study of approaches and methods of practice in early intervention in autism and related disorders**

To be completed by the parent in conjunction with the program supervisor.

We would like the person who has the full knowledge of the child’s home program to fill out this questionnaire. This questionnaire is about the child of the family to which the questionnaire is sent.

Thank you very much for your co-operation.

Helen Chau  
RMIT University
Today’s date is: ________________

1. Please fill out the following for the child under your program:

   a. Date of Birth: ________________

      (Please “✓” the appropriate answers for b. & c.)

   b. ☐ female        ☐ male

   c. Who does the child live with?
      ☐ mother only    ☐ father only    ☐ both parents    ☐ others (please specify): __________

   d. Parent occupation of the child (Please “✓” the appropriate answer)

<table>
<thead>
<tr>
<th>Mother</th>
<th>Father</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ unemployed</td>
<td>☐ unemployed</td>
</tr>
<tr>
<td>☐ unskilled workers in administrative and clerical work, servicing industries and sales</td>
<td>☐ unskilled workers in administrative and clerical work, servicing industries and sales</td>
</tr>
<tr>
<td>☐ skilled workers eg trades person</td>
<td>☐ skilled workers eg trades person</td>
</tr>
<tr>
<td>☐ managers, consultants</td>
<td>☐ managers, consultants</td>
</tr>
<tr>
<td>☐ professionals such as engineers, teachers, dentists.</td>
<td>☐ professionals such as engineers, teachers, dentists.</td>
</tr>
<tr>
<td>☐ lawyers, social workers, nurses and doctors</td>
<td>☐ lawyers, social workers, nurses and doctors</td>
</tr>
<tr>
<td>☐ own business</td>
<td>☐ own business</td>
</tr>
<tr>
<td>☐ home maker</td>
<td>☐ home maker</td>
</tr>
<tr>
<td>☐ others : (please specify) ____________</td>
<td>☐ others : (please specify) ____________</td>
</tr>
</tbody>
</table>

2. What is the type of disability your early intervention program targets? (please “✓” the appropriate answer)

   ☐ autism spectrum disorders (include autism, pervasive developmental disorder - not otherwise specified and Asperger’s syndrome)
   ☐ global delay
   ☐ specific developmental language disorder
   ☐ delay in motor development
   ☐ Down Syndrome
   ☐ Fragile X Syndrome
   ☐ Others (Please specify ___________________________________________________________________________________)

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3. What is the therapist/child ratio per session for your program? (please “✓” the appropriate box)

☐ 1:1
☐ Other: (please specify) ______________________

4. Please give the number (eg 1, 2) of the following specialized staff involved in your program?
   eg. ☐ program therapists
       ☐ local psychologist
       ☐ overseas consultant psychologist
       ☐ occupational therapist
       ☐ speech pathologist
       ☐ program therapists (eg student therapists and therapists under training)
       ☐ Others: (please specify _____________________________)

5. Are parents involved as program therapists? (please “✓” the appropriate box)

☐ Yes  ☐ No

6. Have your program therapists attended ABA training program/workshops in 1998?

☐ Yes  ☐ No

If Yes, please specify the course(s) they have attended in 1998.

☐ workshops organized by the ABIA (Autism Behavioural Intervention Association)
☐ home workshops offered by consultants
☐ others (please specify) ________________________________

7. What types of therapy are offered through your program? (please “✓” all the appropriate answers)

☐ educational - please check below the methods used in the program:
  ☐ Discrete trial learning
  ☐ Incidental teaching
  ☐ Activity-based structural teaching
  ☐ Others: (Please specify): ____________________________

☐ sensory integration
☐ speech therapy
☐ 1:1 teaching
8. Can you list the goals/objectives/expected outcomes of your program?

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

9. What are the theories or models that guide your program delivery? (e.g., behavioural model, developmental model) (please "✓" the appropriate answer)

☐ behavioural model - using Discrete Trial program basing on Lovaas’ (1987) study.
☐ others (please specify): __________________________________________________

10. Do parents in your program implement or follow up on the program provided at home? (please "✓" appropriate answers)

☐ Yes ☐ No (go to Q.11)

a. ☐ as a co-therapist in formal sessions
☐ not participating in formal sessions but help the child generalizing in daily life
what he/she has learnt in therapy sessions
☐ others: (please specify the format) _________________________________

b. How do you rate the effectiveness of parental involvement?

☐ very effective ☐ moderately effective
☐ not very effective ☐ not effective at all

11. a) Have parents of the child in the program attended any training sessions in relation to the child’s disability?

☐ Yes. Please answer b) ☐ No. Go to Q.12
b) What types of training have they attended since the commencement of the child’s program? (please “✓” appropriate answers)

☐ toilet training
☐ sleep problems
☐ speech training
☐ educational
☐ behavioural management
☐ others: please describe ________________________________

12. Does your program include assessments for the child at different points in program involvement? (please “✓” appropriate boxes)

☐ Yes (go to Q.13)  ☐ No. Please answer b) below and go to Q.14

b) Is the child referred to an agency/or a psychologist for assessment processes?

☐ Yes       ☐ No.

13. If your program includes assessments for the child, what are the assessment processes? (please “✓” appropriate answers)

☐ individual educational test(s) (please name the test(s) used): ______________

☐ completion of developmental checklist

☐ standard psychological and speech tests (check the test(s) used):
  ☐ WPPSI (Wechsler Preschool & Primary Scales of Intelligence)
  ☐ The Reynell Developmental Language Scales
  ☐ others (please specify): ________________________________

  Others (please specify): ________________________________

14. a. How long has your program been running? (please “✓” the appropriate answer)

☐ less than 3 months
☐ around 6 months
☐ 7 months to a year
☐ a year and a half
☐ two years
☐ others (please specify): ________________________________
b. How old was the child when he/she entered the program? (please “✓” the appropriate box)
- less than 2 years old
- two to two years and eleven months old
- three to three years and eleven months old
- four to four years and eleven months old
- five to five years and eleven months old
- six years old

15. Please give information on the following features in your program:

a). How many hours does each child spend (on average) in your early intervention program per week? _______ hours

b). Are there any communication/language training strategies in your program? (please “✓” the appropriate answers)
   - Yes
   - No (go to Q.15c)
   If Yes, please check the following if it applies:
     - verbal imitation
     - receptive and expressive language skills
     - conversation skills (please give examples: ) ________________
     - story telling
     - picture exchange
     - Compic
     - Makaton sign language
     - others (please specify): _______________________________

   c) Are strategies for improving children’s social competence included in your program?
   - Yes
   - No (go to Q.15 d)
   If Yes, please describe: ___________________________________________
   __________________________________________________________________

   d) Are strategies for eliminating maladaptive behaviour included in your program?
   - Yes
   - No
   If yes, please describe: _____________________________________________
   __________________________________________________________________
e) Please name other features of your program which you consider important in your program and NOT mentioned above?

________________________________________________________________________
________________________________________________________________________

16. Is the child attending a centre-based program while having a home-based program at home?
   □ Yes    □ No (If No, go to Q18)
   If Yes, how many hours per week does your child attend this program?
   __________ hours

17. Is there a co-ordination between centre-based program and home-based program?
   □ Yes. Please specify the format:
   ______________________________________________________________________
   ______________________________________________________________________

18. Please fill in the characteristics of the child under your program:

   month/year that the program was started: ____ (mth)/____ (year)
For each of the following please “✓” the appropriate box (only ONE) that BEST describes the child:

**Characteristics of the child at beginning of the program**

<table>
<thead>
<tr>
<th>a. level of developmental delay:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ severe</td>
<td>□ moderate</td>
<td>□ mild</td>
<td>□ none</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>l. receptive language ability:</th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>□ minimal</td>
<td>□ poor</td>
<td>□ fair</td>
<td>□ age-appropriate</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>m. expressive language ability:</th>
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<tbody>
<tr>
<td>□ minimal</td>
<td>□ poor</td>
<td>□ fair</td>
<td>□ age-appropriate</td>
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<tr>
<th>n. social competence:</th>
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<tbody>
<tr>
<td>□ minimal</td>
<td>□ poor</td>
<td>□ fair</td>
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<th>o. self help skills:</th>
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<tbody>
<tr>
<td>□ minimal</td>
<td>□ poor</td>
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<td>□ age-appropriate</td>
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<tr>
<th>p. behavioural styles:</th>
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<tbody>
<tr>
<td>i. attention span</td>
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<tr>
<td>□ severe limitation</td>
<td>□ moderate limitation</td>
<td>□ mild limitation</td>
<td>□ age-appropriate</td>
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<table>
<thead>
<tr>
<th>vi. ability to follow instructions</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>□ minimal</td>
<td>□ a lot of prompting required</td>
<td>□ a little prompting required</td>
<td>□ independent</td>
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<thead>
<tr>
<th>vii. rhythmic habit patterns (repetitive, nonfunctional and inappropriate behavioural patterns eg body rocking or head banging.)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>□ severe</td>
<td>□ moderate</td>
<td>□ mild</td>
<td>□ none</td>
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</tbody>
</table>

For each of the following please “✓” the appropriate box (only ONE) that BEST describes the child:

**Current characteristics of the child:**

<table>
<thead>
<tr>
<th>a. level of developmental delay:</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>severe</td>
<td>moderate</td>
<td>mild</td>
<td>none</td>
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<tr>
<th>b. receptive language ability:</th>
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<tbody>
<tr>
<td>minimal</td>
<td>poor</td>
<td>fair</td>
<td>age-appropriate</td>
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<tr>
<th>c. expressive language ability:</th>
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<tbody>
<tr>
<td>minimal</td>
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<tr>
<th>d. social competence:</th>
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<tr>
<td>minimal</td>
<td>poor</td>
<td>fair</td>
<td>age-appropriate</td>
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<th>e. self help skills:</th>
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<tbody>
<tr>
<td>minimal</td>
<td>poor</td>
<td>fair</td>
<td>age-appropriate</td>
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<tr>
<th>f. behavioural styles:</th>
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<tbody>
<tr>
<td>i. attention span</td>
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<td></td>
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<tr>
<td>- severe limitation</td>
<td>moderate limitation</td>
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<tr>
<td>- mild limitation</td>
<td>age-appropriate</td>
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<tr>
<th>viii. ability to follow instructions</th>
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<tbody>
<tr>
<td>minimal</td>
<td>a lot of prompting required</td>
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<td></td>
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<tr>
<td>a little prompting required</td>
<td>independent</td>
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<thead>
<tr>
<th>ix. rhythmic habit patterns</th>
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<tbody>
<tr>
<td>(repetitive, nonfunctional and inappropriate)</td>
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<tr>
<td>behaviour patterns eg body rocking or head banging)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>severe</td>
<td>moderate</td>
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<tr>
<td>mild</td>
<td>none</td>
<td></td>
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</tbody>
</table>

THE END
Thank you
Appendix D  Letter by Autism Behavioural Intervention Association (Inc)

**Autism Behavioural Intervention Association (Inc.)**

A00345412J

P.O. Box 2431
Mount Waverley,
Victoria, 3149,
Australia.
Phone: +61 3 9885 7463
www.voten.net.au/~abia

Wednesday, November 18, 1998

To: All PARENTS of the ABIA

RE: RMIT research - a study of ... practices in early intervention ... autism ...

Dear member,

I am writing to you on behalf of the ABIA committee.

At our last meeting (October 21, 1998) we agreed to support this particular research project by enabling them to send this questionnaire to every family member of the ABIA.

We did this by offering to arrange labelling and postage of the surveys.

The surveys were delivered in envelopes to my home, this letter was to be inserted and the envelopes sealed. The sealed envelopes were to be delivered to the home of the membership secretary where mailing labels were to be printed and attached to the envelopes, just prior to delivery to the post office.

All costs, including postage were to be paid by RMIT.

Another condition of us allowing our mailing list to be used in this way was that all results would be made available to the association and that a full report be given at an ABIA information night - no later than the end of April 1999.

Your participation in this survey is entirely voluntary and completely anonymous.

Yours sincerely,

Mark A. Modra
President
Autism Behavioural Intervention Association (Inc.)

---

1 "A study of the approaches and methods of practice in early intervention in autism and related disorders" - by Helen Chau - PhD student at RMIT.
MEMORANDUM

FROM: John Reece, PhD
PHONE: 9925-7512
FAX: 9925-7303
E-MAIL: reece@rmit.edu.au

TO: Ms Helen Chau, Department of Psychology & Intellectual Disability Studies
DATE: 20 August 1998
RE: Application for ethics approval
CC: Dr Amanda Richdale, Department of Psychology & Intellectual Disability Studies

Your project, titled A Study of Approaches and Methods of Practice in Early Intervention in Autism and Related Disorders has been considered by the Faculty of Applied Science Human Research Ethics Sub-Committee. You self-rated the project as NR (i.e., no risks above the everyday norm) and the Sub-Committee agreed with that rating. Some required and recommended changes were brought to your attention in my memo to you of 15 June. Your revisions deal with all of these issues appropriately. Therefore, you may consider your project, as it is described in your revised application, APPROVED for a period of 12 months from the date on this memo.

Should your project not be completed within 12 months, you should apply for an extension of approval. Also, you should be aware that there is a requirement to provide a report at the end of the project. Pro-formas for both tasks are available from me.

Let me take this opportunity to wish you all the best with your research. If any issues regarding ethics arise during the running of the project, please do not hesitate to contact me.

Sincerely

John Reece, PhD
Chair, Faculty of Applied Science Human Research Ethics Sub-Committee
### Appendix F  Models/Theories and Goals of Home-Based Programs in Survey

<table>
<thead>
<tr>
<th>Model/theories</th>
<th>Goals</th>
<th>General/Specific Goals</th>
</tr>
</thead>
</table>
| Behavioural model - using Discrete Trial Learning | - to achieve behaviours necessary for school entry  
- interactive child + peer led play  
- reading, phonics, worksheets, numeracy skills  
- conversation skills including Wh discrimination | Specific               |
| Behavioural model - using Discrete Trial Learning | - to assist our son in reaching his potential academically, socially, behaviourally | General               |
| Behavioural model - using Discrete Trial Learning | - skill development to age appropriate level  
- fine motor skills  
- cognitive - language  
- social | Specific               |
| Behavioural model - using Discrete Trial Learning | - extension of expressive language  
- spontaneous requests (more frequent)  
- increased compliance  
- improved behaviour | Specific               |
| Behavioural model - using Discrete Trial Learning | - do things independently  
- reduce prompting and increase social skills eg play with other children, go to shopping centres without tantruming, road safety skills | Specific               |
| Behavioural model - using Discrete Trial Learning | - increase in receptive language  
- increase in play skills  
- increase (augmented) language  
- increase in self help skills thru schedules | Specific               |
| Behavioural model - using Discrete Trial Learning | - a normal child (I have high expectations) | General               |
| Behavioural model - using Discrete Trial Learning (with some modifications) | - receptive and expressive language (focus on expressive)  
- compliance when given instructions  
- appropriate communication via language development  
- self help skills | Specific               |
| Behavioural model - using Discrete Trial Learning | - independence  
- interaction with others | General               |
| Behavioural model - using Discrete Trial Learning | - at present after 19 mths at therapy our goal is to equip our son to begin mainstream school next year at the Prep level, our ultimate objective is to fade out his integration aide in the early part of the year. | General               |
| Behavioural model - using Discrete Trial Learning | - To become as normal as possible  
- To be able to socialize & function within at community. To succeed in mainstream schools.  
- To bring language up to peer level. | General               |
| Behavioural model - using Discrete Trial Learning | - improved expressive speech  
- improved social skills  
- decreased use of jargon  
- improved ability to sit still and listen properly | Specific               |
<p>| Behavioural model - using Discrete Trial Learning | - To establish some form of communication - whether it be sign, compic or language, using photos etc | Specific               |</p>
<table>
<thead>
<tr>
<th>Model/theories</th>
<th>Goals</th>
<th>General/Specific Goals</th>
</tr>
</thead>
</table>
| Behavioural model - using Discrete Trial Learning | - to teach total independence  
- to have compic/picture association cover all communication needs | General                |
| Using natural language, imitation, praise & encouragement | - to improve expressive language  
- to increase independence eg. toileting, dressing  
- to be able to read and write  
- to make child socially competent  
- decrease self-stimulatory behaviour | Specific               |
| Behavioural model using discrete trial learning and developmental model | - language skills to reach age appropriate levels  
- social skills to reach age appropriate levels  
- academic skills to reach age appropriate levels | Specific               |
| Behavioural model - using Discrete Trial Learning | - recovery to within normal range                                        | General                |
| Behavioural model - using Discrete Trial Learning | - speech  
- writing  
- mathematics  
- normalization of behaviour | General                |
| Behavioural model - using Discrete Trial Learning | age appropriate behaviour, eye contact & maintaining interest, conversation skills, to be able to sit & attend to task at hand, initiation, play skills, fine motor skills & motor planning | Specific               |
| Behavioural model - using Discrete Trial Learning | maximise potential, increase both receptive and expressive language, decrease undesirable behaviours, learn to manage difficult behaviour, prepare for possible socialization | Specific               |
| Behavioural model - using Discrete Trial Learning | - supported employment and housing                                      | General                |
| Behavioural model - using Discrete Trial Learning | - develop basic speech  
- ready for regular school | General                |
| Behavioural model - using Discrete Trial Learning | - To enable child to be integrated successfully into state school system.  
- Increase social acceptance. | General                |
| Behavioural model - using Discrete Trial Learning | - improve communication skills both expressively and receptively  
- improve play skills in independent play  
- learn how to attend & listen to instruction | Specific               |
| DISTAR reading, language & arithmetic program    | - aim to improve speech, reading, numeracy & writing skills            | Specific               |
| Behavioural model - using Discrete Trial Learning | goals are to make our child as close to possible as a normally developing peer | General                |
| Behavioural model - using Discrete Trial Learning | - to maximise my son’s ability to learn, eventually out of the structured environment  
- to maximise his potential to the maximum ability - as far as he can go | General                |
<p>| Behavioural model - using Discrete Trial Learning | speech development                                                      | General                |
| Behavioural model - using Discrete Trial Learning | Nil                                                                    | None                   |</p>
<table>
<thead>
<tr>
<th>Model/theories</th>
<th>Goals</th>
<th>General/Specific Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- improved comprehension/ conversation</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- toilet training, independent speech, integration</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- to be able to communicate effectively with peers and others - to be able to attend local school, participate &amp; interact with others with no noticeable differences</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning plus adaptation in a more natural environment</td>
<td>- to get our child to communicate, to learn on his own initiative, - to learn to play socially, learn to act in social manner</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- to obtain speech and social interactive skills</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning plus behaviour modification *</td>
<td>* consistently praise and teach good behaviour and ignore/discipline inappropriate behaviour - to give/teach our son the appropriate behaviour, speech and means of communication for his age. - to be able to function independently in adult life, to be accepted in the typical world &amp; to have friends.</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>nil</td>
<td>None</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- to get my child to speak - appropriate play - mix with other children appropriately</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- socialization - language encouragement</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- increased social interaction - development of fine motor skills eg pencil grip - toilet training</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>hope that my child will be able to attend a normal state school by the age of 6 with an aides assistance</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>main aim at present is compliance</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>child to become more compliant, communicate more effectively</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- to aid in improvement of language, behaviour &amp; social skills - to aid in social and language competence so that he will be able to integrate into a normal school environment and interact appropriately with his peers</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>- to teach to deficit, with the aim to bring my child to meet developmental norms - to encourage appropriate use of time eg play - to increase understanding of use of language</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural model - using Discrete Trial Learning</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>Model/theories</td>
<td>Goals</td>
<td>General/Specific Goals</td>
</tr>
<tr>
<td>---------------</td>
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<td>------------------------</td>
</tr>
</tbody>
</table>
| Behavioural model - using Discrete Trial Learning | - improvement in language-based skills eg expressive and receptive language  
- improvement/normalization of social skills eg. minimization of rigidity, obsessive/compulsive traits, temper outbursts. | Specific |
| Behavioural model - using Discrete Trial Learning | we expect him to understand more, speak more, socialize more, behave better | General |
| Behavioural model - using Discrete Trial Learning | - to enable the child to gain as much knowledge + understanding as possible before she begins school so that she maybe at some stage be able to integrate into local school eventually | General |
| Behavioural model - using Discrete Trial Learning | - improve communication & social interaction. decrease inappropriate behaviours (esp aggressive) | General |
| Behavioural model - using Discrete Trial Learning | - to improve academic abilities  
- to improve attending skills  
- to manage challenging behaviour  
- most important improve language skills | Specific |
### Appendix G  Models/Theories and Goals of Centre-Based Programs in Survey

<table>
<thead>
<tr>
<th>Model/theories</th>
<th>Goals</th>
<th>General/Specific Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental-Macquarie system</td>
<td>-to provide every child with the opportunity of meaningful learning, worthwhile education programs and non-categorization that maximises their talents and abilities and encourages self-esteem</td>
<td>General</td>
</tr>
</tbody>
</table>
| Developmental                   | -child development to maximise potential  
- independence  
- social/play skills  
- on task behaviour  
- communication/language development                                                                                      | Specific                |
| Developmental/Behavioural       | -to provide comprehensive and flexible programs to meet the needs of families involved at any one time  
-to implement individual teaching and therapy programs devised by parents and staff working together  
-to provide and operate inclusive programs in the community                                                                   | General                |
| Developmental-Macquarie system  | -to prepare children for mainstream  
- support service to parents/family  
- early stimulation and motivation for child  
- to reduce handicapping effect of disability                                                                                   | Specific                |
| Developmental/Behavioural       | - to provide information, support and guidance to families within family centred practice model assist children to develop skills in all areas of development which well enable positive interaction and inclusion in family and community experiences | General                |
| Developmental/Behavioural       | - to provide a family centred approach to programme  
- to maximize child/family potential  
- to prevent development of second disabilities                                                                                   | General                |
| Developmental                   | To improve the individual learning outcomes for each student in all areas - social, emotional, educational, physical                                                                                     | General                |
| All theories - depends on specific needs | -to aid development in all areas  
- to provide parental support  
- to meet the families goals/expectations  
- to empower parents                                                                                                              | General                |
<p>|                                 | - to give maximum opportunities to prepare a child for school (whatever school is appropriate); some of our major priorities within an educational program are mobility, communication, toileting and self-care, eating and drinking, gross and fine motor skills, social skills | General                |
| Developmental                   | - improved receptive &amp; expressive communication : use of makaton, compic, toilet trained, choice making : turn-taking, understanding of concepts; independent feeding, dressing, improved fine motor, and gross motor skills. | Specific                |</p>
<table>
<thead>
<tr>
<th>Model/theories</th>
<th>Goals</th>
<th>General/Specific Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental</td>
<td>- goals are individually designed based on family centred practice. So parents set 6 monthly goals for children and staff work to help them implement these. In addition, parent education promoting an understanding of child and family options and staff provide options/opinions to parents.</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural - ABA approach</td>
<td>- individually based : for each student to reach potential. Goals negotiated with families. Heavy emphasis on 1. language/communication 2.behaviour management 3. learning technologies</td>
<td>Specific</td>
</tr>
</tbody>
</table>
| Developmental                  | - improved communication  
- improved behaviour  
- improved play skills  
- improved living skills                                                                                                                        | General                |
| Developmental/Behavioural/     | Overall our main aim is to support through therapy, advocacy, information assessment, the child and the family to achieve these fullest potential.                                                                                                                   | General                |
|  family centred practice       | for children in the program :  
- to provide Individual Planned Programs and Individual Family Service Plans for children designed in cooperation with families.  
- to provide educational and therapeutic programs which are regularly evaluated to ensure that they meet the child’s particular developmental needs  
- to provide high quality programs in the centre, at home or in the community  
- to support children in generic settings such as playgroups, childcare, preschool or school settings for the families :  
- to provide support  
- to encourage involvement in the development of children’s programs  
- to provide information on other specialist support programs such as respite care  
- to offer parent groups for sharing and socializing, enabling parents to develop their own resources in the community  
- to offer support to play-groups and pre-schools in their acceptance of children with disabilities  
- to provide professional development to people studying special education and allied health students  
individual goals/outcomes are determined through assessment, discussion and cooperative planning with parents/care-givers. |
<p>| Developmental/Behavioural      | - to encourage to the growth of skills in particular language, within a pre-school environment for parent to continue what they see in the program at home to support our families and assist with transitions to kinder; school etc                                                                 | Specific               |
| Behavioural                   |                                                                                                                                                                                                                     | General                |</p>
<table>
<thead>
<tr>
<th>Model/theories</th>
<th>Goals</th>
<th>General/Specific Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- maximise developmental outcomes for children with ASD</td>
<td>General</td>
</tr>
<tr>
<td>Developmental</td>
<td>- to provide a developmentally appropriate and individualised program to children through a family-centred approach</td>
<td>General</td>
</tr>
<tr>
<td>Developmental</td>
<td>- each child has an individual program; family service plan with goals and plans</td>
<td>General</td>
</tr>
<tr>
<td>Developmental</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>
Appendix H(a) Follow-up Survey Questionnaire (centre-based program)

**Questionnaire**: A study of approaches and methods of practice in early intervention in autism and related disorders

*To be completed by the coordinator of the early intervention program in your centre.*

I would like the person who has the capacity of overseeing the early intervention program in the centre to fill out the questionnaire.

**Note:**
- As this is a 6-year follow-up you might have completed a similar questionnaire at the end of 1998. I am therefore asking if you would do it again as part of the follow-up.
- If this questionnaire is new to you, I still want you to complete it. Your participation will provide valuable new information

If you did / did not complete a similar questionnaire at the end of 1998, please indicate below

Please √ as appropriate:

- [ ] I completed the same questionnaire at the end of 1998.
- [ ] I did not complete the questionnaire at the end of 1998.

I appreciate your effort in completing this questionnaire. It will provide important data about the effectiveness of early intervention for young children with an autism spectrum disorder.

Thank you very much for your co-operation.

Helen Chau (Principal Investigator, RMIT University)
Questionnaire: A study of approaches and methods of practice in early intervention in autism and related disorders

Today’s date is: ______________

1. Please fill out the following information about children in your program:
   a. number of girls: __
   b. number of boys: __
   c. number of children with single parent: __
   d. number of children with both parents: __

2. What are the types of disabilities your early intervention program targets? (Please √ appropriate boxes)
   - *autism spectrum disorders
   - global delay
   - specific developmental disorder
   - delay in motor development
   - Down Syndrome
   - Fragile X
   - Others: (Please specify _____________________________________________________________________)

3. From your records can you give the number of children diagnosed with the following disorders that have been included in your programs?

<table>
<thead>
<tr>
<th>Year</th>
<th>*Autism spectrum disorders</th>
<th>Global Delay</th>
<th>Specific language delay</th>
<th>delay in motor development</th>
<th>Down Syndrome</th>
<th>Fragile X</th>
<th>Others: (_______)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2004</td>
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<td></td>
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</tr>
</tbody>
</table>

* Autism spectrum disorders include autism, PDDNOS (Pervasive Development Disorder Not Otherwised Specified) and Asperger’s Syndrome

4. What is the staff/child ratio for your program (if applicable)?

________________________________________________________________________

5. Please give the number (eg 2,3) of the following specialized staff involved in your program?
   - special education trained teacher
   - speech pathologist
□ occupational therapist
□ social worker
□ psychologist
□ child care worker
□ Others : (please specify _________________________________)

6. Have your teachers attended a training program/staff development in 2003/2004 ?
□ Yes □ No

If Yes, please name the course(s) attended :

1998: __________________________________________________________________
______________________________________________________________________

7. What types of therapy are offered through your program ? (please □ appropriate boxes)

□ educational - please tick below the methods used in the program :
  □ Discrete trial learning
  □ Incidental teaching
  □ Activity-based structural teaching
  □ Others : (Please specify): _____________________________

□ sensory integration
□ speech therapy
□ 1 : 1 teaching
□ behavioural management
□ Others (please specify) : ________________________________

8. Can you list the goals/objectives/expected outcomes of your programs ?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
9. What are the theories or models that guide your program delivery? (eg. behavioural model, developmental model)

Please provide a brief description:

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

10. Do parents in your program implement or follow up on the program provided at home?

☐ Yes ☐ No (go to Q.11)

a. Can you briefly describe what the parents do at home?

_________________________________________________________________

_________________________________________________________________

b. How do you rate the effectiveness of parental involvement?

☐ very effective ☐ moderately effective

☐ not very effective ☐ ineffective

11.a) Does your program offer parent training sessions?

☐ Yes. Please answer b) & c) ☐ No. Go to Q. 12

b) What types of training does the session offer? (please √ appropriate boxes)

☐ toilet training

☐ sleep problems

☐ educational

☐ speech training

☐ behavioural management

☐ others: please describe ________________________________
12. a) Does your centre offer assessment for each child at different points in program involvement?
   □ Yes (go to Q.13) □ No. Please answer b) below.
   b) Is the child referred to an agency for assessment processes? □ Yes □ No

13. If your centre offers assessment for children, what are the assessment processes?
   □ individual educational test(s) (please name the test(s) used): _______________ 
   □ completion of developmental checklist
   □ standard psychological and speech tests (please name the test(s) used):
     □ WPPSI –R or WPPSI- III (Wechsler Preschool & Primary Scales of Intelligence- revised edition or third edition)
     □ The Reynell Developmental Language Scales
     □ others (please specify): ________________________________
   □ Others (please specify): ________________________________

14. Please give information on the following features in your program:

   a). How many hours does each child spend (on average) in your early intervention program per week? __________
   b). Are there any communication/language training strategies in your program?
      □ Yes □ No (go to Q.14c))
      If Yes, please ✔ the following:
      □ verbal imitation
      □ receptive and expressive language skills
      □ conversation skills (please give examples): ______________________________
      ______________________________
      □ story telling
      □ picture exchange
      □ Compic
      □ Makaton sign language
      □ others (please specify): ______________________________

   c). Are strategies for improving children’s social competence included in your program?
      □ Yes □ No. (go to Q.14 d)
      If Yes, please describe:
      ____________________________________________________________________
d). Are strategies for eliminating maladaptive behaviour included in your program?

☐ Yes ☐ No

If yes, please describe:

__________________________________________________________________

__________________________________________________________________

e). Please name other features of your program which you consider important in your program and NOT mentioned above?

__________________________________________________________________

__________________________________________________________________

15. Please select One group of children (age between 3 to 5) who began the program in early 2003 and are still under the program and fill out their characteristics below (if there is no such group, please select at random 8 to 10 children eg. the first ten children in the records who are still in the program):

At beginning of 2003 school year
a. number of children in the group in total: _____
   i. number of boys: _____
   ii. number of girls: _____

b. age range: ___ to ____ years old

c. How many hours did the group spend (on average) in your early intervention program per week? _____

d. What is the staff/children ratio (if applicable)? ________
For the following ☐s please write down the number of children belonging to that category:

eg. ☐ severe ☐ moderate ☐ mild ☐ none

Characteristics at beginning of 2003

<table>
<thead>
<tr>
<th>Category</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. level of developmental delay:</td>
<td>☐ severe</td>
<td>☐ moderate</td>
<td>☐ mild</td>
<td>☐ none</td>
</tr>
<tr>
<td>q. receptive language ability:</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
<td>☐ age-appropriate</td>
</tr>
<tr>
<td>r. expressive language ability:</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
<td>☐ age-appropriate</td>
</tr>
<tr>
<td>s. social competence:</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
<td>☐ age-appropriate</td>
</tr>
<tr>
<td>t. self help skills:</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
<td>☐ age-appropriate</td>
</tr>
<tr>
<td>u. behavioural styles:</td>
<td>☐ severe limitation</td>
<td>☐ moderate limitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. attention span</td>
<td>☐ mild limitation</td>
<td>☐ age-appropriate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x. ability to follow instructions</td>
<td>☐ minimal</td>
<td>☐ a lot of prompting required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xi. rhythmic habit patterns (repetitive, nonfunctional and inappropriate behavioural patterns eg body rocking or head banging.)</td>
<td>☐ severe</td>
<td>☐ moderate</td>
<td>☐ mild</td>
<td>☐ none</td>
</tr>
</tbody>
</table>

Data for 2004 Term 4 (current situation) of the group:

a. number of children in the group in total: ______
   ii. number of boys: _____
   iii. number of girls: _____

b. age range: _____ to _____ years old
c. How many hours does the group spend (on average) in your early intervention program per week? _____ hours

d. What is the staff/children ratio of the program? _____

For the following ☐s please write down the number of children belonging to that category:

eg. ☐ severe ☐ moderate ☐ mild ☐ none

Current characteristics in Term 4

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>level of developmental delay:</td>
<td>☐ severe</td>
<td>☐ moderate</td>
<td>☐ mild</td>
</tr>
<tr>
<td>v.</td>
<td>receptive language ability:</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
</tr>
<tr>
<td>w.</td>
<td>expressive language ability:</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
</tr>
<tr>
<td>x.</td>
<td>social competence:</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
</tr>
<tr>
<td>y.</td>
<td>self help skills:</td>
<td>☐ minimal</td>
<td>☐ poor</td>
<td>☐ fair</td>
</tr>
<tr>
<td>z.</td>
<td>behavioural styles:</td>
<td>☐ severe limitation</td>
<td>☐ moderate limitation</td>
<td>☐ mild limitation</td>
</tr>
<tr>
<td>i.</td>
<td>attention span</td>
<td>☐ minimal</td>
<td>☐ a lot of prompting required</td>
<td>☐ a little prompting required</td>
</tr>
<tr>
<td>xii.</td>
<td>ability to follow instructions</td>
<td>☐ minimal</td>
<td>☐ a lot of prompting required</td>
<td>☐ a little prompting required</td>
</tr>
<tr>
<td>xiii.</td>
<td>rhythmic habit patterns (repetitive, nonfunctional and inappropriate behavioural patterns eg body rocking or head banging.)</td>
<td>☐ severe</td>
<td>☐ moderate</td>
<td>☐ mild</td>
</tr>
</tbody>
</table>
e. Are there any children in the group above have a home program using the principle of Applied Behaviour Analysis (ABA) based on Lovaas research?
   □ Yes, there are. (Please go to Questions. f, g, and h)
   □ No, there is none. (Please end your questionnaire here)

f. What are the diagnoses of the children having an ABA program? (Please indicate the number of children having the diagnoses in the box eg □)
   □ Autism Spectrum Disorders
   □ Others (please specify): ___________________

h. At the centre, have the teachers or workers observed any side effects on the child connected with the home ABA program?
   □ Yes. Please specify:

   ______________________________________
   ______________________________________
   ______________________________________
   □ No.
Appendix H (b)  Follow-up Survey Questionnaire (home-based program)

**Questionnaire (Home Program Version): A Study Of Approaches And Methods Of Practice In Early Intervention In Autism And Related Disorders**

This is a 6-year follow-up study about early intervention for young children with an autism spectrum disorder or related disorder. (If you have completed the same questionnaire in October this year, we appreciate your time and effort. If you have not completed one this October, we appreciate if you could spend some time completing this questionnaire as it will provide valuable information on early intervention practices in Victoria.)

*To be completed by the parent in conjunction with the program supervisor.*

This questionnaire is about the child of the family to which the questionnaire has been sent, and about that child’s ABA program.

I would like the person who has the responsibility for designing and running the child’s home ABA program to complete this questionnaire.

**Note:**
- As this is a 6-year follow-up you might have completed a similar questionnaire at the end of 1998. I am therefore asking if you would do it again as part of this follow-up.
- If this questionnaire is new to you, we still want you to complete it. Your participation will provide valuable new information

If you did / did not complete a similar questionnaire at the end of 1998, please indicate below

Please “✓” as appropriate:

- □ I completed this questionnaire at the end of 1998.
- □ I did not complete the questionnaire at the end of 1998.

I appreciate your effort in completing this questionnaire. It will provide important data about the effectiveness of early intervention for young children with an autism spectrum disorder.

Thank you very much for your co-operation and participation.

Helen Chau
(Principal Investigator, RMIT University)
Today’s date is: ________________

1. Please fill out the following for the child under your program:

   c. Date of Birth: ________________

   (Please check “x” the appropriate answers for b. & c.)
   b. ☐ female   ☐ male

   c. Who does the child live with?
      ☐ mother only   ☐ father only   ☐ both parents   ☐ others (please specify): _________

   d. Parent occupation of the child (Please “✓” the appropriate answer)

<table>
<thead>
<tr>
<th>Mother</th>
<th>Father</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ unemployed</td>
<td>☐ unemployed</td>
</tr>
<tr>
<td>☐ unskilled workers in administrative and</td>
<td>☐ unskilled workers in administrative and</td>
</tr>
<tr>
<td>clerical work, servicing industries and</td>
<td>clerical work, servicing industries and</td>
</tr>
<tr>
<td>sales</td>
<td>sales</td>
</tr>
<tr>
<td>☐ skilled workers eg trades person</td>
<td>☐ skilled workers eg trades person</td>
</tr>
<tr>
<td>☐ managers, consultants</td>
<td>☐ managers, consultants</td>
</tr>
<tr>
<td>☐ professionals such as engineers,</td>
<td>☐ professionals such as engineers, teachers,</td>
</tr>
<tr>
<td>teachers, dentists.</td>
<td>dentists.</td>
</tr>
<tr>
<td>☐ lawyers, social workers, nurses and</td>
<td>☐ lawyers, social workers, nurses and</td>
</tr>
<tr>
<td>doctors</td>
<td>doctors</td>
</tr>
<tr>
<td>☐ own business</td>
<td>☐ own business</td>
</tr>
<tr>
<td>☐ home-maker</td>
<td>☐ home-maker</td>
</tr>
<tr>
<td>☐ others: (please specify) ___________</td>
<td>☐ others: (please specify) ___________</td>
</tr>
</tbody>
</table>

2. What is the type of disability your early intervention program targets? (please “✓” the appropriate answer)

   ☐ autism spectrum disorders (include autism, pervasive developmental disorder
   - not otherwise specified and Asperger’s syndrome)
   ☐ global delay
   ☐ specific developmental language disorder
   ☐ delay in motor development
   ☐ Down Syndrome
   ☐ Fragile X Syndrome
   ☐ Others (Please specify ________________________________)
3. What is the therapist/child ratio per session for your program? (please “✓” the appropriate box)

☐ 1:1
☐ Other: (please specify) ________________

4. Please give the number (eg 1, 2) of the following specialized staff involved in your program?

eg. ☐ program therapists
☐ local psychologist
☐ overseas consultant psychologist
☐ occupational therapist
☐ speech pathologist
☐ program therapists (eg student therapists and therapists under training)
☐ Others: (please specify ________________)

5. Are parents involved as program therapists? (please “✓” the appropriate box)

☐ Yes ☐ No

6. Have your program therapists attended ABA training program/workshops in 2004?

☐ Yes ☐ No

If Yes, please specify the course(s) they have attended in 2004.

☐ workshops organized by the ABIA (Autism Behavioural Intervention Association)
☐ home workshops offered by consultants
☐ others (please specify) _________________________

7. What types of therapy are offered through your program? (please “✓” all the appropriate answers)

☐ educational - please check below the methods used in the program:
  - Discrete trial learning
  - Incidental teaching
  - Activity-based structural teaching
  - Others: (Please specify): _______________________

☐ sensory integration
☐ speech therapy
☐ 1:1 teaching
☐ behavioural management
☐ Others (please specify): _________________________________

8. Can you list the goals/objectives/expected outcomes of your program?
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

9. What are the theories or models that guide your program delivery? (e.g., behavioural model, developmental model) (please “✓” the appropriate answer)

☐ behavioural model - using Discrete Trial program basing on Lovaas’ (1987) study.
☐ others (please specify): _________________________________
____________________________________________________________________
____________________________________________________________________

10. Do parents in your program implement or follow up on the program provided at home? (please “✓” appropriate answers)

☐ Yes  ☐ No (go to Q.11)

a. ☐ as a co-therapist in formal sessions
☐ not participating in formal sessions but help the child generalizing in daily life
☐ not participating in formal sessions but help the child generalizing in daily life
☐ others: (please specify the format) _________________________________

b. How do you rate the effectiveness of parental involvement?

☐ very effective  ☐ moderately effective
☐ not very effective  ☐ not effective at all

11. a) Have parents of the child in the program attended any training sessions in relation to the child’s disability?

☐ Yes. Please answer b)  ☐ No. Go to Q. 12
c) What types of training have they attended since the commencement of the child’s program? (please “✓” appropriate answers)
- toilet training
- sleep problems
- speech training
- educational
- behavioural management
- others: please describe ________________________________

12. Does your program include assessments for the child at different points in program involvement? (please “✓” appropriate boxes)
- Yes (go to Q.13)
- No. Please answer b) below and go to Q.14

b) Is the child referred to an agency/or a psychologist for assessment processes?
- Yes
- No.

13. If your program includes assessments for the child, what are the assessment processes? (please “✓” appropriate answers)
- individual educational test(s) (please name the test(s) used): ______________ ____________________________
- completion of developmental checklist
- standard psychological and speech tests (check the test(s) used):
  - WPPSI (Wechsler Preschool & Primary Scales of Intelligence)
  - The Reynell Developmental Language Scales
  - others (please specify): ________________________________
  - Others (please specify): ________________________________

14. a. How long has your program been running? (please “✓” the appropriate answer)
- less than 3 months
- around 6 months
- 7 months to a year
- a year and a half
- two years
- others (please specify): ________________________________
b. How old was the child when he/she entered the program? (please “✓” the appropriate box)

☐ less than 2 years old
☐ two to two years and eleven months old
☐ three to three years and eleven months old
☐ four to four years and eleven months old
☐ five to five years and eleven months old
☐ six years old

15. Please give information on the following features in your program:

a). How many hours does each child spend (on average) in your early intervention program per week? ______ hours

b). Are there any communication/language training strategies in your program? (please “✓” the appropriate answers)

☐ Yes ☐ No (go to Q.15c)
If Yes, please check the following if it applies:

☐ verbal imitation
☐ receptive and expressive language skills
☐ conversation skills (please give examples: ) ________________
☐ story telling
☐ picture exchange
☐ Compic
☐ Makaton sign language
☐ others (please specify): ________________________________

c) Are strategies for improving children’s social competence included in your program?

☐ Yes ☐ No (go to Q.15d)
If Yes, please describe: __________________________________________________________
__________________________________________________________________________

d) Are strategies for eliminating maladaptive behaviour included in your program?

☐ Yes ☐ No
If yes, please describe: ________________________________________________________
__________________________________________________________________________
e) Please name other features of your program which you consider important in your program and NOT mentioned above?

_________________________________________________________________________________

_________________________________________________________________________________

16. Is the child attending a centre-based program while having a home-based program at home?
   □ Yes  □ No (If No, go to Q18)
   If Yes, how many hours per week does your child attend this program?
   __________ hours

17. Is there a co-ordination between centre-based program and home-based program?
   □ Yes. Please specify the format: ____________________________
         ______________________________________________________

18. Please fill in the characteristics of the child under your program:

   month/year that the program was started: _____(mth)/_____ (year)
For each of the following please “✓” the appropriate box (only ONE) that BEST describes the child:

**Characteristics of the child at beginning of the program**

<table>
<thead>
<tr>
<th>a. level of developmental delay:</th>
<th>box your selection(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>severe</td>
<td>□</td>
</tr>
<tr>
<td>moderate</td>
<td>□</td>
</tr>
<tr>
<td>mild</td>
<td>□</td>
</tr>
<tr>
<td>none</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>aa. receptive language ability:</th>
<th>box your selection(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal</td>
<td>□</td>
</tr>
<tr>
<td>poor</td>
<td>□</td>
</tr>
<tr>
<td>fair</td>
<td>□</td>
</tr>
<tr>
<td>age-appropriate</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>bb. expressive language ability:</th>
<th>box your selection(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal</td>
<td>□</td>
</tr>
<tr>
<td>poor</td>
<td>□</td>
</tr>
<tr>
<td>fair</td>
<td>□</td>
</tr>
<tr>
<td>age-appropriate</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>cc. social competence:</th>
<th>box your selection(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal</td>
<td>□</td>
</tr>
<tr>
<td>poor</td>
<td>□</td>
</tr>
<tr>
<td>fair</td>
<td>□</td>
</tr>
<tr>
<td>age-appropriate</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>dd. self help skills:</th>
<th>box your selection(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal</td>
<td>□</td>
</tr>
<tr>
<td>poor</td>
<td>□</td>
</tr>
<tr>
<td>fair</td>
<td>□</td>
</tr>
<tr>
<td>age-appropriate</td>
<td>□</td>
</tr>
</tbody>
</table>

| ee. behavioural styles:        | box your selection(s) |
| i. attention span              |                       |
| severe limitation              | □                     |
| moderate limitation            | □                     |
| mild limitation                | □                     |
| age-appropriate                | □                     |

<table>
<thead>
<tr>
<th>xiv. ability to follow instructions</th>
<th>box your selection(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimal</td>
<td>□</td>
</tr>
<tr>
<td>a lot of prompting required</td>
<td>□</td>
</tr>
<tr>
<td>a little prompting required</td>
<td>□</td>
</tr>
<tr>
<td>independent</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>xv. rhythmic habit patterns (repetitive, nonfunctional and inappropriate behavioural patterns eg body rocking or head banging.)</th>
<th>box your selection(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>severe</td>
<td>□</td>
</tr>
<tr>
<td>moderate</td>
<td>□</td>
</tr>
<tr>
<td>mild</td>
<td>□</td>
</tr>
<tr>
<td>none</td>
<td>□</td>
</tr>
</tbody>
</table>
For each of the following please “✓” the appropriate box (only ONE) that BEST describes the child:

**Current characteristics of the child:**

<table>
<thead>
<tr>
<th>a. level of developmental delay:</th>
<th>severe</th>
<th>moderate</th>
<th>mild</th>
<th>none</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. receptive language ability:</td>
<td>minimal</td>
<td>poor</td>
<td>fair</td>
<td>age-appropriate</td>
</tr>
<tr>
<td>c. expressive language ability:</td>
<td>minimal</td>
<td>poor</td>
<td>fair</td>
<td>age-appropriate</td>
</tr>
<tr>
<td>d. social competence:</td>
<td>minimal</td>
<td>poor</td>
<td>fair</td>
<td>age-appropriate</td>
</tr>
<tr>
<td>e. self help skills:</td>
<td>minimal</td>
<td>poor</td>
<td>fair</td>
<td>age-appropriate</td>
</tr>
<tr>
<td>f. behavioural styles:</td>
<td></td>
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<td></td>
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<tr>
<td>i. attention span</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>xvi. ability to follow instructions</td>
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<td></td>
</tr>
<tr>
<td>xvii. rhythmic habit patterns (repetitive, nonfunctional and inappropriate behavioural patterns eg body rocking or head banging.)</td>
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</tr>
</tbody>
</table>

THE END
Thank you
Appendix I

Explanatory Statement on Research Project: A study of approaches and methods of practice in early intervention in autism and related disorders

Dear program coordinator,

My name is Helen Chau and I am a PhD student in the Department of Psychology and Intellectual Disability Studies, RMIT University. My research project is "A study of approaches and methods of practice in early intervention in autism and related disorders" and my supervisors are Dr. Amanda Richdale and Dr. Susana Gavidia-Payne.

What is the project about?

The main aim of the project is to examine the relationships among program features, child and family characteristics, and goals or treatment outcomes in early intervention programs. Factors studied will include intensity of the program, teacher: student ratio, curriculum, language training strategies, techniques for dealing with unwanted behaviour, techniques for improving social skills, specific child characteristics such as age-of-start, severity of disability, social competence and family factors such as parent involvement and stress. Recent research indicates that program features, and child and family characteristics are important factors relating to treatment outcomes in early intervention. This study is important as it will provide information for educational and clinical practice concerning the mechanisms through which interventions have their effects in relation to the nature of the developmental delays the programs are designed for. A study of these factors will help identify variables and mechanisms which result in effective treatment outcomes.

How can you help?

The first stage of the project is a questionnaire study on early intervention programs. You are invited to fill out this questionnaire. The total time required is about one hour. Participation in the questionnaire is voluntary. Participants are free to withdraw from the project, or withdraw data, at any time prior to data analysis. The questionnaire is anonymous and participants will not be individually identified. Research data may be included in conference presentations or articles submitted for publications. Your contribution to the study is very much appreciated. Please send the completed questionnaire to me in the self-addressed envelop provided before 1st December. At the end of the research project participants will be informed of the main findings.

Should you have questions regarding this research, please do not hesitate to inform me direct at Tel: (03) 9925 7376 or my supervisor, Dr Amanda Richdale at Tel: (03) 9925 7366 or you may prefer to contact the Secretary of Faculty of Applied Science Human Research Ethics Subcommittee or the Secretary to the RMIT Human Research Ethics Committee c/o University Secretariat at Tel: (03) 9925 1745.

Yours sincerely,

Helen Chau
(PhD student)

Dr. Amanda Richdale
(Supervisor)

Dr. Susana Gavidia-Payne
(Supervisor)
Dear Helen

HRE-SC Application CHAU A Study of approaches and methods of practice in early intervention and related disorders, Study 1 – Survey

Your request for an extension to your Ethics Approval for your project titled: A Study of approaches and methods of practice in early intervention and related disorders, Study 1 – Survey was reviewed by the Chair of the SET Portfolio Human Research Ethics Sub-Committee (Non-Biomedical).

I am pleased to inform you that the Chair has approved your extension request and your research is now approved until December 2005.

The committee would like to remind you that:

All data should be stored on University Network systems. These systems provide high levels of manageable security and data integrity, can provide secure remote access, are backed up on a regular basis and can provide Disaster Recover processes should a large scale incident occur. The use of portable devices such as CDs and memory sticks is valid for archiving, data transport where necessary and for some works in progress;

The authoritative copy of all current data should reside on appropriate network systems; and the Principal Investigator is responsible for the retention and storage of the original data pertaining to the project for a minimum period of five years.

The necessary form can be found at: http://www.rmit.edu.au/rd/hrec

Yours sincerely,

Julie Barnett
Secretary, Science Engineering & Technology Portfolio
Human Research Ethics Sub-Committee
RMIT University

Cc Chair SET Portfolio Human Research Ethics Sub-Committee (Non-Biomedical): John Reece
Supervisor: Amanda Richdale School of Health Sciences
Appendix K  Models/Theories and Goals of Home-Based Programs in the Follow-Up Survey

<table>
<thead>
<tr>
<th>Models/theories</th>
<th>Goals</th>
<th>General/Specific Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to attend mainstream school without need of aide support</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to increase socialisation skills</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to enhance cognitive development</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to enhance motor development</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- improved behaviour e.g. attention span</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- interaction with other children including siblings</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- improvement in speech</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to improve imitation skills and play skills</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to improve receptive and expressive language abilities</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to improve communication with PECS</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- best possible life for my child</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to decrease all unwanted behaviours</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to increase all positive behaviours</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to develop speech and communication</td>
<td>Specific</td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to develop independent skills</td>
<td></td>
</tr>
<tr>
<td>Behavioural—using Discrete Trial program</td>
<td>- to increase activity in regular social, academic and family activities for the positive benefit of the child with autism and the family.</td>
<td>General</td>
</tr>
</tbody>
</table>
Appendix L  Models/Theories and Goals of Centre-Based Programs in the Follow-Up Survey

<table>
<thead>
<tr>
<th>Models/theories</th>
<th>Goals</th>
<th>General/Specific Goals</th>
</tr>
</thead>
</table>
| Structured preschool program  
Intensive interaction  
Structured play  
Total communication environment                                                                                                                          | To develop communication and interaction skills                                           | General                |
| Combination of behavioural and developmental model which focuses on the development of social and play skills                                             | For children and families to be actively included in their communities                     | General                |
| Developmental model that mixes elements—sensory integration, visual communication, social skills, self-regulation are emphasised                     | Individual goals developed with families, emphasise achieving age-appropriate self-regulation, social inclusion and communication skills, especially pragmatics and cognitive skills | Specific               |
| Developmental model—we work from where the child is currently at and work towards achieving the next developmental skill                             | For children to make progress in their developmental skills  
For children to make progress with their communication skills  
For parents to feel more able to assist their children’s learning                           | General                |
| Developmental—Individual programs involving all developmental areas, A Family-Centred Program                                                            | A multidisciplinary team of professionals who, along with parents, are committed to providing timely, accessible, specialised and individually tailored services to meet the needs of children and families challenged by Autism Spectrum Disorder and the information needs of the broader community  
Partnership with parents in developing their child’s Individual Program and Family Service & Support Plan  
Support with Inclusion Programs in Daycare Centres, Playgroups, Preschools and Schools  
The goal of successful community inclusion | General                |
<table>
<thead>
<tr>
<th>Models/theories</th>
<th>Goals</th>
<th>General /Specific Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family-centred practice Play, Vygotsky</td>
<td>Goal of program is to assist families to support their children with a developmental delay or disability. Families are supported in a play-based program in the centre.</td>
<td>General</td>
</tr>
<tr>
<td>Developmental—An early intervention service with a particular focus on language and communication</td>
<td>Provide a developmental and age-appropriate program which encourages the development of communication and social interaction within a play environment. Provide individual program plans and family support. Provide parent support and encourage parent-to-parent support. Provide activity and resource ideas to parents to use at home. Liaise with relevant generic and specialist children and family services. Provide an environment in which parents and staff can work together on ongoing assessment and individual program planning.</td>
<td>Specific</td>
</tr>
<tr>
<td>Developmental and behavioural model Family-centred practice Bilingual model for all group programs</td>
<td>Listening skills development. Promotion of play skills. Development of communication skills. Parenting skills development. Promotion of the whole child’s wellbeing.</td>
<td>General</td>
</tr>
<tr>
<td>Behavioural and developmental model</td>
<td>Building the resources of families to promote their child’s personal development, and the child’s participation, functioning and acceptance within the family and the community. Behaviour management programs. Parent education, information and support programs, which are aimed at building the resources of families to promote their child’s personal development, and the child’s participation and functioning within the family and the community. Group programs that integrate education and therapy programs for each individual age group. Skill-focused transition programs for children progressing from early childhood intervention and universal preschool to primary school.</td>
<td>General</td>
</tr>
<tr>
<td>ABA (one-to-one teaching) task analysis of specific skills</td>
<td>We offer individual one-to-one intensive programs based on assessment at the start of the year which include objectives important to parents e.g. behaviours, toilet training.</td>
<td>Specific</td>
</tr>
<tr>
<td>Models/theories</td>
<td>Goals</td>
<td>General/Specific Goals</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Variety of models according to needs of children/families and experiences of staff</td>
<td>To support children and their families To increase/improve developmental outcomes for children in all areas of development To support and promote inclusion of children in generic services To increase parental/ family functioning To provide information/support/parent-to-parent support to families, siblings, generic service providers</td>
<td>General</td>
</tr>
<tr>
<td>NIL</td>
<td>Do not work with children with ASD. Our goals are more linked with the physical outcomes for children and the social, emotional outcomes for them, their parents and their siblings</td>
<td>General</td>
</tr>
<tr>
<td>Developmental and sensory/motor integration—conducting education (now renamed SCAMP to include Music), PECS (where specifically appropriate e.g. autism nonverbal)</td>
<td>Social and emotional, language and communication, fine motor, gross motor, cognitive development—year level goals and individual goals are listed under these headings for the individual learning plan</td>
<td>Specific</td>
</tr>
<tr>
<td>Activity-based model of planning with parents to promote child and family participation in their activities of choice /to develop functions based on these activities prioritised by families</td>
<td>Partnership with parents, delivering services that are fundamentally driven by the needs, strengths and dreams of a family Centre-based settings to services delivered within the natural environments in which the child and family interact</td>
<td>General</td>
</tr>
<tr>
<td>Integrative program based on TEACCH Developmental/Naturalistic Program—follow child’s lead ABA-DTT—minimal use</td>
<td>To provide an individual autism-specific ECI program based on best practice and current research To assist parents to develop skills/strategies to assist their child’s development To provide/offer parent education and parent-to-parent support To provide support/consultation to early childhood services To provide training to EC field</td>
<td>Specific</td>
</tr>
<tr>
<td>Family-centred practice—an outreach home visiting service plus centre-based program for children with autism</td>
<td>Goals and objectives are based around family needs Services delivered in partnership with families</td>
<td>General</td>
</tr>
<tr>
<td>Developmental model</td>
<td>To attend to what other children or adults say to them To improve language with signing and or words (expressive) To improve communication—eye contact, PECS To improve cognitive skills in play, imitation To improve receptive language—concepts, following directions To improve fine and gross motor skills</td>
<td>Specific</td>
</tr>
<tr>
<td>Models/theories</td>
<td>Goals</td>
<td>General /Specific Goals</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------</td>
</tr>
</tbody>
</table>
| All children learn through play and also from others                             | Work together with family to develop FSSP (Family Service Support Plan) and IPP (Individual Program Plan), children/families to feel secure in trusting environment  
Implement communication system  
Develop familiarity and independence in following routines  
Review FSSP and IPP twice yearly                                                    | Specific                |
| Tasks need to be broken down so children have a chance to succeed               |                                                                                                                                                                                                       |                         |
| Children learn through routines                                                 |                                                                                                                                                                                                       |                         |
| Relate programming to typical early childhood development                        | Develop skills which allow the children to access the most appropriate social and educational environment  
Learn developmentally appropriate skills in the areas of cognition, gross motor, fine motor, communication (undertaking a range of verbal and nonverbal communication), sensory response, social and emotional responses, independence skills (e.g. toileting, eating, dressing) | Specific                |
| Utilise one-to-one and small group teaching                                      |                                                                                                                                                                                                       |                         |
| Establish individual management and educational programs in collaboration with families and other specialists |                                                                                                                                                                                                       |                         |
| Models are eclectic dependent upon the children within the service at any given time | To provide a wholistic, family-centred approach to supporting the child/family  
To provide therapy from a multidisciplinary team within both/either group and individual modules (as appropriate)                           | General                 |
MEMORANDUM

FROM: John Reece, PhD
PHONE: 9925-7512
FAX: 9925-7303
E-MAIL: john.reece@rmit.edu.au

TO: Ms Helen Chau, Department of Psychology & Intellectual Disability Studies

DATE: 20 April 2000
RE: Application for ethics approval
CC: Dr Amanda Richdale, Department of Psychology & Intellectual Disability Studies

Your project, titled A Study of Approaches and Methods of Practice in Early Intervention in Autism and Related Disorders has been considered by the Faculty of Applied Science Human Research Ethics Sub-Committee. You self-rated the project as MR (i.e., minimal risks above the everyday norm) and the Sub-Committee agreed with that rating. Some required changes to your application were brought to your attention in my memo to you of 17 February 2000. You have addressed all of the issues raised in that memo appropriately. Therefore, you may consider your project, as it is described in your revised application, APPROVED for a period of three years from the date on this memo.

Should your project not be completed within three years, you should apply for an extension of approval. Also, you should be aware that there is a requirement to provide a report at the end of the project. Pro-formas for both tasks are available from me.

Let me take this opportunity to wish you all the best with your research. If any issues regarding ethics arise during the running of the project, please do not hesitate to contact me.

Sincerely

John Reece, PhD
Chair, Faculty of Applied Science Human Research Ethics Sub-Committee
Appendix N  Longitudinal Study – Approval from Human Research Ethics Sub-Committee (Extension)

25th September 2005

Helen Chau

Dear Helen

HRE-SC Application CHAU A Study of approaches and methods of practice in early intervention and related disorders, Study 2 – Longitudinal Study

Your request for an extension to your Ethics Approval for your project titled: A Study of approaches and methods of practice in early intervention and related disorders, Study 2 – Longitudinal Study was reviewed by the Chair of the SET Portfolio Human Research Ethics Sub-Committee (Non-Biomedical).

I am pleased to inform you that the Chair has approved your extension request and your research is now approved until December 2005.

The committee would like to remind you that:

All data should be stored on University Network systems. These systems provide high levels of manageable security and data integrity, can provide secure remote access, are backed up on a regular basis and can provide Disaster Recover processes should a large scale incident occur. The use of portable devices such as CDs and memory sticks is valid for archiving, data transport where necessary and for some works in progress;

The authoritative copy of all current data should reside on appropriate network systems; and the Principal Investigator is responsible for the retention and storage of the original data pertaining to the project for a minimum period of five years.

The necessary form can be found at:
http://www.rmit.edu.au/rd/hree

Yours sincerely,

Julie Barnett
Secretary, Science Engineering & Technology Portfolio
Human Research Ethics Sub-Committee
RMIT University

Ce Chair SET Portfolio Human Research Ethics Sub-Committee (Non-Biomedical): John Reece
Supervisor: Amanda Richdale School of Health Sciences
Appendix O  Explanatory Statement on Research Project (Longitudinal Study)

Explanatory Statement on Research Project: A study of approaches and methods of practice in early intervention in autism and related disorders

Dear parent/program coordinator,

My name is Helen Chau, a registered psychologist and a PhD student in the Department of Psychology and Intellectual Disability Studies, RMIT University and my supervisors are Dr. Amanda Richdale and Dr. Susana Gavidia-Payne.

What is the project about?

This project is Study two of the PhD research on the approaches and methods of practice in early intervention for young children with autism and related disorders in Victoria. It is a longitudinal study of approximately 15 children with autism in the main types of early intervention programs, namely the early intervention generic centre program, the autism specific early intervention centre program, and the home program based on Lovas’ research (1987).

What is the aim of the project and when will the project commence?

The aim of this study is to measure the growth of children objectively in the major developmental areas, namely communication, self-help skills, social competence and behaviour styles using standardised tests. Within the different program approaches, key variables, namely goals of the program, intensity of the program, language training strategies and techniques for improving sociability in relation to the outcome measures of the programs will be examined in depth. Progress will also be measured in relation to goals for intervention.

This study will be conducted from March 2000 to December 2001. Initial testing will begin in late March 2000.

How can your child/children help?

Children aged 3 to 5 diagnosed with autism are invited to participate in this project. Standard language and psychological tests, behaviour checklists, and stress scales will be used to assess the change in the child’s language abilities, cognitive abilities, behaviour pattern, and parents’ stress levels and coping strategies over a period of 12 months. Program co-ordinators will be requested to complete a questionnaire regarding program features. A brief report will be provided. Participation in the project is voluntary. Participants are free to withdraw from the project, or withdraw data, at any time prior to data analysis. Information will be coded and participants will not be individually identified. Research data may be included in conference presentations or articles submitted for publications. Your contribution to the study is very much appreciated. At the end of the research project participants will be informed of the main findings.

Should you have questions regarding this research, please do not hesitate to inform me direct at Tel: (03) 9925 7376 or my supervisor, Dr Amanda Richdale at Tel: (03) 9925 7366 or you may prefer to contact the secretary, RMIT Human Research Ethics Committee, RMIT at (03) 9925 1745.

Yours sincerely,

Helen Chau  Dr. Amanda Richdale  Dr. Susana Gavidia-Payne
Explanatory Statement on Research Project: A study of approaches and methods of practice in early intervention in autism and related disorders

Dear parent/program coordinator,

My name is Helen Chau, a registered psychologist and a PhD student in the Department of Psychology and Disability Studies, RMIT University and my supervisors are Dr. Amanda Richdale and Dr. Susana Gavidia-Payne.

What is the project about?

This project is Study two of the PhD research on the approaches and methods of practice in early intervention for young children with autism and related disorders in Victoria. It is a longitudinal study of approximately 15 children with autism in the main types of early intervention programs, namely the early intervention generic centre program, the autism specific early intervention centre program, and the home program based on Lovaas’ research (1987).

What is the aim of the project and when will the project commence?

The aim of this study is to measure the progress of children objectively in the major developmental areas, namely communication, self-help skills, social competence and behaviour styles using standardised tests. Within the different program approaches, key variables, namely goals of the program, intensity of the program, language training strategies and techniques for improving sociability in relation to the outcome measures of the programs will be examined in depth. Progress will also be measured in relation to goals for intervention.

This study is conducted from March 2003 to April 2004.

How can your child/children help?

Children aged 3 to 5 diagnosed with autism are invited to participate in this project. Standard language and psychological tests, behaviour checklists, and stress scales will be used to assess the change in the child’s language abilities, cognitive abilities, behaviour pattern, and parents’ stress levels and coping strategies over a period of 12 months. Program co-ordinators will be requested to complete a questionnaire regarding program features. A brief report will be provided. Participation in the project is voluntary. Participants are free to withdraw from the project, or withdraw data, at any time prior to data analysis. Information will be coded and participants will not be individually identified. Research data may be included in conference presentations or articles submitted for publications. Your contribution to the study is very much appreciated. At the end of the research project participants will be informed of the main findings.

Should you have questions regarding this research, please do not hesitate to inform me direct at Tel: (03) 9925 7376 or my supervisor, Dr Amanda Richdale at Tel: (03) 9925 7366 or you may prefer to contact the secretary, RMIT Human Research Ethics Committee, RMIT at (03) 9925 1745.

Yours sincerely,

Helen Chau
(Principal Investigator)

Dr. Amanda Richdale
(Supervisor)

Dr. Susana Gavidia-Payne
(Supervisor)
Appendix P Supplementary Information on Longitudinal Study for parents

A study of approaches and methods of practice in early intervention in autism and related disorders - supplementary information for parents of participating children

A child participating in the study will be assessed with the following standardised tests by a registered psychologist without any cost:

- Leiter International Performance Scale - Revised,
- Preschool Language Scale - 3rd Edition,
- Gilliam Autism Rating Scale,
- Vineland Social-Emotional Early Childhood Scales,
- Observation of children in the preschool and home setting.

Parents will be invited to complete the parenting hassles scale and the COPE questionnaire, which is a measure of coping strategies.

The change in the child’s language abilities, cognitive abilities, behaviour patterns, and parents’ stress levels and coping strategies will be monitored over a period of 12 months. A brief written report will be provided.

Participating in the project is voluntary. Participants are free to withdraw from the project, or withdraw data, at any time prior to data analysis. Information will be coded and participants will not be individually identified. Research data may be included in conference presentations or articles submitted for publications.

Helen Chau  
(Psychologist & Principal investigator)  
RMIT University

Dr Amanda Richdale  
(Supervisor)
RESEARCH PROJECT INVOLVING HUMAN SUBJECTS

DIVISION OF PSYCHOLOGY

SCHOOL OF HEALTH SCIENCE

Name of participant: ____________________________

Project Title: A study of approaches and methods of practice in early intervention in autism and other developmental disorders

Name of investigator(s): Helen Chau Tel: (BH) 9925 7376
Amanda Richdale Tel: (BH) 9925 7366

1. I consent to participate in the above project, the particulars of which - including details of interviews, questionnaires or tests - have been explained to me and are appended hereto.

2. I authorise the investigator or his or her assistant to interview me or administer a questionnaire or administer a test to my child.

3. I acknowledge that:
   (a) I have been informed that I am free to withdraw from the project at any time and to withdraw any unprocessed data previously supplied;
   (b) The project is for the purpose of research and/or teaching and not for treatment.
   (c) I have read and retained a copy of the Plain Language Statement, and agree to the general purpose, methods and demands of the study.
   (d) The project may not be of direct benefit to me or my child.
   (e) My involvement entails completing a questionnaire/completing an interview and my child be assessed with standardised language and psychological tests and behaviour checklists.
   (f) My anonymity and that of my child are assured.
   (g) Confidentiality is assured. However, should information of a confidential nature need to be disclosed for moral, clinical or legal reasons, I will be given an opportunity to negotiate the terms of this disclosure.
   (h) The security of the data obtained is assured following completion of the study.
   (i) The research data collected during the study may be published, and a report of the project outcomes will be provided. Any data which may identify me or my child will not be used.

I consent to the participation of ____________________________ in the above project.

Signature: ____________________________ Date: ________________

(Signature of parent or guardian)

Any queries or complaints about your participation in this project may be directed to the Secretary, RMIT Human Research Ethics Committee, RMIT, GPO Box 2476 V, Melbourne, 3001. The telephone number is (03) 9925 2251.
Appendix R  Tables of Assessment Results of the 12 Children in the Longitudinal Study

Table 8.1

*John’s scores in the assessment of cognition, speech and social and emotional adaptations*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition:</strong> Leiter-R IQ: 99 (45th percentile)</td>
<td>Cognition: Leiter-R IQ: 104 (61st percentile)</td>
</tr>
<tr>
<td><strong>Speech:</strong> Preschool Language Scale</td>
<td>Speech: Preschool Language Scale</td>
</tr>
<tr>
<td>More than two standard deviations below the mean on auditory comprehension (AC), expressive communication (EC) and total language (TL)</td>
<td>More than two standard deviations below the mean on auditory comprehension (AC), expressive communication (EC) and total language (TL)</td>
</tr>
<tr>
<td>AC: 63 (standard score)</td>
<td>AC: 52 (standard score)</td>
</tr>
<tr>
<td>EC: 65 (standard score)</td>
<td>EC: 50 (standard score)</td>
</tr>
<tr>
<td>TL: 60 (standard score)</td>
<td>TL: 50 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total language: 1 year, 10 months</td>
<td>Age equivalent for total language: 2 years, 6 months</td>
</tr>
<tr>
<td><strong>Vineland Social and emotional scales</strong></td>
<td><strong>Vineland Social and emotional scales</strong></td>
</tr>
<tr>
<td>Interpersonal relationships:</td>
<td>Interpersonal relationships:</td>
</tr>
<tr>
<td>standard score: 66</td>
<td>standard score: 82</td>
</tr>
<tr>
<td>age equivalent: 1 year, 8 months</td>
<td>age equivalent: 3 years, 3 months</td>
</tr>
<tr>
<td>Play and leisure:</td>
<td>Play and leisure:</td>
</tr>
<tr>
<td>standard score: 73</td>
<td>standard score: 85</td>
</tr>
<tr>
<td>age equivalent: 2 years, 2 months</td>
<td>age equivalent: 3 years, 8 months</td>
</tr>
</tbody>
</table>
Table 8.2

*John’s scores on GARS (Gillian Autism Rating Scale) at the baseline and the review assessments*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autism features: GARS</strong></td>
<td><strong>Autism features: GARS</strong></td>
</tr>
<tr>
<td>Stereotyped behaviour: 9</td>
<td>Stereotyped behaviour: 14</td>
</tr>
<tr>
<td>Communication: 15</td>
<td>Communication: 13</td>
</tr>
<tr>
<td>Social interaction: 8</td>
<td>Social interaction: 9</td>
</tr>
<tr>
<td>Developmental: 4</td>
<td>Developmental: 8</td>
</tr>
</tbody>
</table>

**Autism Quotient:** 93 (Average)  
**Autism Quotient:** 107 (Average)

Table 87.3

*John’s scores on the autism real-life rating scale at the baseline and the review assessments*

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline</th>
<th>Mid-year EI</th>
<th>Review Preschool</th>
<th>Review EI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.57</td>
<td>0.29</td>
<td>0.3</td>
<td>0</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.44</td>
<td>0.22</td>
<td>0.3</td>
<td>-0.5</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.81</td>
<td>0.56</td>
<td>0.13</td>
<td>0.19</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>0.5</td>
<td>0.4</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Overall score</td>
<td>0.5</td>
<td>0.29</td>
<td>0.19</td>
<td>-0.06</td>
</tr>
</tbody>
</table>
Table 8.4

*John’s parent scores on Ways of Coping at the baseline and the review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment relative scores</th>
<th>Review assessment relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.05</td>
<td>0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.08</td>
<td>0.09</td>
<td>0.01</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.11</td>
<td>0.15</td>
<td>0.04</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.2</td>
<td>0.19</td>
<td>-0.01</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.05</td>
<td>0.17</td>
<td>0.12</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.06</td>
<td>0.1</td>
<td>0.04</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.2</td>
<td>0.13</td>
<td>-0.07</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.21</td>
<td>0.12</td>
<td>-0.09</td>
</tr>
</tbody>
</table>
**Table 8.5**

*Jessie’s scores in the assessment of cognition, speech and social and emotional adaptations*

<table>
<thead>
<tr>
<th></th>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition : Leiter-R</strong></td>
<td>IQ: 91 (27th percentile)</td>
<td>IQ: 96 (39th percentile)</td>
</tr>
<tr>
<td><strong>Speech: Preschool Language Scale</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than two standard deviations below the mean on auditory comprehension (AC), expressive communication (EC) and total language (TL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC: 59 (standard score)</td>
<td></td>
<td>AC: 63 (standard score)</td>
</tr>
<tr>
<td>EC: 71 (standard score)</td>
<td></td>
<td>EC: 62 (standard score)</td>
</tr>
<tr>
<td>TL: 61 (standard score)</td>
<td></td>
<td>TL: 58 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total language: 1 year, 11 months</td>
<td></td>
<td>Age equivalent for total language: 3 years</td>
</tr>
<tr>
<td><strong>Vineland Social and Emotional scales</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal relationships:</td>
<td></td>
<td>Interpersonal relationships:</td>
</tr>
<tr>
<td>standard score: 63</td>
<td></td>
<td>standard score: 51</td>
</tr>
<tr>
<td>age equivalent: 1 year, 5 months</td>
<td></td>
<td>age equivalent: 1 year, 6 months</td>
</tr>
<tr>
<td>Play and leisure:</td>
<td></td>
<td>Play and leisure:</td>
</tr>
<tr>
<td>standard score: 41</td>
<td></td>
<td>standard score: 40</td>
</tr>
<tr>
<td>age equivalent: 1 year</td>
<td></td>
<td>age equivalent: 1 year, 2 months</td>
</tr>
</tbody>
</table>
Table 8.6

**Jessie’s scores on GARS (Gillian Autism Rating Scale) at the baseline and the review assessments**

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td>Autism features: GARS</td>
</tr>
<tr>
<td>Stereotyped behaviour: 7</td>
<td>Stereotyped behaviour: 10</td>
</tr>
<tr>
<td>Communication: 11</td>
<td>Communication: 11</td>
</tr>
<tr>
<td>Social interaction: 8</td>
<td>Social interaction: 8</td>
</tr>
<tr>
<td>Developmental: 8</td>
<td>Developmental: 9</td>
</tr>
<tr>
<td><strong>Autism Quotient</strong>: 90 (Average)</td>
<td><strong>Autism Quotient</strong>: 97 (Average)</td>
</tr>
</tbody>
</table>

Table 8.7

**Jessie’s scores on the autism real-life rating scale at the baseline and the review assessments**

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline</th>
<th>Mid-year</th>
<th>Review Care</th>
<th>Review EI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.57</td>
<td>0.43</td>
<td>0.29</td>
<td>0.29</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.78</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.1</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.2</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>1</td>
<td>0.25</td>
<td>0.19</td>
<td>0.06</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>0.4</td>
<td>-0.3</td>
<td>0.2</td>
<td>-0.4</td>
</tr>
<tr>
<td>Overall score</td>
<td>0.59</td>
<td>0.08</td>
<td>0.14</td>
<td>-0.15</td>
</tr>
</tbody>
</table>
Table 8.8

*Jessie’s parent scores on Ways of Coping at the baseline and the review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment relative scores</th>
<th>Review assessment relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.18</td>
<td>0.22</td>
<td>0.04</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.03</td>
<td>0.03</td>
<td>0.00</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.06</td>
<td>0.1</td>
<td>0.94</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.22</td>
<td>0.16</td>
<td>-0.06</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.09</td>
<td>0.1</td>
<td>0.01</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.05</td>
<td>0.13</td>
<td>0.08</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.2</td>
<td>0.13</td>
<td>-0.07</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.18</td>
<td>0.09</td>
<td>-0.09</td>
</tr>
</tbody>
</table>
Table 8.9
Sam’s scores in the assessment of cognition, speech and social and emotional adaptations

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R IQ:</strong> 119 (90th percentile)</td>
<td><strong>Cognition: Leiter-R IQ:</strong> 122 (93rd percentile)</td>
</tr>
<tr>
<td><strong>Speech : Preschool Language Scale</strong></td>
<td><strong>Speech : Preschool Language Scale</strong></td>
</tr>
<tr>
<td>More than two standard deviations below the mean on auditory comprehension (AC), on expressive communication (EC) and on total language (TL)</td>
<td>Half a standard deviation above the mean on auditory comprehension (AC), on expressive communication (EC) and on total language (TL)</td>
</tr>
<tr>
<td>AC: 61 (standard score)</td>
<td>AC: 109 (standard score)</td>
</tr>
<tr>
<td>EC: 64 (standard score)</td>
<td>EC: 111 (standard score)</td>
</tr>
<tr>
<td>TL: 58 (standard score)</td>
<td>TL: 111 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total language: 3 years</td>
<td>Age equivalent for total language: 6 years, 1 month</td>
</tr>
</tbody>
</table>

**Vineland Social and Emotional scales**

**Interpersonal relationships:**
- standard score: 40
- age equivalent: 1 year

**Play and leisure:**
- standard score: 47
- age equivalent: 1 year, 6 months

**Interpersonal relationships:**
- standard score: 71
- age equivalent: 3 years, 3 months

**Play and leisure:**
- standard score: 64
- age equivalent: 2 years, 9 months
Table 8.10

Sam’s scores on GARS (Gillian Autism Rating Scale) at the baseline and the review assessments

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td>Autism features: GARS</td>
</tr>
<tr>
<td>Stereotyped behaviour: 8</td>
<td>Stereotyped behaviour: 8</td>
</tr>
<tr>
<td>Communication: 10</td>
<td>Communication: 5</td>
</tr>
<tr>
<td>Social interaction: 10</td>
<td>Social interaction: 7</td>
</tr>
<tr>
<td>Developmental: 9</td>
<td>Developmental: 10</td>
</tr>
<tr>
<td><strong>Autism Quotient: 95 (Average)</strong></td>
<td><strong>Autism Quotient: 83 (Average)</strong></td>
</tr>
</tbody>
</table>

Table 8.11

Sam’s scores on the autism real-life rating scale at the baseline and the review assessments

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline</th>
<th>Mid-year</th>
<th>Review School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.43</td>
<td>0.29</td>
<td>0.14</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.88</td>
<td>0.1</td>
<td>0</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.8</td>
<td>0.4</td>
<td>0</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.75</td>
<td>0.25</td>
<td>0</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>0.1</td>
<td>-0.1</td>
<td>-0.2</td>
</tr>
<tr>
<td>Overall score</td>
<td>0.59</td>
<td>0.19</td>
<td>-0.01</td>
</tr>
</tbody>
</table>
Table 8.12
*Sam's parent scores on Ways of Coping at the baseline and the review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment relative scores</th>
<th>Review assessment relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.83</td>
<td>0.5</td>
<td>-0.33</td>
</tr>
<tr>
<td>Distancing</td>
<td>1.16</td>
<td>1</td>
<td>-0.16</td>
</tr>
<tr>
<td>Self-control</td>
<td>1.29</td>
<td>1.14</td>
<td>-0.15</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>1.5</td>
<td>0.67</td>
<td>-0.83</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.75</td>
<td>0.5</td>
<td>-0.25</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.5</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>1.33</td>
<td>0.83</td>
<td>-0.5</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>1.43</td>
<td>0.86</td>
<td>-0.57</td>
</tr>
</tbody>
</table>
Table 8.13

Benjamin’s scores in the assessment of cognition, speech and social and emotional adaptations

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R</strong></td>
<td><strong>Cognition: Leiter-R</strong></td>
</tr>
<tr>
<td>Full IQ score: 105 (63rd percentile)</td>
<td>Full IQ score: 112 (79th percentile)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Speech: Preschool Language Scale</strong></th>
<th><strong>Speech: Preschool Language Scale</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Two standard deviations below the mean on auditory comprehension (AC), three standard deviations below the mean on expressive communication (EC) and on total language (TL)</td>
<td>Nearly two standard deviations below the mean on auditory comprehension (AC), one standard deviation below the mean on expressive communication (EC) and one and a half standard deviations below the mean on total language (TL)</td>
</tr>
<tr>
<td>AC: 72 (standard score)</td>
<td>AC: 75 (standard score)</td>
</tr>
<tr>
<td>EC: 50 (standard score)</td>
<td>EC: 83 (standard score)</td>
</tr>
<tr>
<td>TL: 57 (standard score)</td>
<td>TL: 77 (standard score)</td>
</tr>
</tbody>
</table>

| Age equivalent for total language: 3 years, 3 months | Age equivalent for total language: 5 years, 1 month |

<table>
<thead>
<tr>
<th><strong>Vineland Social and Emotional Scales</strong></th>
<th><strong>Vineland Social and Emotional Scales</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal relationships -</td>
<td>Interpersonal relationships -</td>
</tr>
<tr>
<td>standard score: 54</td>
<td>standard score: 87</td>
</tr>
<tr>
<td>age equivalent: 1 year, 9 months</td>
<td>age equivalent: 4 years, 7 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Play and leisure -</th>
<th>Play and leisure -</th>
</tr>
</thead>
<tbody>
<tr>
<td>standard score: 44</td>
<td>standard score: 73</td>
</tr>
<tr>
<td>age equivalent: 1 year, 7 months</td>
<td>age equivalent: 3 years, 4 months</td>
</tr>
</tbody>
</table>
Table 8.14

*Benjamin’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autism features: GARS</strong></td>
<td><strong>Autism features: GARS</strong></td>
</tr>
<tr>
<td>Stereotyped behaviour: 9</td>
<td>Stereotyped behaviour: 9</td>
</tr>
<tr>
<td>Communication: 10</td>
<td>Communication: 6</td>
</tr>
<tr>
<td>Social interaction: 8</td>
<td>Social interaction: 6</td>
</tr>
<tr>
<td>Developmental: 8</td>
<td>Developmental: 8</td>
</tr>
<tr>
<td><strong>Autism Quotient: 92(Average)</strong></td>
<td><strong>Autism Quotient: 82(Below Average)</strong></td>
</tr>
</tbody>
</table>

Table 8.15

*Benjamin’s scores on the autism real-life rating scale at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Preschool</th>
<th>Mid-year Preschool</th>
<th>Mid-year EI</th>
<th>Review Preschool</th>
<th>Review EI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
<td>0.28</td>
<td>0.28</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.44</td>
<td>0.22</td>
<td>-0.44</td>
<td>-0.55</td>
<td>-0.55</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.00</td>
<td>0.00</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.06</td>
<td>0.06</td>
<td>0.06</td>
<td>0.13</td>
<td>-0.06</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>-0.10</td>
<td>-0.20</td>
<td>-0.40</td>
<td>-0.50</td>
<td>-0.60</td>
</tr>
<tr>
<td>Overall score</td>
<td>0.11</td>
<td>0.04</td>
<td>-0.08</td>
<td>-0.09</td>
<td>-0.15</td>
</tr>
</tbody>
</table>
Table 8.16

*Benjamin’s parent scores on Ways of Coping at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment Relative scores</th>
<th>Review assessment Relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.12</td>
<td>0.13</td>
<td>0.01</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.12</td>
<td>0.05</td>
<td>-0.07</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.08</td>
<td>0.09</td>
<td>0.01</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.27</td>
<td>0.28</td>
<td>0.01</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.04</td>
<td>0.00</td>
<td>-0.04</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.05</td>
<td>0.00</td>
<td>-0.05</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.27</td>
<td>0.36</td>
<td>0.09</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.06</td>
<td>0.09</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table 8.17

*Joshua’s scores in the assessment of cognition, speech and social and emotional adaptations*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R</strong></td>
<td>Cognition: Leiter-R</td>
</tr>
<tr>
<td>Full IQ score: 123 (94&lt;sup&gt;th&lt;/sup&gt; percentile)</td>
<td>Full IQ score: 110 (75&lt;sup&gt;th&lt;/sup&gt; percentile)</td>
</tr>
<tr>
<td><strong>Speech : Preschool Language Scale</strong></td>
<td>Speech : Preschool Language Scale</td>
</tr>
<tr>
<td>One standard deviation below the mean on auditory comprehension (AC), on expressive communication (EC) and on total language (TL)</td>
<td>½ standard deviation below the mean on auditory comprehension (AC), ¼ standard deviation below the mean on expressive communication (EC) and ½ standard deviation below the mean in total language (TL)</td>
</tr>
<tr>
<td>AC: 86 (standard score)</td>
<td>AC : 92 (standard score)</td>
</tr>
<tr>
<td>EC: 83 (standard score)</td>
<td>EC : 96 (standard score)</td>
</tr>
<tr>
<td>TL: 83 (standard score)</td>
<td>TL : 93 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total language: 4 years, 6 months</td>
<td>Age equivalent for total language: 6 years, 1 month</td>
</tr>
<tr>
<td><strong>Vineland Social and Emotional Scales</strong></td>
<td><strong>Vineland Social and Emotional Scales</strong></td>
</tr>
<tr>
<td>Interpersonal relationships - standard score: 82</td>
<td>Interpersonal relationships - standard score: 94</td>
</tr>
<tr>
<td>age equivalent: 3 years, 1 month</td>
<td>age equivalent: 5 years, 2 months</td>
</tr>
<tr>
<td>Play and leisure - standard score: 77</td>
<td>Play and leisure - standard score: 95</td>
</tr>
<tr>
<td>age equivalent: 2 years, 10 months</td>
<td>age equivalent: 5 years, 2 months</td>
</tr>
</tbody>
</table>
Table 8.18

Joshua’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and the review assessments

<table>
<thead>
<tr>
<th></th>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features:</td>
<td>GARS</td>
<td>GARS</td>
</tr>
<tr>
<td>Stereotyped</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Communication</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Social interaction</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Developmental</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Autism Quotient</td>
<td>82 (Below Average)</td>
<td>93 (Average)</td>
</tr>
</tbody>
</table>

Table 8.19

Joshua’s scores on the autism real-life rating scale at the baseline and review assessments

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Preschool</th>
<th>Mid-year Preschool</th>
<th>Mid-year EI</th>
<th>Review Preschool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.28</td>
<td>0.00</td>
<td>0.00</td>
<td>0.14</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.56</td>
<td>0.33</td>
<td>0.10</td>
<td>-0.10</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.38</td>
<td>0.13</td>
<td>0.13</td>
<td>0.25</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.40</td>
<td>-0.50</td>
</tr>
<tr>
<td>Overall score</td>
<td>0.24</td>
<td>0.09</td>
<td>-0.04</td>
<td>-0.04</td>
</tr>
</tbody>
</table>
Table 8.20

*Joshua’s parent scores on Ways of Coping at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment Relative scores</th>
<th>Review assessment Relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.10</td>
<td>0.13</td>
<td>0.03</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.10</td>
<td>0.07</td>
<td>-0.03</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.19</td>
<td>0.15</td>
<td>-0.04</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.22</td>
<td>0.17</td>
<td>-0.05</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.11</td>
<td>0.10</td>
<td>-0.01</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.04</td>
<td>0.00</td>
<td>-0.04</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.19</td>
<td>0.23</td>
<td>0.04</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.04</td>
<td>0.15</td>
<td>0.11</td>
</tr>
</tbody>
</table>
Table 8.21

*Corey’s scores in the assessment of cognition, speech and social and emotional adaptations*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R</strong></td>
<td><strong>Cognition: Leiter-R</strong></td>
</tr>
<tr>
<td>Full IQ score: 108 (70\textsuperscript{th} percentile)</td>
<td>Full IQ score: 112 (79\textsuperscript{th} percentile)</td>
</tr>
<tr>
<td><strong>Speech: Preschool Language Scale</strong></td>
<td><strong>Speech: Preschool Language Scale</strong></td>
</tr>
<tr>
<td>Nearly one standard deviation above the mean on auditory comprehension (AC), expressive communication (EC) and on total language (TL)</td>
<td>One standard deviation above the mean on auditory comprehension (AC), average on expressive communication (EC) and one ( \frac{1}{2} ) standard deviation above the mean on total language (TL)</td>
</tr>
<tr>
<td>AC: 115 (standard score)</td>
<td>AC: 113 (standard score)</td>
</tr>
<tr>
<td>EC: 111 (standard score)</td>
<td>EC: 105 (standard score)</td>
</tr>
<tr>
<td>TL: 115 (standard score)</td>
<td>TL: 110 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total language: 5 years, 5 months</td>
<td>Age equivalent for total language: 6 years, 9 months</td>
</tr>
<tr>
<td><strong>Vineland Social and Emotional Scales</strong></td>
<td><strong>Vineland Social and Emotional Scales</strong></td>
</tr>
<tr>
<td>Interpersonal relationships - standard score: 94 age equivalent: 4 years, 3 months</td>
<td>Interpersonal relationships - standard score: 101 age equivalent: 5 years, 10 months</td>
</tr>
<tr>
<td>Play and leisure - standard score: 92 age equivalent: 4 years, 2 months</td>
<td>Play and leisure - standard score: 91 age equivalent: 4 years, 11 months</td>
</tr>
</tbody>
</table>
Table 8.22
Corey’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and review assessments

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td>Autism features: GARS</td>
</tr>
<tr>
<td>Stereotyped behaviour: 7</td>
<td>Stereotyped behaviour: 7</td>
</tr>
<tr>
<td>Communication: 6</td>
<td>Communication: 4</td>
</tr>
<tr>
<td>Social interaction: 4</td>
<td>Social interaction: 9</td>
</tr>
<tr>
<td>Developmental: 0</td>
<td>Developmental: 6</td>
</tr>
<tr>
<td>Autism Quotient: 62 (VeryLow)</td>
<td>Autism Quotient: 77 (Low )</td>
</tr>
</tbody>
</table>

Table 8.23
Corey’s scores on the autism real-life rating scale at the baseline and review assessments

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Preschool</th>
<th>Mid-year Preschool</th>
<th>Mid-year EI</th>
<th>Review School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
<td>0.57</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.11</td>
<td>-0.01</td>
<td>-0.33</td>
<td>-0.33</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.31</td>
<td>0.06</td>
<td>-0.06</td>
<td>-0.06</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>-0.30</td>
<td>-0.40</td>
<td>-0.50</td>
<td>-0.60</td>
</tr>
<tr>
<td>Overall Score</td>
<td>0.05</td>
<td>-0.04</td>
<td>-0.15</td>
<td>-0.08</td>
</tr>
</tbody>
</table>
Table 8.24

*Corey’s parent scores on Ways of Coping at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment</th>
<th>Review assessment</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relative scores</td>
<td>Relative scores</td>
<td></td>
</tr>
<tr>
<td>Confrontive coping</td>
<td>0.08</td>
<td>0.18</td>
<td>0.10</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.13</td>
<td>0.11</td>
<td>-0.02</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.16</td>
<td>0.15</td>
<td>-0.01</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.16</td>
<td>0.26</td>
<td>0.10</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.14</td>
<td>0.05</td>
<td>-0.09</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.09</td>
<td>0.00</td>
<td>-0.09</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.16</td>
<td>0.23</td>
<td>0.07</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.09</td>
<td>0.04</td>
<td>-0.05</td>
</tr>
</tbody>
</table>
Table 8.25

*Michael’s scores in the assessment of cognition, speech and social and emotional adaptations*

<table>
<thead>
<tr>
<th></th>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognition: Leiter-R</td>
<td>Full IQ score: 122 (93rd percentile)</td>
<td>Cognition: Leiter-R Full IQ score: 126 (96th percentile)</td>
</tr>
<tr>
<td>Speech: Preschool Language Scale</td>
<td>1 standard deviation above the mean on auditory comprehension (AC), average on expressive communication (EC) and a ½ standard deviation above the mean on total language (TL)</td>
<td>Speech: Preschool Language Scale 1 standard deviation above the mean on auditory comprehension (AC), average on expressive communication (EC) and a ½ standard deviation above the mean on total language (TL)</td>
</tr>
<tr>
<td></td>
<td>AC: 98 (standard score)</td>
<td>AC: 117 (standard score)</td>
</tr>
<tr>
<td></td>
<td>EC: 52 (standard score)</td>
<td>EC: 98 (standard score)</td>
</tr>
<tr>
<td></td>
<td>TL: 72 (standard score)</td>
<td>TL: 108 (standard score)</td>
</tr>
<tr>
<td></td>
<td>Age equivalent for total language: 3 years, 5 months</td>
<td>Age equivalent for total language: 5 years, 11 months</td>
</tr>
<tr>
<td>Vineland Social and Emotional Scales</td>
<td>Interpersonal relationships - standard score: 72 age equivalent: 2 years, 3 months</td>
<td>Interpersonal relationships - standard score: 98 age equivalent: 5 years, 4 months</td>
</tr>
<tr>
<td></td>
<td>Play and leisure - standard score: 78 age equivalent: 2 years, 9 months</td>
<td>Play and leisure - standard score: 102 age equivalent: 5 years, 10 months</td>
</tr>
</tbody>
</table>
Table 8.26

*Michael’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and review assessments*

<table>
<thead>
<tr>
<th></th>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stereotyped behaviour: 9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Communication: 11</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Social interaction: 10</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Developmental: 10</td>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>

Autism Quotient: 100 (Average)  
Autism Quotient: 92 (Average)

Table 8.27

*Michael’s scores on the autism real-life rating scale at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Preschool</th>
<th>Mid-year Preschool</th>
<th>Mid-year EI</th>
<th>Review Preschool</th>
<th>Review EI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>-0.10</td>
<td>-0.30</td>
<td>-0.56</td>
<td>-0.90</td>
<td>-1.00</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>-0.13</td>
<td>-0.13</td>
<td>-0.13</td>
<td>-0.13</td>
<td>-0.13</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>-0.70</td>
<td>-0.60</td>
<td>-0.80</td>
<td>-0.80</td>
<td>-0.90</td>
</tr>
<tr>
<td>Overall Score</td>
<td>-0.18</td>
<td>-0.20</td>
<td>-0.30</td>
<td>-0.37</td>
<td>-0.41</td>
</tr>
</tbody>
</table>
Table 8.28
Michael’s parent scores on Ways of Coping at the baseline and review assessments

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment Relative scores</th>
<th>Review assessment Relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.14</td>
<td>0.16</td>
<td>0.02</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.11</td>
<td>0.02</td>
<td>-0.09</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.16</td>
<td>0.11</td>
<td>-0.05</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.07</td>
<td>0.19</td>
<td>0.12</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.05</td>
<td>0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.11</td>
<td>0.10</td>
<td>-0.01</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.19</td>
<td>0.19</td>
<td>0.00</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.16</td>
<td>0.19</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table 8.29

*Danny’s scores in the assessment of cognition, speech and social and emotional adaptations*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R</strong>&lt;br&gt;Full IQ score: not available</td>
<td><strong>Cognition: Leiter-R</strong>&lt;br&gt;Full IQ score: 76 (5th percentile)</td>
</tr>
<tr>
<td><strong>Speech: Preschool Language Scale</strong>&lt;br&gt;Not available</td>
<td><strong>Speech: Preschool Language Scale</strong>&lt;br&gt;More than 3 standard deviations below the mean on auditory comprehension (AC), expressive communication (EC) and total language (TL)&lt;br&gt;• AC: 50 (standard score)&lt;br&gt;• EC: 50 (standard score)&lt;br&gt;• TL: 50 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total language: not available</td>
<td>Age equivalent for total language: 1 year, 4 months</td>
</tr>
<tr>
<td><strong>Vineland Social and Emotional Scales</strong></td>
<td><strong>Vineland Social and Emotional scales</strong></td>
</tr>
<tr>
<td><strong>Interpersonal relationships</strong>&lt;br&gt;standard score: 40&lt;br&gt;age equivalent: 1 month</td>
<td><strong>Interpersonal relationships</strong>&lt;br&gt;standard score: 40&lt;br&gt;age equivalent: 6 months</td>
</tr>
<tr>
<td><strong>Play and leisure</strong>&lt;br&gt;standard score: 40&lt;br&gt;age equivalent: 3 months</td>
<td><strong>Play and leisure</strong>&lt;br&gt;standard score: 40&lt;br&gt;age equivalent: 10 months</td>
</tr>
</tbody>
</table>
Table 8.30

*Danny’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td>Autism features: GARS</td>
</tr>
<tr>
<td>Stereotyped behaviour: 13</td>
<td>Stereotyped behaviour: 10</td>
</tr>
<tr>
<td>Communication: not applicable</td>
<td>Communication: 8</td>
</tr>
<tr>
<td>Social interaction: 14</td>
<td>Social interaction: 9</td>
</tr>
<tr>
<td>Developmental: 7</td>
<td>Developmental: 7</td>
</tr>
</tbody>
</table>

Autism Quotient: 109 (Average)  
Autism Quotient: 90 (Average)

Table 8.31

*Danny’s scores on the autism real-life rating scale at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Preschool</th>
<th>Review Preschool</th>
<th>Review Preschool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>1.00</td>
<td>0.14</td>
<td>0.4</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>1.22</td>
<td>0.00</td>
<td>0.33</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>1.00</td>
<td>0.20</td>
<td>0.40</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>1.40</td>
<td>0.37</td>
<td>0.56</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>0.80</td>
<td>0.00</td>
<td>0.40</td>
</tr>
<tr>
<td>Overall Score</td>
<td>1.08</td>
<td>0.14</td>
<td>0.42</td>
</tr>
</tbody>
</table>
Table 8.32

*Danny’s parent scores on Ways of Coping at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment Relative scores</th>
<th>Review assessment Relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.06</td>
<td>0.05</td>
<td>-0.01</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.16</td>
<td>0.13</td>
<td>-0.03</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.16</td>
<td>0.22</td>
<td>0.06</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.14</td>
<td>0.20</td>
<td>0.06</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.06</td>
<td>0.30</td>
<td>0.24</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.03</td>
<td>0.00</td>
<td>-0.03</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.22</td>
<td>0.08</td>
<td>-0.14</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.17</td>
<td>0.02</td>
<td>-0.15</td>
</tr>
</tbody>
</table>
Abbey’s scores in the assessment of cognition, speech and social and emotional adaptations

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R</strong></td>
<td><strong>Cognition: Leiter-R</strong></td>
</tr>
<tr>
<td>Full IQ score: 131 (98&lt;sup&gt;th&lt;/sup&gt; percentile)</td>
<td>Full IQ score: 127 (96&lt;sup&gt;th&lt;/sup&gt; percentile)</td>
</tr>
<tr>
<td><strong>Speech: Preschool Language Scale</strong></td>
<td><strong>Speech: Preschool Language Scale</strong></td>
</tr>
<tr>
<td>Nearly two standard deviations below the mean on auditory comprehension (AC), more than two standard deviations below the mean on expressive communication (EC) and on total language (TL)</td>
<td>One standard deviation below the mean on auditory comprehension (AC), two standard deviations below the mean on expressive communication (EC) and nearly two standard deviations below the mean in total language (TL)</td>
</tr>
<tr>
<td>AC: 74 (standard score)</td>
<td>AC: 89 (standard score)</td>
</tr>
<tr>
<td>EC: 61 (standard score)</td>
<td>EC: 66 (standard score)</td>
</tr>
<tr>
<td>TL: 64 (standard score)</td>
<td>TL: 75 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total language: 2 years, 8 months</td>
<td>Age equivalent for total language: 4 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Vineland Social and Emotional Scales</strong></th>
<th><strong>Vineland Social and Emotional Scales</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interpersonal relationships</strong></td>
<td><strong>Interpersonal relationships</strong></td>
</tr>
<tr>
<td>standard score: 55</td>
<td>standard score: 76</td>
</tr>
<tr>
<td>age equivalent: 1 year, 6 months</td>
<td>age equivalent: 3 years, 1 month</td>
</tr>
<tr>
<td><strong>Play and leisure</strong></td>
<td><strong>Play and leisure</strong></td>
</tr>
<tr>
<td>score: 40</td>
<td>score: 73</td>
</tr>
<tr>
<td>age equivalent: 1 year, 10 months</td>
<td>age equivalent: 2 years, 10 months</td>
</tr>
</tbody>
</table>
Table 8.34

Abbey’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and the review assessments

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td>Autism features: GARS</td>
</tr>
<tr>
<td>Stereotyped behaviour: 5</td>
<td>Stereotyped behaviour: 3</td>
</tr>
<tr>
<td>Communication: 7</td>
<td>Communication: 4</td>
</tr>
<tr>
<td>Social interaction: 4</td>
<td>Social interaction: 2</td>
</tr>
<tr>
<td>Developmental: 6</td>
<td>Developmental: 4</td>
</tr>
<tr>
<td>Autism Quotient: 70 (Low)</td>
<td>Autism Quotient: 55 (Very Low)</td>
</tr>
</tbody>
</table>

Table 8.35

Abbey’s scores on the autism real-life rating scale at the baseline and review assessments

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Preschool</th>
<th>Mid-year Preschool</th>
<th>Mid-year EI</th>
<th>Review Preschool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.43</td>
<td>0.29</td>
<td>0.14</td>
<td>0.0</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.67</td>
<td>0.22</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.69</td>
<td>0.56</td>
<td>0.38</td>
<td>0.19</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>0.5</td>
<td>0.3</td>
<td>-0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Overall score</td>
<td>0.5</td>
<td>0.27</td>
<td>0.08</td>
<td>0.04</td>
</tr>
</tbody>
</table>
Table 8.36

Abbey’s parent scores on Ways of Coping at the baseline and review assessments

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment</th>
<th>Review assessment</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relative scores</td>
<td>Relative scores</td>
<td></td>
</tr>
<tr>
<td>Confrontive coping</td>
<td>0.16</td>
<td>0.08</td>
<td>-0.08</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.10</td>
<td>0.02</td>
<td>-0.08</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.03</td>
<td>0.21</td>
<td>0.18</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.16</td>
<td>0.21</td>
<td>0.05</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.21</td>
<td>0.10</td>
<td>-0.11</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.12</td>
<td>0.05</td>
<td>-0.07</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.05</td>
<td>0.17</td>
<td>0.12</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.15</td>
<td>0.17</td>
<td>0.02</td>
</tr>
</tbody>
</table>
Table 8.37  
*Lachlan’s scores in the assessment of cognition, speech and social and emotional adaptations*

<table>
<thead>
<tr>
<th></th>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full IQ score:</td>
<td>104 (61st percentile)</td>
<td>124 (95th percentile)</td>
</tr>
<tr>
<td><strong>Speech: Preschool</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language Scale</td>
<td>Nearly two standard deviations below the mean on auditory</td>
<td>½ standard deviation below the mean on auditory comprehension (AC), &gt;1</td>
</tr>
<tr>
<td></td>
<td>comprehension (AC), on expressive communication (EC) and</td>
<td>standard deviation below the mean on expressive communication (EC) and 1</td>
</tr>
<tr>
<td></td>
<td>on total language (TL)</td>
<td>standard deviation below the mean in total language (TL)</td>
</tr>
<tr>
<td></td>
<td>AC: 73 (standard score)</td>
<td>AC: 94 (standard score)</td>
</tr>
<tr>
<td></td>
<td>EC: 77 (standard score)</td>
<td>EC: 81 (standard score)</td>
</tr>
<tr>
<td></td>
<td>TL: 72 (standard score)</td>
<td>TL: 86 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total</td>
<td>1 year, 10 months</td>
<td>3 years, 2 months</td>
</tr>
<tr>
<td>language:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vineland Social and</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Emotional Scales</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal relationships-</td>
<td>standard score: 66</td>
<td>standard score: 88</td>
</tr>
<tr>
<td></td>
<td>age equivalent: 1 year, 4 months</td>
<td>age equivalent: 2 years, 8 months</td>
</tr>
<tr>
<td>Play and leisure -</td>
<td>standard score: 43</td>
<td>standard score: 83</td>
</tr>
<tr>
<td></td>
<td>age equivalent: 9 months</td>
<td>age equivalent: 2 years, 5 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 8.38
Lachlan’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and review assessments

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td>Autism features: GARS</td>
</tr>
<tr>
<td>Stereotyped behaviour: 6</td>
<td>Stereotyped behaviour: 5</td>
</tr>
<tr>
<td>Communication: 7</td>
<td>Communication: 6</td>
</tr>
<tr>
<td>Social interaction: 6</td>
<td>Social interaction: 4</td>
</tr>
<tr>
<td>Developmental: 8</td>
<td>Developmental: 10</td>
</tr>
<tr>
<td>Autism Quotient: 78 (Low)</td>
<td>Autism Quotient: 75 (Low)</td>
</tr>
</tbody>
</table>

Table 8.39
Lachlan’s scores on the autism real-life rating scale at the baseline and review assessments

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Preschool</th>
<th>Mid-year Preschool</th>
<th>Review Preschool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.14</td>
<td>0.14</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.22</td>
<td>0.00</td>
<td>-0.33</td>
</tr>
<tr>
<td>Scale III - Affectual Reactions</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.31</td>
<td>0.06</td>
<td>0.19</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>-0.10</td>
<td>-0.30</td>
<td>-0.40</td>
</tr>
<tr>
<td>overall score</td>
<td>0.84</td>
<td>-0.10</td>
<td>-0.11</td>
</tr>
</tbody>
</table>
Table 8.40

*Lachlan’s parent scores on Ways of Coping at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment Relative scores</th>
<th>Review assessment Relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.20</td>
<td>0.11</td>
<td>-0.09</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.02</td>
<td>0.21</td>
<td>0.19</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.11</td>
<td>0.09</td>
<td>-0.02</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.19</td>
<td>0.11</td>
<td>-0.08</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.06</td>
<td>0.00</td>
<td>-0.06</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.28</td>
<td>0.49</td>
<td>0.21</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.14</td>
<td>0.00</td>
<td>-0.14</td>
</tr>
</tbody>
</table>
Table 8.41
*Lucas’s scores in the assessment of cognition, speech and social and emotional adaptations*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R</strong></td>
<td><strong>Cognition: Leiter-R</strong></td>
</tr>
<tr>
<td>Full IQ score: 94 (34th percentile)</td>
<td>Full IQ score: 94 (34th percentile)</td>
</tr>
<tr>
<td><strong>Speech: Preschool Language Scale</strong></td>
<td><strong>Speech: Preschool Language Scale</strong></td>
</tr>
<tr>
<td>Nearly three standard deviations below the mean on auditory comprehension (AC), on expressive communication (EC) and on total language (TL)</td>
<td>Three standard deviations below the mean on auditory comprehension (AC), expressive communication (EC) and total language (TL)</td>
</tr>
<tr>
<td>AC: 58 (standard score)</td>
<td>AC: 50 (standard score)</td>
</tr>
<tr>
<td>EC: 57 (standard score)</td>
<td>EC: 50 (standard score)</td>
</tr>
<tr>
<td>TL: 53 (standard score)</td>
<td>TL: 50 (standard score)</td>
</tr>
<tr>
<td>Age equivalent for total language: 2 years, 1 month</td>
<td>Age equivalent for total language: 2 years, 4 months</td>
</tr>
<tr>
<td><strong>Vineland Social and Emotional Scales</strong></td>
<td><strong>Vineland Social and Emotional Scales</strong></td>
</tr>
<tr>
<td>Interpersonal relationships - standard score: 59</td>
<td>Interpersonal relationships - standard score: 62</td>
</tr>
<tr>
<td>age equivalent: 1 year, 7 months</td>
<td>age equivalent: 2 years, 1 month</td>
</tr>
<tr>
<td>Play and leisure - standard score: 44</td>
<td>Play and leisure - standard score: 60</td>
</tr>
<tr>
<td>age equivalent: 2 years</td>
<td>age equivalent: 2 years, 2 months</td>
</tr>
</tbody>
</table>
Table 8.42
*Lucas’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td>Autism features: GARS</td>
</tr>
<tr>
<td>Stereotyped behaviour: 4</td>
<td>Stereotyped behaviour: 4</td>
</tr>
<tr>
<td>Communication: 10</td>
<td>Communication: 9</td>
</tr>
<tr>
<td>Social interaction: 5</td>
<td>Social interaction: 5</td>
</tr>
<tr>
<td>Developmental: 4</td>
<td>Developmental: 4</td>
</tr>
<tr>
<td>Autism Quotient: 72 (Low)</td>
<td>Autism Quotient: 70 (Low )</td>
</tr>
</tbody>
</table>

Table 8.43
*Lucas’s scores on the autism real-life rating scale at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Preschool</th>
<th>Mid-year Preschool</th>
<th>Mid-year EI</th>
<th>Review Preschool</th>
<th>Review EI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.14</td>
<td>0.14</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.88</td>
<td>0.22</td>
<td>-0.11</td>
<td>0.11</td>
<td>-0.11</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.82</td>
<td>0.19</td>
<td>-0.06</td>
<td>0.00</td>
<td>-0.06</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>0.70</td>
<td>0.20</td>
<td>-0.1</td>
<td>-0.1</td>
<td>-0.20</td>
</tr>
<tr>
<td>overall score</td>
<td>0.55</td>
<td>0.19</td>
<td>-0.01</td>
<td>0.04</td>
<td>-0.07</td>
</tr>
</tbody>
</table>
Lucas’s parent scores on Ways of Coping at the baseline and review assessments

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment Relative scores</th>
<th>Review assessment Relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.13</td>
<td>0.09</td>
<td>-0.04</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.19</td>
<td>0.17</td>
<td>-0.02</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.15</td>
<td>0.14</td>
<td>-0.01</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.17</td>
<td>0.17</td>
<td>0.00</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.07</td>
<td>0.05</td>
<td>-0.02</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.07</td>
<td>0.03</td>
<td>-0.04</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.17</td>
<td>0.24</td>
<td>0.07</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.57</td>
<td>0.12</td>
<td>-0.45</td>
</tr>
</tbody>
</table>
Table 8.45

Liam’s scores in the assessment of cognition, speech and social and emotional adaptations

<table>
<thead>
<tr>
<th></th>
<th>Baseline assessment</th>
<th>Assessment after one year of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognition: Leiter-R</strong></td>
<td><strong>Full IQ score: 84 (14&lt;sup&gt;th&lt;/sup&gt; percentile)</strong></td>
<td><strong>Full IQ score: 101 (53&lt;sup&gt;rd&lt;/sup&gt; percentile)</strong></td>
</tr>
<tr>
<td><strong>Speech: Preschool Language Scale</strong></td>
<td><strong>3 standard deviations below the mean on auditory comprehension (AC), 2 standard deviations below the mean on expressive communication (EC) and 2½ standard deviations below the mean on total language (TL)</strong></td>
<td><strong>3 standard deviations below the mean on auditory comprehension (AC), 2 ½ standard deviations below the mean on expressive communication (EC) and 3 standard deviations below the mean on total language (TL)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>AC: 58 (standard score)</strong></td>
<td><strong>AC: 54 (standard score)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>EC: 66 (standard score)</strong></td>
<td><strong>EC: 59 (standard score)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>TL: 58 (standard score)</strong></td>
<td><strong>TL: 52 (standard score)</strong></td>
</tr>
<tr>
<td>Age equivalent for total language:</td>
<td>1 year, 5 months</td>
<td>Age equivalent for total language: 2 years, 1 month</td>
</tr>
<tr>
<td><strong>Vineland Social and Emotional scales</strong></td>
<td><strong>Interpersonal relationships -</strong> standard score: 46 age equivalent: 10 months</td>
<td><strong>Interpersonal relationships -</strong> standard score: 53 age equivalent: 1 year, 5 months</td>
</tr>
<tr>
<td></td>
<td><strong>Play and leisure -</strong> standard score: 40 age equivalent: 1 year, 3 months</td>
<td><strong>Play and leisure -</strong> standard score: 54 age equivalent: 1 year, 9 months</td>
</tr>
</tbody>
</table>
### Table 8.46

*Liam’s scores on GARS (Gilliam Autism Rating Scale) at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Baseline assessment</th>
<th>Review assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autism features: GARS</td>
<td>Autism features: GARS</td>
</tr>
<tr>
<td>Stereotyped behaviour: 10</td>
<td>Stereotyped behaviour: 10</td>
</tr>
<tr>
<td>Communication: 11</td>
<td>Communication: 14</td>
</tr>
<tr>
<td>Social interaction: 12</td>
<td>Social interaction: 12</td>
</tr>
<tr>
<td>Developmental: 8</td>
<td>Developmental: 9</td>
</tr>
</tbody>
</table>

**Autism Quotient : 102 (Average)**

**Autism Quotient : 108 (Average )**

---

### Table 8.47

*Liam’s scores on the autism real-life rating scale at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Scales</th>
<th>Baseline Playgroup</th>
<th>Mid-year EI</th>
<th>Review Preschool</th>
<th>Review EI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale I - Sensory motor behaviours</td>
<td>0.43</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale II - Social relationship to people</td>
<td>0.56</td>
<td>-0.22</td>
<td>-0.44</td>
<td>-0.44</td>
</tr>
<tr>
<td>Scale III - Affectual reactions</td>
<td>0.20</td>
<td>0.20</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Scale IV - Sensory response</td>
<td>0.50</td>
<td>0.06</td>
<td>0.00</td>
<td>-0.06</td>
</tr>
<tr>
<td>Scale V - Language</td>
<td>0.40</td>
<td>-0.20</td>
<td>-0.10</td>
<td>-0.20</td>
</tr>
<tr>
<td>Overall Score</td>
<td>0.42</td>
<td>-0.16</td>
<td>-0.11</td>
<td>-0.14</td>
</tr>
</tbody>
</table>
Table 8.48

*Liam’s parent scores on Ways of Coping at the baseline and review assessments*

<table>
<thead>
<tr>
<th>Ways of Coping</th>
<th>Baseline assessment Relative scores</th>
<th>Review assessment Relative scores</th>
<th>Differences in scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confrontive coping</td>
<td>0.18</td>
<td>0.07</td>
<td>-0.11</td>
</tr>
<tr>
<td>Distancing</td>
<td>0.06</td>
<td>0.11</td>
<td>0.05</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.18</td>
<td>0.20</td>
<td>0.02</td>
</tr>
<tr>
<td>Seeking social support</td>
<td>0.08</td>
<td>0.13</td>
<td>0.05</td>
</tr>
<tr>
<td>Accepting responsibility</td>
<td>0.06</td>
<td>0.05</td>
<td>-0.01</td>
</tr>
<tr>
<td>Escape–avoidance</td>
<td>0.06</td>
<td>0.04</td>
<td>-0.02</td>
</tr>
<tr>
<td>Planful problem-solving</td>
<td>0.30</td>
<td>0.29</td>
<td>-0.01</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>0.07</td>
<td>0.09</td>
<td>0.02</td>
</tr>
</tbody>
</table>