



## ***Final Report***

# **Literature Review on Intervention with Challenging Behaviour in Children and Youth with Developmental Disabilities**

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## Executive Summary

This report summarises the processes, approach, and findings of a review of the literature and knowledge base regarding severe challenging behaviour in children and young people with developmental disabilities. Our review is focussed on effective educational and support services for children and youth whose behavioural challenges accompany a diagnosis of intellectual disability, developmental delay, severe learning difficulties, severe traumatic brain injury, and/or autistic spectrum disorder.

The review follows well-established procedures, including an extensive search of published research in journals and monographs for intervention studies, theoretical contributions, and previous reviews of the literature covering work carried out in New Zealand and the extensive body of work available internationally. Reports and publications were identified through searches of on-line databases, 22 major international refereed journals in the field for the years 1988-2005, major books, and e-mail contact with leading researchers to locate information on research still in press. In all, information regarding more than 1,000 journal articles resulted in sourcing and developing an EndNote dataset of nearly 700 reports in order to identify those that met required criteria for different components of the review.

Our review is multi-method, involving both quantitative and qualitative analyses. Included in the review is a meta-analysis of research reports meeting rigorous criteria for this component, and a more traditional review of the broader literature including clinical judgements regarding evidence-based best practices in interventions with challenging behaviour. Our approach and findings were critiqued by external expert reviewers as well as by key personnel in the Ministry of Education.

The final report analyses empirically the evidence from systematic intervention research regarding the relative effectiveness of interventions implemented to achieve desired behavioural outcomes for children, young persons, and their families. We have incorporated available evidence-based New Zealand research and education sector interventions, particularly those with a bicultural focus and designed to meet the needs of Māori students and their families.

The review report includes details of findings from the meta-analysis of effective interventions as well as highlights exemplars of approaches appropriate for intervening during the early childhood, middle childhood, and adolescent years for children and youth with developmental disabilities and challenging behaviour. A summary of evidence-based best practices includes discussion of criteria for intervention decision-making, standards for evaluating interventions, and contextual and cultural variables critical for the design of appropriate and effective strategies. Critical features of effective interventions are summarised and professional development needs highlighted.

A Glossary of Key Terms and Abbreviations is provided in Appendix A to aid communication with readers who will approach the review from their different methodological and theoretical perspectives.

## **Key Findings**

### ***Best practices in behavioural intervention***

- A functional analysis of the purposes of behaviour for the child is incorporated into intervention planning for the majority of research reports in the published literature.
- Positive interventions implemented in a variety of environments now predominate in the published literature in comparison to reliance on restraints, aversives, or other intrusive approaches more commonly reported in clinical research published prior to 1990.
- The best outcomes appear to occur when treatments are *not* driven by medication, aversives, intrusiveness, and use of restraints. In addition to producing the best results, positive interventions lend themselves to sensitive, ethical, and socially responsible service delivery.
- Multi-component interventions are both recommended and increasingly common in the published literature across all categories of challenging behaviour.
- The published literature continues to favour programmes tailored to individual child needs rather than diagnosis or age per se, but increasingly incorporates attention to the child's developmental level as well as the contextual fit of an intervention with the child's environment and culture.
- In Aotearoa New Zealand it is essential that there be involvement and collaboration with whānau whānui, respectful of the mana and contributions of community to intervention design, and evidence is promising that the incorporation of culturally appropriate principles and practices will have a positive impact on child and family outcomes.

### ***Evidence of intervention effectiveness***

- Self-injurious, stereotypic, socially inappropriate, and destructive behaviour responded well to behavioural treatments, while the results for aggressive and disruptive behaviour were less successful.
- A child's primary or secondary diagnosis did not moderate outcomes; that is, the child's "syndrome" (and the cluster of behaviours associated with that syndrome) is of less significance to the success of an intervention than the nature of the challenging behaviour.
- Our meta-analysis results reveal that an effective intervention is likely to involve peers, be organised by a professional or teacher, and can be carried out in a number of controlled contexts (residential/home, school, treatment room), whereas lower effect sizes occurred with wider settings in the presence of complex "real life" events. Involving family members and siblings in the intervention did not necessarily result in significantly better outcomes. However, given the short time period during which published interventions monitored outcomes, we don't know the extent to which positive results achieved in a controlled setting will generalise and maintain to the child's natural environment.
- Theory would predict that positive results achieved in natural settings are more likely to maintain, while those achieved under relatively artificial, controlled settings will not maintain without the application of another intervention phase to generalise those results, but further research is needed to investigate this issue.
- Combination treatments incorporating systems change, and single treatments without system change, both produced satisfactory outcomes. All combinations

were effective in maintaining behaviour reductions, consistently produced better effects than single treatments, and performed well in modifying challenging behaviour. Single treatments in conjunction with systems change were best at maintaining a zero rate of behaviour.

- Skills replacement training outperformed other single treatments (e.g., modifying antecedents or consequences) and performed best in combination with systems change. Further, skills replacement training was equally effective across all ages and diagnoses.
- There is no evidence of difference in treatment responsiveness for children diagnosed as Autistic/ASD in comparison to children with other diagnoses, with the exception of a slight effect for the inclusion of an antecedent treatment component for children with ASD in comparison to other children. Overall, skills replacement training significantly outperforms all other treatment approaches for children with autism, as it does for children with other diagnoses.
- A well-targeted, carefully applied, and time-limited intervention, conducted within or close to the resources readily available to the treatment provider, is likely to be more useful and effective than alternatives requiring extraordinary resources, supports and extended durations of treatment.

### **Recommended Levels of Behavioural Support**

#### **Level 1 Behavioural Support:**

**Placement in integrated school and community environments with a positive behaviour support programme that makes possible access to participation with peers in a normalised if partially restrictive range of school and community activities leading to meaningful educational and social outcomes.**

The majority of students with significant challenging behaviour can be accommodated within safe early childhood centres/services and schools, provided that support and specialised training services are available to teachers and caregivers within an inclusive educational model.

#### **Level 2 Behavioural Support:**

**Placement in a more restrictive school setting with a positive behaviour support programme that facilitates at least some access to typical educational/community settings and activities plus participation with non-disabled peers.**

A minority of children in the middle years and the majority of secondary age youth with severe challenging behaviours may require this level of service at varying, limited periods of time. Where a more restrictive placement is needed, there must be ongoing access to typical schools available throughout the programme, with the goal of an inclusive educational placement signifying successful intervention.

#### **Level 3 Behavioural Support:**

**Level 1 or Level 2 plus wraparound child-centred services and/or parent training outside the range of the normal school day and/or school year to support families.**

Wraparound support and training services should be available to all families with a child aged birth to 8 years who has severe challenging behaviour, at a level appropriate for caregiver capacity and preferences. Wraparound community-based services for families with older children should also be provided on an as-needed

basis, because of the severe needs at secondary ages if earlier interventions have not successfully reduced serious challenging behaviour. Without wraparound community-based services, families and typical school environments are unlikely to be able to accommodate the level of risk to safety of the child and others.

# Section 1: Approach to the Review

## Introduction

This report summarises the processes, approach, and findings of a review of the literature and knowledge base regarding severe challenging behaviour in children and young people with developmental disabilities. Our review is focussed on effective educational and support services for children and youth whose behavioural challenges accompany a diagnosis of intellectual disability, developmental delay, severe learning difficulties, severe traumatic brain injury, or autistic spectrum disorder (ASD).

The review follows well-established procedures, including an extensive search of published research in journals and monographs for intervention studies, theoretical contributions, and previous reviews of the literature, covering work carried out in New Zealand and the extensive body of work available internationally. Reports and publications were identified through searches of on-line databases, 22 major international refereed journals in the field for the years 1988-2005, major books, and e-mail contact with leading researchers to locate information on research still in press.

Our review is multi-method, involving both quantitative and qualitative analyses. Findings from a meta-analysis of those intervention research studies meeting the requirements for this approach have also been reported separately as quantitative support for validated intervention strategies (Harvey, Boer, Meyer, & Evans, 2006). Two previous progress reports discussed initial findings and broad themes evident from our preliminary work in preparation for the meta-analysis and our qualitative review of the literature to date, including articles from the meta-analysis dataset as well as other relevant literature not suited to a meta-analysis. The second progress report provided a methodological overview and a summary of preliminary findings that were shared with four internationally recognised expert peer reviewers<sup>1</sup> and with key personnel in the Ministry of Education, Special Education group. Reviewer feedback from these processes was incorporated into our revision and continued work in preparation for the final report. Thus, this final report comprises a revision of the review findings and incorporates the quantitative results from the meta-analysis as part of a comprehensive, cross-methodology literature review. This review includes detail regarding the following:

- A summary of the impact of severe behaviour in combination with developmental disabilities on outcomes for children and youth and their families, including student outcomes and child and family adjustment
- Evidence regarding the incorporation of effective behavioural treatment in different settings and environments with an emphasis upon school, home and community
- Major features of effective interventions and effective strategies, including any evidence of differences according to particular diagnoses or age ranges
- Information regarding the relative effectiveness of different intervention agents, including professional clinicians or experts, teachers and other school care

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<sup>1</sup> Our international expert reviewers were Associate Professor Jill Bevan-Brown (Massey University, New Zealand); Professor V. Mark Durand (University of South Florida, USA); Professor Ted Glynn (University of Waikato, New Zealand); and Professor Dennis Moore (Monash University, Australia).

providers, and parents or family members, peers and others in the natural environment

- Evidence on the feasibility and do-ability of effective strategies in different treatment, educational and natural environments, including the need for various types of services and supports based on the extent and nature of the behaviours and other child-related variables (such as age)
- Information regarding key competencies and skills needed by practitioners and professionals (and, where relevant, caregivers and others) to implement effective and educationally valid interventions
- Outcomes that have been achieved and should be expected as a function of various intervention approaches and characteristics of the children and young people
- The essential professional learning and infra-structural support required by professionals, practitioners, and family members for the delivery of effective services to manage and remediate challenging behaviour in this population
- Information regarding culture-specific accommodations, adaptations, supports, and practitioner understandings required for effective and ecologically valid interventions, particularly with regard to the needs for Māori and Pasifika children and young people and their families/whānau.

This report examines the evidence from systematic intervention research regarding the relative effectiveness of interventions designed to achieve positive behavioural outcomes for children, young persons, and their families. We also report on the nature and extent of behavioural changes that have been achieved through the application of best-practices interventions and policies, both short and long term. In addition, we consider the extensive theoretical literature in this area, which has both influenced and been influenced by empirical research on the effectiveness of interventions. The report has been informed by the results of the meta-analysis, as well as a conceptual overview of the larger body of literature in this area. Our review has also sought to identify and incorporate available New Zealand research and education sector interventions, particularly those with a bicultural focus and designed to meet the needs of Māori and Pasifika students.

The next section below describes the scope of the review and highlights relevant aspects of information regarding intervention effectiveness, educational validity, and essential features of empirically supported interventions.

### **The Scope of the Review**

Our review of the intervention literature with challenging behaviour in children and youth with intellectual disabilities covers both the empirical validation of formal treatment studies using meta-analysis, alongside a conceptual and broad review of the state of the art in this area. Prior to sourcing the literature for published studies that would suit the meta-analysis, we examined existing reviews for definitions of severe behaviour difficulties in combination with a diagnosis of intellectual disability, ASD, developmental delay, traumatic brain injury, and/or severe learning difficulties. Thus, our review allowed for the identification of any variation in practices internationally that might affect our sourcing of the intervention literature by key works. For example, the label learning disability is used in the United Kingdom in contrast to use of the label mental retardation in the United States and intellectual disability in New Zealand and Australia. The search summarised and synthesised

information from existing reviews of the research in this area, filling in any gaps with the most recent research regarding: the type and range of severe behaviours that interfere with educational participation and learning; the duration, intensity, and modifiability of challenging behaviours; causes and hypotheses regarding causes; prevalence and incidence of particular behavioural patterns; and the impact of severe behaviour challenges on learning and participation in school and community environments.



***The long-term implications of challenging behaviour.*** Previously published literature reviews and empirical research on the long term significance of the presence of challenging behaviours highlight the importance of successful intervention in order to have overall benefits for children, their families, and society. The presence of severe behaviour problems in children and youth with severe disabilities at any age presents a major challenge to families, educational settings, and all aspects of community participation (Glasberg, Martins, & Harris, 2006). It might be argued that this is a growing problem internationally, based on the escalating number of media reports and even prime-time television programmes such as *Supernanny* that present case studies of children with severe behaviour problems whose families receive professional advice to intervene. Even very young children are said to present major problems for families and child care facilities. As a recent front-page newspaper story with the headline *Bullying by toddlers taxes staff* noted:

Toddlers using aggressive and bullying behaviour are causing problems at childcare centres, with staff saying they lack training to handle the troublemakers.... The behaviour included hitting, pushing, punching, yelling, screaming, refusal to cooperate, temper tantrums and shouting at parents. Others showed little respect for other children or for adults.... Fixing such behaviour in the preschools was vital because it was a time when children developed lasting behaviour patterns” (*Dominion*, 1 May 2006, p A1).

There is considerable evidence that the presence of challenging behaviour in children with disabilities is a major issue. Quine (1986) reported that fully two-thirds of children with severe intellectual disabilities also exhibited behaviour problems in the preschool years. The more severe the level of intellectual delay, the more likely it was that a child would have behaviour problems such as self-injurious behaviour, aggression or stereotyped mannerisms (Quine, 1986). Einfeld and Tonge (1996) found that four out of 10 children with intellectual disabilities had severe emotional and/or behavioural problems. Behaviour problems have been found to interfere with a child’s education, opportunities for participation in mainstream schools and community environments, and family adjustment and satisfaction (Emerson, Moss, & Kiernan, 1999; Tonge, 1999). Emerson (2003) found that behaviour problems are not only common in young children with severe disabilities, but are also extremely persistent over time (Emerson, Moss, & Kiernan, 1999).

In their analysis of the extant data from a sample of thousands of children in the UK, Murphy, Beadle-Brown, Wing, Gould, Shah, and Holmes (2005) presented perhaps the most powerful evidence available to date of the consequences for a child, the family and the community if challenging behaviour at a young age is ignored or allowed to escalate into the middle childhood years. In an investigation of the chronicity of challenging behaviour in those with severe intellectual disabilities and/or autism, Murphy and her colleagues followed up a large sample of children aged 15 years or younger at Time 1, to twelve years later, labelled Time 2. Children who at Time 1 were labelled socially impaired — rather than socially able — evidenced significantly greater abnormal behaviour at Time 2. While abnormal behaviour generally did improve with age, those who had the most challenging behaviour at Time 1 were “often those with most abnormal behaviour at Time 2” (Murphy et al., p. 275). Further, they noted “the relationship between abnormal behaviours and language skills was really more impressive and pervasive than that with IQ” (Murphy et al., p. 277). Overall, they reported that high levels of abnormal behaviour at Time 2 were predicted by the presence at Time 1 of the following factors: a diagnosis of autism/autistic spectrum disorders, social impairment,

limited expressive language, and abnormal behaviour. Their evidence supports systematic and early intervention with young children who present these factors as a priority, particularly given the pervasive impact of challenging behaviours on the child and his/her family (Fox, Vaughn, Wyatte, & Dunlap, 2002). Without intervention, such behaviour is most likely to escalate and become far more difficult to change in later years — it does not go away.

**Components covered in the review.** Our search of the published intervention literature focussed on the modification of severe behaviour difficulties in children and young people with a diagnosis of intellectual disability, developmental delay, ASD, traumatic brain injury, and/or severe learning difficulties. It identified research reports that are amenable to the different analyses strategies employed, based on the nature of the applied research design and evidence regarding outcomes. Studies included in this component are those providing description of the intervention approach, relevant policy and/or staff development supports, and evidence on child outcomes including generalisation and maintenance data sufficient to allow inclusion in the qualitative and/or quantitative review analysis.

As much as was practicable, the review was structured to accommodate issues highlighted in previous work contracted by the Ministry of Education (NZ) in order to enable analysis of the evidence with reference to congruent reviews (*cf.* Church, 2003). Key points include: (1) ensuring the inclusion of early childhood intervention literature; (2) reporting key criteria for judging the effectiveness of programmes, allowing comparison with the evidence as summarised in the Church report but emphasising internationally established standards for evaluating treatment effectiveness (*cf.* Chambless et al., 1996); (3) organising key findings by three broad developmental age groups with differing implications for educational placement and service supports (early years, birth to age 8; middle childhood, ages 8-12 years; and adolescents/secondary youth, ages 13-21); (4) including a comparison of the effectiveness of interventions with challenging behaviour in children with autism vs. those with another diagnosis; (5) distinguishing between evidence and professional judgement (with the evidence-based meta-analysis, but also in discussion of the literature that does not lend itself to inclusion in the meta-analysis); (6) presenting available information on parent interventions and supports; and (7) ensuring that our recommendations are supported by the evidence, including recommendations regarding the level of skill, expertise, and understanding needed to deliver effective interventions.

Nevertheless, caveats are in order with regard to certain of these components and the extent to which we are able to follow the recommended format. Firstly, unlike the population of interest in the Church review, a large percentage of the children and youth with developmental disabilities reported in the literature continue to reside and attend educational programmes in segregated settings that serve children across quite broad age ranges. Further, researchers working with these young people often report interventions trialled with several participants or even large groups across quite divergent age samples. This tendency to ignore major age groupings in the research literature is part of the problem in identifying appropriate interventions. However, what we could do was analyse different intervention techniques in terms of their *likely* feasibility and doability in natural environments such as early childhood settings and junior classrooms (ages 0-8), intermediate and middle school years (ages 8-12); and the junior and senior secondary school (ages 13-21).

## **Intervention Targets and Decision-making**

How do agency personnel, teachers, and family members make decisions about treatment for children and youth with behavioural needs? Treatments and/or interventions are selected and implemented based on multiple decision criteria. Firstly, the seriousness of the behaviour will influence whether or not it is targeted for treatment in the first place. Secondly, the characteristics of available intervention approaches will influence choice of treatment. These factors will also interact with other child needs, family values, cultural context, agency philosophies and commitments, and existing policy and practice to shape intervention choices and judgements about the outcomes of treatment. The meta-analysis component of this report tends to focus on the *efficacy* of a treatment — whether or not a circumscribed procedure works to change a targeted behaviour in the predicted direction. However, it is important to acknowledge that the choice to intervene and how to intervene may be influenced by factors that are not directly related to empirical evidence about efficacy.

It must also be emphasised that there has been a long tradition in psychological treatment outcome research to distinguish between *efficacy* that can be documented in well-controlled, specialised clinical trials, and *effectiveness* of an intervention when used in real-world clinical and educational settings (e.g., Kazdin & Kendall, 1998; Weisz & Jensen, 1999). Because so many of the published studies in our area of interest are case studies, they do report on real clients who have not necessarily been carefully selected for inclusion in a specific study. On the other hand, the facilities, staffing, and professional resources available for these interventions may have been much more dense and sophisticated than in typical service settings. Thus, the difference between efficaciousness and effectiveness may not be as distinctive as in other areas of treatment outcome research. What we have attempted to do is to report on the professional personnel and facilities involved; what we cannot do is ascertain whether the clients were selected because of their clinical needs or because of their suitability for the particular style of intervention that was being trialled. We elaborate on this in the next section.

***Factors affecting treatment decisions.*** Some of the influences on treatment decisions relate to context and capacity rather than reflecting child characteristics or needs. Cost is one of these, and treatment decisions in the health and education sectors can be influenced by the relative expense of adopting a particular approach over another, especially in relationship to the expected outcomes associated with each. The financial and psycho-social costs likely to occur in the longer term without intervention will also have an impact on the willingness to commit to an expensive treatment in the immediate term, if it can be shown that these costs will actually be less over time than those associated with not adopting the treatment. This is, essentially, one major argument that influenced the implementation of special education entitlements for children with disabilities: Special education is expected to increase the child's independence and participation in society across the lifespan, as opposed to outcomes of lifelong dependency in the absence of an appropriate education. Another factor influencing choice of treatment and whether to intervene involves judgements about the seriousness or the priority assigned to intervening with a particular behaviour: There may even be an expectation of parity, such that society would be unwilling to pay for an expensive treatment to change a behaviour that may be different only, rather than one that is seen as life-threatening, dangerous to others, a significant impediment to learning, and so on.

Adoption of an intervention also requires that the treatment be *do-able* in the context of the capacities and resources of agencies, services and personnel responsible for delivery of the treatment (Barwick et al., 2005; Meyer & Evans, 1993; Meyer, Park, Grenot-Scheyer, Schwartz, & Harry, 1998). For example, the treatment may require

highly specialised personnel who are not available even if they could be afforded (Schreibman, 2005). Where such barriers exist, an alternative treatment that “works” with less cost in typical settings and with readily available personnel, is more likely to be implemented.

The acceptability and adoption of particular treatment approaches will be further influenced by societal values, the philosophy of a particular agency or setting, the culture of the family and community, and other values held by intervention agents, those who are the focus of the intervention, and/or their family members. For example, the use of aversives to intervene with challenging behaviour was quite common two decades ago, and there was widespread debate regarding their appropriateness for persons with disabilities. Subsequently — supported by evidence that positive intervention alternatives were available and were equally effective — the international disability community took the philosophical position that it was indefensible to use treatments that inflicted pain with persons with disabilities who could not give their consent or protest (Helmstetter & Durand, 1991). Controversy regarding the ethics of using such procedures escalated in the 1980s leading to formal resolutions against their use by major international disability associations (Guess, Helmstetter, Turnbull, & Knowlton, 1986). In New Zealand, similar guidelines were articulated (Parsonson, 1997).

Cultural values also affect the acceptability of an intervention approach. Something that is appropriate for use in the United States may simply not be culturally acceptable elsewhere (Meyer, 2003). Here in New Zealand, we now recognise that consultation with the whānau/family and cultural community is a crucial component to educational decision-making (Bevan-Brown, 2001, 2003; Macfarlane, 2005).

***Appropriate decision criteria.*** What are the appropriate criteria to use in making treatment decisions? The factors described in the previous section do not focus on whether a treatment works, but instead reflect judgements of acceptability of an intervention in relationship to social context, values and cost versus anticipated benefits. Treatment decisions should be and are influenced by these factors so that it is impossible to ignore them. Understanding such issues will help interventionists to design treatments that will be effective and do-able in typical environments and more sustainable in the long run than an approach that failed to recognise these variables (Barwick et al., 2005). At the same time, there should be confirmation that the treatment programmes that are selected and implemented are justified empirically by evidence that they can be efficacious. There is little point in continuing to expend time, energy and financial resources on interventions and programmes that have not been demonstrated to make a difference, and the promotion of clearly ineffectual if not purely superstitious programmes should prompt serious concerns on behalf of young people who cannot afford to have their learning opportunities squandered (Schreibman, 2005).

Whether or not a particular intervention approach *works* — that is, it actually results in a positive change in the behaviour that is the focus of the intervention — should be important to families, service delivery agencies, and advocates alike. And while the factors discussed above will vary depending upon circumstances and contextual variables, the value of a particular intervention must be testable.

Later in the report we describe in detail the criteria for evaluating treatment effectiveness disseminated by the Task Force on Promotion and Dissemination of Psychological Procedures of the Division of Clinical Psychology of the American Psychological Association (Chambless et al., 1995, 1996). The evaluative criteria they promulgated are now widely cited as the standards to be met for efficaciousness

(Lonigan, Elbert, & Johnson, 1998). These standards require evidence of beneficial outcome, but also the availability of sufficient information to enable the treatment to be replicated by others. Chambless et al. (1995, 1996) endorses the broad category of “behaviour modification for developmentally disabled individuals” as a well-established treatment that has been empirically validated (Chambless et al., 1995, p. 22).

The literature and empirical evidence on which that judgement was based, however, do not comprise a particular package one might label “behaviour modification”. Instead, this approach consists of multiple single-subject intervention reports. These studies follow the general set of principles and practices referred to as behaviour modification, but individually they report particular behavioural interventions with one or more specific target behaviours. Thus, our meta-analysis reviews the results of a variety of interventions designed to intervene with different challenging behaviours across different children and youth. Our overall conclusions and recommendations arising from the review are based on both the findings from our meta-analysis and the theoretical integration of the broader literature base in relevant areas.

## Section 2: Conceptual Framework

This conceptual discussion is not a review of the existing literature, although it is grounded in our meta-analysis that does comprehensively review interventions with challenging behaviour in children with disabilities published between 1988 and 2005. Our purpose instead is to present here a conceptual framework or blueprint for integrating and understanding empirical research relating to challenging behaviour in children and young people with significant intellectual disabilities. The past two decades have seen radical shifts in approaches to understanding, assessing, and changing problematic behaviour. Twenty years ago we published the first comprehensive practical manual for modifying problematic behaviour from the educative, positive, skill-development perspective (Evans & Meyer, 1985). Four years later we published a more refined and more practical manual, relying on similar principles and empirical evidence, but emphasising applications in ordinary homes and community settings by typical carers and teachers. This was important, as more and more people with significant developmental disabilities were coming out of institutional settings and being accommodated in the community, in typical residential contexts and in ordinary schools (Meyer & Evans, 1989).

At the time these works were published, the research literature on the treatment of challenging behaviour was heavily dominated by traditional approaches from behaviour modification, or applied behaviour analysis (ABA). We wrote a number of critiques, at that time, pointing out the limitations of continuing narrow applications of this tradition (Evans & Meyer, 1990; Meyer & Evans, 1993). The key issues were as follows:

- *Clinical significance of the behaviour targets:* In accordance with operant conditioning methodology and strategies for behavioural measurement, the behaviours targeted for change tended to be isolated, discrete behaviours, with little understanding of how they fitted into the more complex repertoires of the individual, or even whether they were important for the person's well-being or social adjustment.
- *Failure to recognise the functions of behaviour:* The function of the undesirable behaviour was often not assessed or recognised. There was also little evidence of any long-term follow-up of intervention effectiveness, and clinical experience suggested that problematic behaviour which served a purpose was likely to reoccur once the artificial intervention conditions abated.
- *Negative and reductionist approaches:* Viewing negative behaviours as undesirable without seeking to understand the purpose of those behaviours led to an emphasis on eliminating them as a prerequisite for learning new skills or being part of a less restrictive environment. Persons with challenging behaviour may have no alternative positive behaviours, so that effective intervention would need to build (teach) new skills, such as communication, play, or social interactions (friendships), as well as modifying social environments to ensure that those new skills would be more effective for the individual than the problem behaviour had been.
- *Ignoring contexts and generalisation issues:* Interventions reported in the early literature had occurred in artificial laboratory-type or restrictive settings with extraordinary controls and resources. These were conditions unlikely to mirror the natural contexts where the behaviours had been problematic in the first instance — hence the intervention had little life beyond the journal article.

- *Using negative and aversive methods:* In the focus on deceleration of targeted behaviours, there was also a tendency to utilise punitive methods - either aversive negative consequences or withdrawal of positive experiences or opportunities (e.g., use of “time out” rooms). Painful aversives and extreme consequences that would never be allowed for typical persons were justified for persons with disabilities.
- *Failure to address quality of life:* Given that the people (clients) involved already had highly restricted lives with few opportunities for normal reinforcers and positive interactions, interventions that also ignored quality of life issues and actually introduced additional deprivation or even pain became increasingly unacceptable to society. Previously, the research tradition that focussed primarily on changing the frequency of single behaviours had not fully appreciated the general poverty of persons’ lives and the need for greater choice, autonomy, or self-sufficiency among clients receiving intervention programmes.

Today, all this has changed. Although our criticisms and those of other clinical experts were sometimes interpreted as being anti-science or even anti-ABA, we repeatedly emphasised that these represented in reality a “second generation” of empirically sound behavioural intervention strategies, in which intervention design needed to be fitted into natural and typical environments (e.g., Evans & Berryman, 1998; Meyer & Evans, 2004). A major impetus for this second generation came from the pioneering work of Durand and Carr (1991) who conducted a series of sensitive and well-designed studies on the communicative function of behaviour. Their research illustrated that many behaviours judged to be challenging could be reinterpreted as serving a communicative function and were in fact decreased and eliminated as alternative verbal skills were taught and mastered. At the same time came a general recognition of the importance of the functional analysis in which understanding the nature of the problem before trying to change it became a central value for researchers and clinicians alike.

### **Positive Behaviour Support**

While these technical developments were shaping best practices, the continued emphasis in the field on certain inclusive values began to impact the design and the evaluation of intervention methods (Horner, Dunlap, et al., 1990). There was increased recognition that parents, families, and the individuals with disabilities themselves needed to be centrally involved in selecting intervention priorities. Self-advocacy and “circle of friends” procedures became widespread, along with other strategies such as person-centred planning and the PATH (Planning Alternative Tomorrows with Hope) analysis for helping establish the most meaningful goals for children’s lives. There was recognition of ecological, contextual factors in shaping and maintaining inappropriate behaviours, and the importance of thinking of family, school, and community systems of influence. These background values, together with the more expanded understanding of individual repertoires and behaviour analysis in natural environments, led to the formulation of a set of approaches and procedures that have become known as Positive Behavioural Support. Promulgated by Horner, Carr, Dunlap, Koegel, Anderson, and others, this orientation has now emerged as the most well-developed and carefully evaluated “package” for implementing positive behaviour change: what might now be considered the third generation of behavioural interventions (e.g., Carr, Dunlap, et al., 2002). Notably, Positive Behavioural Support has moved progressively from interventions focussed solely on the individual with disabilities to establishing the conditions needed to

ensure that natural environments – home, family, school – support safe behaviour for all as well as provide a context for meeting individual needs (Carr et al., 1999).

A small number of issues remain to be considered when evaluating the relevant literature.

- a) The most significant limitation of Positive Behavioural Support is that it is increasingly being conceptualised as a comprehensive, technical philosophy or conceptual model--a thing rather than a loose collection of principles and practices that should be open to change and development and that need to be individualised for each client (Crimmins & Farrell, 2006). Whenever there is the development of a professional product, it is tempting to want to introduce the product rather than the principles, as happened to ill-effect in New Zealand when the products developed by LaVigna predominantly for adult residential settings in California (LaVigna, Willis, Shaull, Abedi, & Sweitzer, 1994) were attempted in school special educational settings in this country. There were very negative consequences of having “a single preferred model for service delivery, based on an Applied Behavioural Analysis model, often referred to as the LaVigna model” (p. 55), which was “widely criticised as unrealistic and inflexible” (p. 58) (Wiley, 2000).
- b) Secondly, the initial behaviour modification tradition, strongly influenced by operant conditioning principles and less by the values-base of contemporary disability models, still exists and researchers continue to publish one-off case studies. Even the use of aversive interventions is still occasionally being evaluated in the research literature.
- c) There are useful concepts emerging from motivational theory, family systems, and even social-constructionist perspectives that can make a contribution to our understanding, but which are not yet incorporated into positive behavioural support models.
- d) Finally, positive behavioural support concepts, having been developed almost exclusively in the United States and applied primarily in Anglo-European countries (e.g., Ireland, Canada), do not fully recognise the cultural perspectives that need to be considered when working with more diverse communities or within specific settings such as bicultural Aotearoa New Zealand, where indigenous and other cultural traditions may vary significantly from dominant cultures in European nations.

**Summary.** There have been important developments recently in our understanding of the assessment and treatment of challenging behaviour in children and young people, and in particular the needs of such individuals in school contexts. While many of these developments could be incorporated within the rubric of positive behaviour support, that model does not fully cover all of the issues that are pertinent for culturally sensitive policy and practice development in New Zealand. In this overview, therefore, we identify some of the most important trends and issues that do need to be considered. In this way we hope to provide a conceptual framework for more formal assessments of the published literature, unconstrained by the adoption of any specific model or programme.

### **Identification, Definition, and Assessment of Challenging Behaviour**

It has become increasingly recognised that the behaviours of young people with developmental disabilities that “challenge the system” are not a homogeneous group. “Challenging behaviour” is itself a euphemism for behaviours that used to be called



negative, inappropriate, or provided with a psychiatric label, such as “psychotic.” The term is helpful in reminding us that it is the system that is challenged; however it is a very broad term that covers many aspects of a child’s functioning. There is ongoing concern with how challenging behaviours are identified. Who is to decide if a behaviour is undesirable, and by what criteria? From the research perspective, once a behaviour has been locked in as the target behaviour, there can be little further discussion or analysis of whether it was the most appropriate behaviour to have been selected, whether its degree of change is meaningful to others, or whether its change – however, successful in comparison to baseline levels – can be judged as important for the child, his or her family, or for long-term quality of life. The following concepts help to clarify these issues.

**Description and demographics.** There have been numerous studies in the past 20 years or so that have attempted to provide demographic information on the frequency of challenging behaviours in different groups or contexts. A series of such studies has been conducted in the UK and there are also some useful data from Australia (see Emerson, 2001). Such studies help provide insights into the nature of challenging behaviour, by revealing, for example, whether patterns of certain kinds of problems are related to the age of the child or to the level of functioning. But some of the studies were based on institutional populations that no longer exist, and another limitation is the way the behaviours are defined and identified.

Demographic counts of behaviours naturally have to rely on reports that are based on topographic descriptions of behaviour, such as “stealing” or “hits others”. However, the form of two behaviours, as has long been recognised in the behavioural tradition, may be similar, but the nature, purpose, and function of the two acts could be completely different.

**Physiological origins.** Some challenging behaviours are directly related to organic causes, such as the response to an allergen or the observable consequence of an epileptic seizure. Like any other emotional disorder in non-disabled individuals, organic events can also set the occasion for negative moods or emotionally based behaviours. A good example of this might be menstrual cramps or premenstrual tension being the occasion setting event for irritability and subsequent aggression following a minor provocation. Durand (2001) emphasises that contemporary biomedical advances are likely to stimulate a new wave of intervention possibilities.

Challenging behaviours can be direct components of specific syndromes of developmental or psychiatric disorders. For example, the stereotypic behaviours seen in Rett’s Disorder are a direct consequence of the neuropathology of the syndrome. This does not mean that these patterns are not amenable to change by social, psychological, or educational interventions. There is good evidence that they are, just as there is good evidence that contextual factors, such as a stressful environment, will influence the occurrence or frequency of these stereotypic patterns (e.g., Evans & Meyer, 1999).

**Components of a psychiatric syndrome.** It has been a substantial breakthrough in understanding challenging behaviour to recognise that children with severe developmental disabilities can also have concurrent psychiatric disorders (e.g., Reiss, Leviton, & Szysko, 1982). This has been referred to in the literature as “dual diagnosis” and there are conceptual, logical concerns regarding such thinking (for a fuller analysis, see Evans, 1991). Despite these issues, the recognition that a child with an intellectual disability could also be experiencing a phobic anxiety or PTSD symptoms following abuse has been a major insight for analysing challenging behaviour. It is more complex when the syndrome contains elements of other

psychiatric disorder. For example, children with Asperger's Disorder often display obsessive-compulsive behaviour. Is it useful to think of this as a concurrent psychiatric problem, or is it simply a component of the developmental syndrome? Reiss and colleagues introduced the term "diagnostic overshadowing" and numerous studies since then have confirmed that when a child has an intellectual disability professionals are less likely to recognise behaviour problems as symptoms of a psychiatric disorder.

**Stereotypic behaviour.** Because children with very severe developmental delays often exhibit repetitive motor behaviours such as rocking, finger-flicking, or stereotypic play (flicking and spinning objects), stereotypic behaviour has had a considerable degree of attention in the research literature. Some of this focus probably derives from the fact that these behaviours lend themselves nicely to rate measurement and thus to being summarised by the individual baselines of operant methodology. In the past, the justification for selecting and changing stereotypic behaviour came from the claim that while engaging in these behaviours children were less likely or less able to engage in other more desirable behaviours, or even attend to relevant stimuli in learning contexts. This rationale has not been fully supported in the literature, nevertheless stereotypic behaviours can interfere with social acceptance or lead to self-injury if excessive. In earlier writing regarding teacher and parent judgements of reasons for changing behaviour, such issues did emerge as important considerations under some circumstances (Voeltz, Evans, Freedland, & Donellon, 1982). Unfortunately the current research literature on these behaviours is often conducted on a range of individuals in different (but most probably impoverished) environments and of different developmental disorders. There is little useful generalisation that can emerge from such studies.

There is a related pattern of behaviour that we might call habitual. These behaviours are like any other child habit – thumb sucking, hair twisting and pulling, pica, and so forth. They are similar to stereotypes in that they appear to be controlled more by the consequences of repetition and over-practice than in terms of their purpose or ability to control a social environment. Like stereotypes they do seem to be influenced by the sensory feedback they produce and they also seem to be able to regulate arousal. Thus these behaviours can acquire a function such as reducing tension, raising stimulation, or managing anxiety (just like a nervous individual might engage in finger tapping, leg jiggling, or sucking on a pencil).

**Reactive versus instrumental functions.** This distinction has recently been drawn most strongly in the child development literature on the nature of aggression. It is now well understood that children's aggression might be as a reaction to frustration or goals being thwarted, thus producing anger, or in threatening situations, thus producing fear. However, it is also clear that some children use aggression instrumentally as a means of obtaining things they want, or intimidating and controlling others. It is essential when developing interventions for aggression, to understand these different classes of function.

## **Social Judgement**

Some behaviour described as challenging is actually typical or developmentally appropriate behaviour that is judged unacceptable in children with developmental disabilities. Ultimately all behaviour judged to be challenging is a social construction. For this reason in particular, we favour the following definition:

*[Challenging behaviour is] culturally abnormal behaviour(s) of such an intensity, frequency, or duration that physical safety of the person or*

*others is likely to be placed in serious jeopardy, or behaviour which is likely to seriously limit the use of, or result in the person being denied access to, ordinary community facilities* (Emerson, 1995, p.4).

A good example of this reasoning is provided by the numerous studies on non-compliant behaviour. Since compliance is typically judged according to parental or teacher directives, delivered verbally, so-called noncompliant behaviour in children with intellectual disabilities is often simply a consequence of not understanding the directive given or what is expected of them. At a more complex level, we know that for many children with developmental disabilities the standards of autonomy and free choice that are expected of them are totally different from those for a non-disabled child. Thus, behaviour that might be judged in certain contexts as desirably assertive or self-directed, may – in other contexts and/or by other people with different expectations or cultural standards – also be judged as unnecessarily aggressive or non-compliant. One of the interesting implications of this sort of analysis is that it highlights the subjectivity of behavioural attributions. In many cases, behaviour that is reported by adult caregivers as problematic is actually a function of normal, typical or appropriate behaviours being misjudged or misconstrued, and thus it is the adult expectations that need to be modified, not the child's behaviour. It is important that whenever families, teachers and schools report behaviour as problematic, their own standards and expectations for the child must be closely examined, especially if the ethnic/cultural identity of the student is different from that of the adult expressing concern.

### **Multiple Causal Models**

There is now good understanding in the literature that challenging behaviour will typically have a number of causes or sources of influence – it is always *multiply determined*. Even a behaviour that might have started out as the direct consequence of some physiological state or medical condition (such as pain, or illness causing a sleep problem), can come to have a social or psychological function (such as sleeping in a parent's bed now having a reinforcing or anxiety-reducing function).

Within the classic behavioural paradigm, the four component model, originally developed by Meyer and Evans (1989) and elaborated by Evans (1999), emphasises that typically a problem behaviour will have four major controlling elements: (a) an ecological component (it will be triggered by specific stimuli or be more probable in certain environments or settings) (b) a consequence (the well-known reinforcement effect); (c) be related to a lack of alternative behaviours for achieving the same consequence; and (d) will be related to needs, goals or motives important to the individual. Whatever model is adopted, the important principle from the perspective on intervention is to recognise that behaviours are generally multiply determined and thus intervention plans will need to address different causes and different levels of cause and cannot rely on simply changing one isolated facet of the child's life. In this sense, intervention design with challenging behaviour is no different from any other form of psychotherapy where multiple intervention foci are the norm.

Clearly if causal influences can be categorised in this way, so change strategies can also be thought of in similar terms. Later in this report, guided by the common distinctions in the research, we divide treatment approaches into those that focus on changing antecedents, those that manipulate contingencies, those that teach alternative, new, or preferred skills, and those that modify general systems. It will be seen that these four are closely related to our four-component causal model. However, in our model we have always emphasised that all four need to be considered within any one plan for change, whereas the treatment literature we

review has traditionally tended to describe one or two combinations only. Another slight difference is that our fourth component relates more to the child's emotional/motivational needs, such as jealousy, frustration, helplessness (the need for autonomy), or boredom (the need to be engaged). While some of these needs will be addressed by sensitive systems change, which often offers the child greater choice, more activities, and more control, some interventions that change broader systems may do little more than re-arrange antecedents and contextual factors. Thus a systems change intervention such as a new curriculum in a new classroom might alter behaviour by altering antecedents, but also might effect improvements by, say, being more interesting, allowing higher levels of success with fewer failures (e.g., errorless learning strategies that characterise "gentle teaching," McGee, 1987).

### **Emotion, Motivation and Needs**

Largely as a result of Skinner's continued philosophical influence on applied behaviour analysis, the traditional behavioural approach to understanding and modifying challenging behaviour has neglected the broader motivational issues of children's basic needs and the emotional forces that typically influence overt behaviour. These include the need for entertainment and pleasure, the need to belong and to feel part of a larger community, the need for autonomy and a level of independence, and the need for control.

### **Personality: Challenging Behaviour in the Context of the Individual Repertoire**

Personality is a complex concept that is the focus of a vast body of psychological literature. Essentially the concept refers to those characteristic ways an individual has of behaving (including beliefs, values, attitudes), of engaging the world, of coping, and so on, that make each person a unique individual but which collectively can be summarised into general groupings or traits. Any individual can be rated as to the degree to which a particular measurable trait is evidenced. Some diagnostic groups appear to have characteristic traits. For example, children with Down Syndrome have often been described as cheerful, friendly, and good-natured. This does not mean that every child will display such characteristics, but that in general this does seem to be a useful way of describing typical members of a group (Lecavalier & Tasse, 2005).

Behaviour theory has eschewed the concept of personality for many philosophical reasons. The chief of these is that personality theory is descriptive and lacks explanatory power. Thus one could not explain the cheerful affect of a child with Down Syndrome because he or she has the trait of cheerfulness. Also behaviour is highly specific to certain situations. A child with Down Syndrome will not be cheerful if his or her favourite sports team loses a game, or if he or she comes last in an event in Special Olympics. Thus one needs to understand the interaction between a trait and the situation in order to predict behaviour. However, concepts such as personality – like that of a psychiatric syndrome – do emphasise that behaviours are linked within repertoires, such that the presence of one behaviour might predict the presence of others, or might mediate behaviour in another context.

The research by Meyer and Evans was among the first to demonstrate that the discrete behaviours that were being modified in ABA studies were usually linked to other behaviours. Thus, one could expect that if the frequency of one behaviour was altered, there would be collateral influences on other behaviours (Voeltz & Evans,

1982). Although this concept is now widely accepted, it is still quite difficult to demonstrate how behaviours within an individual repertoire are actually related. Various behavioural models, such as that developed by Staats (1990), have revealed how one set of behaviours or skills are prerequisites for another, and thus it is essential to consider basic behavioural repertoires when designing intervention programmes.

The concept of collateral effects also has profound implications for the evaluation of treatments. Often, one particular target behaviour is modified not because it is important in its own right but because it is expected that changing that target will have ongoing positive benefits for the child and his or her interaction with the environment. However, these positive outcomes are not always assessed or reported in the published literature (Meyer & Evans, 2004).

Among the many inter-response relationships that are important to consider, those between affect and behaviour are possibly the most important. As mentioned in the previous section on motivational forces, many behaviours serve the function of managing affect – either by increasing positive, pleasurable emotions, or regulating negative, unpleasant ones. Escape and avoidance behaviours, for example, are defined that way because their function is to reduce or prevent feelings of fear or anxiety. If the individual feels threatened, then aggressive, attacking behaviours serve a similar function.

## **Understanding Social Systems**

In the previous section we considered how behaviours function within complex intra-individual systems. However, behaviours also operate within complex inter-individual systems. While many of our everyday behaviours affect our physical environment, a powerful set of conditions is when they affect the behaviour of others. For most of us, and especially for children, the majority of our everyday functioning takes place within social contexts and much of it is in fact social behaviour – communicating, sharing, receiving support and emotional attachment, influencing and directing others.

**Parents and families.** Intimate relationships are perhaps the most important of these systemic influences. A child who does not have a secure, consistent, and meaningful relationship with adult caregivers is unlikely to be able to behave in ways that are considered culturally appropriate. Quite apart from parental and family behavioural influences on children, emotional influences provide the critical context for the development of motives to please, to fit in, to love and be loved. Much of the earliest work in ABA took place in contexts that were already highly deprived of such conditions, with paid professional caregivers, or parents who had already found their child too difficult to cope with. Now it is simply accepted as a given that no meaningful intervention plan can be designed if it is not delivered against a background of loving, involved caregivers or teachers who like the child. These can, of course, be extended family or whānau members, foster parents, adoptive families, grandparents, and so on.

This simple requirement means that support or assistance of many kinds will be required to allow parents and other family members, including siblings, to develop the necessary meaningful interpersonal relationships with the child with developmental disabilities. Obviously in the case of certain syndromes – Autistic Disorder in particular – the nature of the disability can make such relationships difficult. This is also true in the case where the parent has significant mental illness or has been involved in the past in physical or sexual abuse, or neglect, and has had this child or

other children removed from the home by Child, Youth and Family. For any family, however, brief residential opportunities (e.g., camps, holidays away) that allow families to have some respite can be of the utmost importance. So too are programmes that support siblings, including e-mail networks, newsletters for siblings, and outdoor adventure programmes whereby young family members can support each other. In New Zealand, these opportunities are emphasised by parent support groups, such as Parent-to-Parent (Matua-ki-te-Matua).

In addition to strategies that allow emotional attachment with parental figures, families are involved in behaviour difficulties in other very direct ways. Poor or harsh parental disciplinary tactics might have resulted in excessive use of negative methods for regulating behaviour (punishment, verbal reprimand and criticism). Similarly, some families exist in states of relative confusion and inconsistency that result in either inappropriate contingencies or a general failure of contingencies to promote pro-social behaviour. Direct instruction in basic positive parenting practices – such as Triple P (Positive Parenting Program) – may be an important general ingredient of any systematic intervention.

Obviously a basic strategy that has been used extensively in the past-regardless of the parents' current level of competence in family interactions-has been to design an intervention programme and then instructing parents in how to apply it. There is considerable evidence that this is typically very hard for parents to do, and there have been numerous suggestions that as an alternative, parents could be taught some very broad and general principles of effective positive parenting techniques, rather than trying to have them implement formal behavioural interventions. Many of these general principles revolve around a reduced need for control and counter control, allowing greater degree of choice and autonomy, creating a more positive family atmosphere, having methods available for including the child in other family activities, and anticipating times when behavioural problems might be particularly likely to occur and having preventative and distracting tactics for coping with such situations.

Family dynamics and interactional patterns – what is generally known as the systems approach to families – provide the information needed to better understand the relationships among family members and whether behaviour problems are somehow connected to family patterns that are maladaptive ways of dealing with tensions between parents. There are studies which demonstrate that sometimes the child with the challenging behaviour is enmeshed in an overprotective relationship with one parent, that the methods of dealing with the challenging behaviour are a major source of conflict and disagreement, or that the child's original disability might be blamed on one or other member of the family (scapegoating). Any such dynamic creates opportunities whereby there is inconsistency in parenting, occasions in which the undesirable behaviour is inadvertently reinforced, and family atmospheres in which opportunities to teach positive behaviours are very limited.

**Friendships.** One of the more regrettable consequences of difficult and challenging behaviours, particularly aggression, is that it makes it harder for a child who already has minimal social skills to be able to interact with peers and develop friendly relationships – which in turn are needed as the context for motivating positive behaviour towards others. Friends may have to be very accepting of the child's difficult behaviour, at least initially, although there are studies showing that peers provide natural consequences and feedback about socially inappropriate behaviour, which can be very effective.

Meyer and her colleagues (Meyer, Park, Grenot-Scheyer, Schwartz & Harry, 1998) have published extensively on peer relationships and friendships and how these

relationships impact children's lives. In particular, it is now widely acknowledged that typical peers can be highly tolerant as well as effective intervention agents in supporting children with disabilities who are learning more acceptable social behaviours.

**Classrooms and schools.** One of the most complex social systems in which children with challenging behaviour must function is that of the school. This context has been most carefully considered and investigated within the Positive Behaviour Support model (Turnbull, Edmonson et al., 2002). Inclusive schools represent one of the major practical sources whereby stigma associated with intellectual disabilities can be addressed. Thus teacher attitude and the climate of the classroom and the school become very important variables. Educational policies interact with social perception. For example, it is now standard practice to add extra educational supports for children with disabilities via the transdisciplinary team, instead of the older "pull out" procedures.

**The holistic model and the importance of culture.** It can be seen from the complexity of the systems that we have considered that the overriding trend in best practice models of intervention is to consider the child and his or her environment in a holistic fashion. It is no longer acceptable to simply focus on a single challenging behaviour, no matter how difficult it may be for the adult caregivers to cope with or manage that behaviour.

Holistic models have the added advantage for New Zealand of fitting nicely into the worldview of Māori, as well as some of the other cultural groups increasingly adding to the diversity of the New Zealand school population. Conceptual models of psychiatric (mental health) service delivery, such as that of Te Whare Tapa Whā (Durie, 1994), overlap closely with the analyses presented thus far. In Te Whare Tapa Whā, it is necessary to attend to the role of the whānau, physiological circumstances, psychological variables, and spiritual elements.

## **Supports and Policies**

Over and over in this conceptual blueprint we have used the concept of support as a unifying principle, and this, of course, is one of the fundamental benefits of the Positive Behaviour Support model. Such a model shifts the emphasis from directly modifying the challenging behaviour – as though it were an illness that can be eradicated – to seeing the challenging behaviour as a reflection of a mismatch between the characteristics and needs of the child and the characteristics and needs of the systems within which that child is expected to function. What is also compelling about the Positive Behaviour Support approach is the emphasis upon creating environments that are safe for all members of a community – rather than focussing on the safety of a particular person or persons. The *system* and the general rules of that system may need to be changed if the persons within the environment are to receive the support they need to also change in positive ways.

As such concepts become increasingly widely accepted, responsibility for managing challenging behaviour shifts onto these systems and away from a focus on one or two highly skilled individual clinicians who are expected to come in and change the child. As a result, policies at the management and governmental level need to evolve that facilitate systemic change rather than emphasising more and more individual expert talent. Of course, it is essential that New Zealand has the capacity to nurture individual professionals skilled in behavioural consultation. Thus far we have relied upon the work of rather small teams of "behaviour support" consultants, who often

have to travel around regions to analyse a situation and design solutions. Their work has not necessarily been backed by policies that place the onus on school system adaptation and accommodation, and this makes the work of individual consultants extremely difficult.

Another limitation in the capacity of New Zealand expertise is that there is a dearth of training programmes that combine the knowledge of individual behaviour change (ABA principles, for example), with knowledge of systems, both family and school. Recent developments of postgraduate qualifications in ABA (at Auckland and Waikato Universities) have not been required to include this breadth of focus, although they may do so, and clinical psychologists who are used to thinking systemically typically lack knowledge and training opportunities in working with children and families having severe developmental disabilities as opposed to mental health needs. If we add to these limitations the dearth of a sound body of New Zealand-based empirical literature, then we find ourselves having to import models and procedures, which, however excellent they may be, have not been developed or adapted for bicultural conditions in New Zealand.

There are always going to be conflicts between fundamental principles. One of the most important developments over the past 20 years or more has been empowering parents and providing them with more and more technical information, much of which can be obtained from the Internet. But this has created some confusion among families. A good example of this is discrete trial instruction, a useful component of any structured intervention. Parents, however, have tended to equate this with what is often referred to as the Lovaas Method, which they also sometimes confusingly refer to as “ABA”. Lovaas’s (1987) study of what he called “Early Intensive Behavioral Intervention” was very persuasive, with reports of 47% of the children actually recovering from autism. Other studies, for example, Smith, Groen, and Wynn (2000), have not reported such outcomes. A useful summary of the state of knowledge in the treatment of children with autism has been provided by Schreibman (2005).

***Implications for evaluation and for evidence-based practice.*** There are important lessons to be drawn from this general overview regarding the nature of evidence about challenging behaviour, how principles and practices should be evaluated, and how practice in New Zealand can become increasingly evidence-based. One of the important implications of the holistic approach is that there will not be a specific intervention or strategy that is demonstrated to be effective in the abstract, so that it can then be used with assurance by any reasonably skilled teacher or clinician. It is now passé to rely on the old idea that a particular type of intervention – say overcorrection, or time out – could be validated by a series of single case studies that show its effectiveness. Many different approaches can reduce a challenging behaviour, but that does not mean they are desirable, acceptable to society or the individual recipient, or even that they produce meaningful outcomes over the long term.

What these individual studies can best be used for is to build up a repository of ideas of approaches that might be tried with other children in other contexts. In mental health this is now referred to as translational research – translating findings from basic science into useful applications. In this sense the hundreds of interesting case studies that exist need to be made available to educators and clinicians, not as validated treatments but as possible ways in which sound principles might be translated into practice. When doing so the interventions must have “integrity”. Treatment integrity means implementing the proposed professional treatment in the



manner intended and in accordance with the basic principles on which it was designed.

An important benefit of the conventional ABA single-subject research tradition is that it articulates the value of monitoring, measuring, and evaluating the consequences of one's programmatic efforts. Careful data collection has been the hallmark of any behavioural approach and provides an excellent model for everyday educational practice, in which systematic observation and other forms of data collection should be providing the information that allows us to adjust and alter programmes to ensure their maximum effectiveness (Liberty & Miller, 2005).

***Policy and practice guidelines for Aotearoa New Zealand.*** Essentially these ideas coalesce to encourage a model of self-critical programme evaluation rather than other models derived from medical and drug research in which the gold standard of evidence is the randomised controlled experimental trial. That experimental model of applied science is not always pertinent to the needs of educators in New Zealand. There is a need for academic training programmes and for government agencies to pool resources such that international empirical literature is available to support policy and educational practices, but where adaptations and innovations that are home-grown are carefully and critically evaluated and disseminated to the field.

It can be assumed that new strategies which think of the person with challenging behaviour as first and foremost a child (or individual) with normal human needs will be important in establishing technically sound programmes that are delivered with humanity. Person-centred planning represents the ideals of this perspective. And as children grow up and become more independent we can also see that parents and close family members may not always be able to separate their own needs from those of the person with the disability. Strategies such as establishing a "circle of friends" means that ordinary people can establish expectations regarding interests and values that the person with challenging behaviour might have, including popular music, sexual exploration, experimenting with alcohol and similar components of the life journeys of typical young people.

A fundamental principle for understanding challenging behaviour is the functional analysis: determining the function that the challenging behaviour achieves for the individual. Understanding the purpose of the behaviour and developing a conceptual model or "case formulation" to explain what has maintained the behaviour in the past and what factors are currently controlling it, is a complex judgement task that requires considerable professional sophistication. In developing the case conceptualisation it is important for the expert clinician or educator to recognise the "social validity" of the assessment — will it ring true and be acknowledged by the people who have most to do with the young person, such as the family or whānau, school community, and peers? To emphasise the importance of equally recognising Māori priorities and values in such formulations, Evans and Paewai (1999) have described how the functional analysis can be interpreted within a bicultural framework.

## **Conclusions**

In the empirical literature there are still serious limitations on the ability of researchers to build systematic understanding of challenging behaviour in children with intellectual disabilities. Many of the contemporary studies are no more than further demonstration of a general principle that is already well recognised and accepted, or examples of previously developed techniques being applied to a new problem area

or new client group or context. Furthermore, the issue of how new research findings can best be translated into useful and practical procedures that can be used in classrooms, homes, and other settings by the typical teacher or caregiver, has still not been adequately addressed.

However, the general convergence of ideas and concepts does allow the formulation of well-validated and accepted principles that can and should guide educational policy and best-practice guidelines for professionals. By linking these to general issues of relevance to Aotearoa New Zealand, it is possible to formulate a useful set of evidence-based principles.

Sound assessment continues to be a core value for any professional intervention programme. Unless we understand the dynamics of the problem behaviour it is not possible to effect change. These dynamics include the inter-relationships within the individual child's repertoire, how it influences and is maintained by the external environment, and how these complex environments, or systems, further regulate the behaviour. Within this model it also becomes apparent that the meaning attached to the behaviour, how it is defined and represented by the stakeholders or the adults in the child's environment is also a critical consideration. Challenging behaviours are not always easily identified and agreed-upon entities. They are socially constructed and socially defined, and so systems need to change, not simply the target behaviour of the target child.

Once the behaviour itself is better understood, decisions can be made about how it might be modified. These decisions reflect complex values and additional considerations regarding autonomy, choice, social preference, and cultural perspective. The inclusion of all relevant individuals and groups in the judgement process will ensure a greater degree of uniformity and consistency in approach, in addition to protecting the individual civil and human rights of the child. Finally, interventions need to withstand tests of do-ability, utility and affordability: There is little point in designing highly specialised approaches that cannot survive in the absence of extraordinary resources or technical skill (Meyer & Evans, 2004; Meyer & Janney, 2004). We now have evidence of effective approaches to addressing individual children's needs that fit well into natural, safe schools that benefit other children as well. Generalised school practices can establish safe schools that prevent bullying at the same time that they provide a context for addressing the aggressive behaviour of a child with a disability: Such approaches are far more likely to be maintained than something delivered by an outside consultant who is not around for the longer term.

Of the many possible tactics for intervening, those that consider the behaviour in context seem logically to be more valuable than those that purport to objectify the behaviour and introduce artificial contingencies to control it. In fact there is consistent evidence that naturalistic interventions that look like the sorts of things any family would do and want for any child are most likely to be successful. In this context it is now recognised that simply teaching behaviour management principles to parents and teachers and expecting them to be able to implement them is a false hope. At the very least such intervention agents will need large amounts of support, coaching, mentoring, and monitoring if they are likely to be able to carry out suggestions with integrity.

Within these broad principles it is of fundamental importance that whatever empirical evidence exists is critically examined. Because some concept or principle seems valid, sounds like a good idea, makes sense, or is passionately believed, it does not necessarily follow that it will yield the critical outcome of improved behaviour in children and young people presenting the most severe challenges. Thus, it is

essential that the empirical literature that reports identified change be critically appraised and synthesised. The concepts we have described provide a context, but now it is necessary to examine actual effects. The only defensible strategy for doing so, that is accepted by the broad scientific community, is to summarise findings from intervention research using statistical tools such as meta-analysis. It is to such an analysis that we now turn.

## Section 3: Methodology for the Meta-Analytic Review

### Definitions and Key Terms

The next section describes the key terms used in our search to ensure that the relevant literature was sourced to identify effective interventions that were usable in typical and specialised school and community settings. In addition to these more specific terms, we adopted the following definition of challenging behaviour to provide a framework for the approach to be taken in the review:

*[Challenging behaviour is] culturally abnormal behaviour(s) of such an intensity, frequency, or duration that physical safety of the person or others is likely to be placed in serious jeopardy, or behaviour which is likely to seriously limit the use of, or result in the person being denied access to, ordinary community facilities (Emerson, 1995, p.4).*

This definition offers several critical aspects that differentiate challenging behaviours requiring intervention from those that may not be the appropriate focus of intervention. Firstly, behaviour must be regarded as culturally inappropriate within the context of the culture of the child and his/her family; it would not be appropriate to label behaviour as abnormal on the basis of cultural differences. Secondly, the behaviour represents a threat to the person with the behaviour and/or to others in the environment of that person, rather than being behaviour that is simply irritating or eccentric but has no serious consequences other than representing the range of human differences. Thirdly, a decision regarding the extent to which a particular behaviour does actually represent a threat to self or others will be influenced by context, access and participation in daily life activities and relationships. Bevan-Brown (personal communication, 2005) advocates that the definition should encompass *cultural safety* as well as physical safety; this would be particularly appropriate in a country such as Aotearoa New Zealand where features of cultural safety have been described and recognised in relationship to context and behaviour.

What is important about this definition is that not only do the actual features of the behaviour distinguish it as problematic, but also how that behaviour affects and is perceived by important people in the life of the person with disabilities. Whether or not a behaviour will be seen as challenging depends on the extent to which it varies from environmental expectations. Behaviour will be judged as challenging and in need of intervention because of a discrepancy between what is expected and what occurs, particularly when this discrepancy is so extreme that the child cannot be accommodated without serious disruption to the nature of ongoing activities and relationships valued in that environment and context.

### Sourcing Research Reports for the Review

We used multiple methods to locate studies meeting selection criteria in order to minimise bias in study selection. This project used several processes to locate relevant research since the Scotti, Evans, Meyer, and Walker (1991) review, hence covering the years 1988 to 2005. Our methods for the review were consistent with international standards for conducting more traditional literature reviews as well as specific recommendations for carrying out meta-analyses (Hunter & Schmidt, 2004; Lipsey & Wilson, 2001). These included: (a) review articles; (b) references located within studies; (c) the computerised bibliographic databases Educational Resources Information Clearinghouse (ERIC) and Psychological Literature (PsycLIT) databases;

and (d) making contact with relevant experts in this area for contemporary information. Approximately 20 researchers were contacted to request pre-print or additional literature and the names of new researchers who might not yet be known in the published literature but who were currently doing relevant work.

For the computerised database search, our search covered the years 1988-2005 and used the relevant descriptors listed in the PsychInfo Thesaurus, either singly or in combination:

1. **Symptom terms** – aggressive behaviour (including social behaviour, behaviour orders, conduct disorder), self-destructive behaviour (including self-injurious behaviour), stereotyped behaviour and self stimulation;
2. **Alternative behaviour and intervention terms** – behaviour modification (including treatment, classroom behaviour modification etc), cognitive behaviour therapy, cognitive therapy, intervention (including early, school-based and family), prosocial behaviour, social skills, social skills training, play therapy, childhood play development, social interaction, behaviour change, behaviour analysis, behavioural assessment, self-regulation;
3. **Disability labels** – behaviour disorders, mental disorders, mental retardation, developmental disabilities (including autism, Asperger's disorder, delayed development etc), pervasive developmental disorders, autistic spectrum disorders (ASD) (including Rett's disorder etc.), traumatic brain injury, brain damage, head injuries, learning disorders, learning disabilities, deaf-blind, childhood psychosis, delayed development, congenital disorders, cognitive impairment, autosomal disorders, chromosome disorders.

**The journal search.** These descriptors were used to search for relevant research published in 22 leading, refereed international journals from 1988-2005. The journals included in our review were:

- *American Journal on Mental Retardation* (formerly *American Journal of Mental Deficiency*)
- *Behavior Modification*
- *Behaviour Research & Therapy*
- *Behavior Therapy*
- *Behavioral Disorders*
- *Child & Family Behavior Therapy*
- *Disability & Rehabilitation* (formerly *International Disability Studies*; formerly *International Rehabilitation Medicine*)
- *Education & Training in Developmental Disabilities*
- *Exceptional Children*
- *International Journal of Disability, Development and Education* (formerly *Exceptional Child*)
- *Journal of Abnormal Child Psychology*
- *Journal of Applied Behavior Analysis*
- *Journal of Autism & Developmental Disorders*
- *Journal of Behavior Therapy & Experimental Psychiatry*
- *Journal of Consulting & Clinical Psychology*
- *Journal of Experimental Child Psychology*
- *Journal of Intellectual & Developmental Disability* (formerly *Australia and New Zealand Journal of Developmental Disabilities*; formerly *Australian Journal of Developmental Disabilities*)
- *Journal of Positive Behavior Interventions*
- *Journal of Special Education*

- *Mental Retardation*
- *Research & Practice for Persons with Severe Disabilities* (formerly *Journal of The Association for Persons with Severe Handicaps*)
- *Research in Developmental Disabilities*

Library experts searched the 22 journals electronically using the key descriptors, yielding a potential database search of 1,086 journal articles, for which the full citation and abstract were printed. This information for each of the articles was reviewed by the Research Assistant (Diana Boer) against the project criteria: (a) focus target population diagnosis; (b) target population age (up to age 20); (c) intervention directly relevant to challenging behaviour; (d) review or theory paper directly relevant to challenging behaviour; and (e) quality assured publication. Where there were questions regarding the inclusion of a particular article, the research assistant marked the article: all articles so-marked were checked further by Meyer who made the final decision whether to source the items in question. In some instances, a publication was not directly relevant but was included because a theoretically interesting issue or approach was addressed that could potentially add value to the review.

This process reduced the original number of 1,086 to 680 articles of relevance to our review to be requested from either the VUW or another New Zealand library holding the journal and issues needed. With the addition of articles sent by authors electronically in advance of publication, the dataset comprised a total of nearly 700 articles to be sourced and entered into the EndNote database.

**Sorting articles for review components.** Following sourcing the articles, Meyer reviewed all file copies of the complete articles to select those that were potentially appropriate for the meta-analysis review, those that might not suit the meta-analysis but could be included in the broader literature review, and those that were not applicable. Our final database was as follows:

- 199 articles potentially appropriate for the meta-analysis review. To be included in this component, an intervention study applicable to challenging behaviour and not solely reliant on medication had to include graphed data points for at least baseline and intervention phases. Further, studies were included in the meta-analysis only if they involved individuals 20 years or younger, diagnosed with a developmental disability or disability included in the review (see above list of categories)
- 145 additional articles appropriate for the broader literature review in addition to those included in the meta-analysis. These included intervention studies reporting only anecdotal data or outcome measures after intervention and also included relevant existing published review articles, meta-analyses, and theoretical discussions.
- 291 articles were judged not applicable to our review (see criteria noted above). For example, articles were excluded if they focussed exclusively on a non-relevant population (e.g., over age 21, or children with emotional disturbance who were performing academically at age level), or on the effects of medication as a sole treatment.
- 13 of the articles requested were not received in time to be considered for the review
- 45 of the articles identified in the search were not available from a New Zealand library (due to missing issues, etc.)

Several processes were needed to analyse the 344 articles in the first two categories above. Firstly, all articles screened for potential inclusion in the meta-analysis were scrutinised by Shane Harvey (who conducted the statistical analysis) to ensure that the published data were appropriate for the statistical programme. Of the 199 studies available for the analysis, 44 were excluded because their data were not suitable for

the calculation of effect sizes. An additional 13 articles were excluded because they contained less than the minimum number of three data points across both baseline and treatment phases needed for at least one of the meta-analyses. This reduced the sample suitable for meta-analysis to 142 articles reporting studies with 316 individuals (299 single case studies and one group study including 17 participants for intervention). While the larger sample of articles containing 300 independent datasets was able to be included in the meta-analysis involving three to four data points, 30 of these articles were excluded from the meta-analysis requiring five data points (five+) because they lacked sufficient observations across baseline and intervention for that sample. One additional study was excluded from the five+ database for the Allison-MT algorithms as the data were unsuitable. These processes resulted in a total of 111 articles and 219 independent datasets comprising the sample for the final five+ meta-analysis. The final meta-analysis sample of 142 articles is included as Appendix B to this Report.

Articles that were judged to lack the necessary specificity of data for inclusion in the meta-analysis were dropped into the broader review category. A total of 189 additional articles were relegated for inclusion in the broader literature review. All articles, including those in the meta-analysis, were read in full by at least one of the co-Directors (Meyer and/or Evans). A complete listing of these articles is available from the authors on request.

**Sourcing key relevant monographs and reports.** In addition to our journal search, the broader literature search identified key relevant recent books, monographs and unpublished (but quality assured) government reports. We included only those with a focus on intervention models designed for home, school and community environments. Those most relevant to our review are cited at relevant points in the report and, accordingly, in the list of references.

## **Procedures for the Meta-analysis**

**Unit of analysis.** Virtually all of the articles reporting interventions with challenging behaviour for children and youth in the populations of interest presented the results of a single subject evaluation design involving one or more subjects. In meta-analyses of effectiveness with different groups, the group will be the prime unit of analysis. In our analysis of a large sample of single-subject designs, each individual who underwent treatment became the primary element of analysis, with no more than one effect size being computed from any one individual per study. This represents a departure from the approach used in our earlier report (Scotti, Evans, Meyer, & Walker, 1991), where a study formed the basic unit of analysis irrespective of the number of participants. In contrast, for this analysis we used the individual as the basic unit of analysis.

We chose to use the individual as the unit of analysis because of two problems we encountered. Firstly, many studies involved several individuals, only some of whom met the inclusion criteria. Instead of excluding an entire study if a proportion of participants did not meet criteria, we were able to use those participants who did meet criteria. Secondly, some articles had different treatment conditions for different behaviours in different contexts with different individuals, all within the same study<sup>2</sup>.

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<sup>2</sup> Alberto, Heflin, & Andrews, (2002); Dixon, Helsel, Rojahn, & Cipollone, (1989); Dunlap, Kern-Dunlap, Clarke, & Robbins, (1991); Johnson, Hunt, & Siebert, (1994); Kern, Carberry, & Haidara, (1997); Koegel, & Koegel, (1990); Roane, Kelly, & Fisher, (2003); Kuhn, Lerman, & Vorndran, (2003); Mancina, Tankersley, Kamps, Kravits, & Parrett, (2000); Rapp, Vollmer, St Peter, Dozier, & Cotnoir, (2004); Vollmer, Marcus, & LeBlanc, (1994); Vollmer, Progar, Lalli, Van Camp, Sierp, Wright, et al. (1998).



For individuals who were subjected to conditions not hypothesised to be moderators, a mean of all appropriate effect sizes was computed. In studies where multiple moderator variables were hypothesised to apply across different studies involving the same individual, several effect sizes were entered into the analysis, with each representative moderator calculated as an independent statistic. By basing the analysis on individual rather than study, we minimised the impact these two problems would have. For individuals who were subjected to conditions not hypothesised to be moderators, a mean of all appropriate effect sizes was computed. In studies where multiple moderator variables were hypothesised to apply across different studies involving the same individual, several effect sizes were entered into the analysis, with each representative moderator calculated as an independent statistic.

**Meta-analysis coding procedures.** Codes for the meta-analysis were developed by the research team (Meyer, Evans, Harvey, and Boer) in a series of meetings informed by codes used in previous meta-analyses (Scotti et al., 1991) and trial coding of randomly selected articles. A large number of demographic, setting, and treatment variables are potentially interesting and reported, to varying extents, in the published literature. Nevertheless, the purpose of coding variables should relate to whether or not they have utility for the analysis and are likely to be of interest to intervention agents. Hence, we identified selected variables for coding that are reported in Appendix A, the Coding Form for Challenging Behaviour.

For each article, the Research Assistant entered the specific information for each variable into an Excel database, which was reviewed by the Director. Variables were arranged according to recommendations made by Lipsey and Wilson (2001); consequently, characteristics and variables were categorised into discrete sub-groups for comparison. We also added codes according to the current status of the literature. Studies were coded and grouped into the following categories to be entered into the Excel database: (1) participant/s; (2) setting and context; (3) treatment or intervention; (4) practicality of the intervention; and (5) outcomes. These groupings formed the basis for descriptive analysis, effect size computations, and moderator analyses.

Studies were then coded and arranged according to the following sub-codes:

1. Participants: age, gender, ethnicity, primary and secondary diagnosis, target behaviour, behaviour severity, intellectual level<sup>3</sup>, sensory and motor impairments, communication level, and whether previous interventions were reported;
2. Setting and Context: locality where the intervention took place, both primary and, if included, secondary setting (residential/home, school, community, treatment room, hospital), mainstreaming (or inclusion), intervention agent (staff/teacher, professional, parent, sibling, peers, not reported), family involvement, and peer involvement;
3. Treatment or Intervention: designation by author, treatment strategy (category and combination described below), the level of Intervention intrusiveness (based on Scotti et al., 1991, see below), experimental design (group or single-subject), performance of a functional

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<sup>3</sup> Intellectual level was omitted from the analysis owing to insufficient reporting of this variable.

- analysis prior to the treatment, involvement of medication, and use of restraints;
4. Practicality: cost, duration, do-ability, and positive behaviour support;
  5. Outcome: quantitative outcome measures (PZD, PND, SMD,  $d$ ,  $R^2$ ; which are metrics in meta-analysis) plus collateral change (positive and negative) and follow-up data.

Most variables are self-explanatory. However, certain variable codes were adapted from previous work or were derived for this study as described below. Note also that the quantitative outcome data — the measures of frequency and intensity of target challenging behaviours as a function of the intervention — are the key dependent variables for the meta-analysis, whereas the other codes comprise intended and unintended independent variables. Collateral change and follow-up evidence provide additional dependent variable information useful for evaluating treatment effectiveness. Of course, not all studies report these data, although we would argue that this information is crucial to judgements about effectiveness. Recommendations for best practice in intervention research specify the inclusion of such information (Chambless et al., 1995, 1996), yet our review revealed once again that intervention researchers and refereed journals in the field still do not systematically reflect this growing imperative (Horner, Carr, Strain, Todd, & Reed, 2002; Scotti, Ujcich, Weigle, Holland, & Kirk, 1996).

#### Level of Behaviour Severity

A hierarchical classification system of behaviour severity was adapted from Scotti et al. (1991; see also Evans & Meyer, 1985). This system is supported theoretically by the literature in this area and rates three levels, ranging from least to most severe which are based on the impact of behaviour for quality of life and intrusiveness:

- Level 1 – excess behaviour reflects deviance in terms of impeding community acceptance or interfering with other behaviours, but remaining unchanged over time;
- Level 2 – serious behaviour is interfering with learning, is likely to become severe if untreated and/or greatly concerns caregivers;
- Level 3 – critical behaviour that is health-threatening, dangerous or even life-threatening to self or to other individuals.

#### Treatment Strategy Coding

Treatment strategies were coded on two dimensions: the type of intervention components and whether or not the intervention represented combinations of types. Type of intervention codes were based, again, on previous reviews of the literature to allow for comparison of results across studies, with four categories recorded:

- antecedents/stimulus-based
- teaching skills, replacement
- consequence based: reward, punishment, extinction
- systems change (see Horner et al. 2002).

To allow for analysis of the effects of multiple treatment principles including systems change and aversive procedures, we coded four combination possibilities:

- single level addressed (no combination)

- aversives included
- 2 or more levels addressed but not systems change
- 2 or more levels addressed including systems change.

### Intervention Intrusiveness

For the meta-analysis review component, six categories representing the intrusiveness of interventions were adapted from previous work (Evans & Meyer, 1985; Scotti et al., 1991; Stephenson, Demsey, & Scotti, 1983). The six levels are (ranging from least to most intrusive):

1. Ecological changes such as sensory integration, altering task difficulty, reinforcement, teaching a skill, modelling, and redirection
2. Extinction procedures, interruption, basic restitution, social disapproval, time-out within vicinity of caregiver, removal of objects (e.g., toys), and relaxation
3. Overcorrection, contingent exercise, timeout involving removal from room
4. Visual screening, mandatory relaxation, timeout in restraining room
5. Restraint, application of noxious stimuli, medication, and
6. Slapping, pinching, electric shock, exposure to cold and a range of noxious stimuli (in various modalities such as visual, auditory, tactile, olfactory, taste).

The remaining codes (design, functional analysis, medication information, and the specifics of variables relating to practicality and outcome) are self-explanatory.

### **Data Analysis Procedures for the Meta-Analysis**

Before reporting the current meta-analysis, it is necessary to explain certain issues regarding single-case research designs and the logic of meta-analysis. Meta-analysis requires the estimation of the magnitude of a treatment effect in units that can be standardised across a range of different studies and outcome measures. This unit is called “effect size” and it involves a comparison of the outcomes for the treatment group compared to the outcomes for the no-treatment (placebo or other comparison) group, represented as a ratio of the overall standard deviation yielded by both groups. An immediate complication for single-case designs is that the no-treatment data are not derived from a control group but from a control period or baseline observation (“conditions as usual”) prior to the treatment beginning. Variability in the treatment period outcome is determined by the collection of outcome data over another period of time.

**Variability of behaviour.** In the ideal single subject experiment, the control condition (no treatment) is continued until the variable of interest (say, the frequency of a challenging behaviour) has reached a “steady state”—in other words showing little variability over time. In real life clinical settings, however, such conditions are rarely achieved, and the client’s behaviour is likely to show considerable variability over observation occasions. If such variability is simply random fluctuation, then it presents no serious statistical problem, as the mean level of the behaviour adequately represents the baseline condition against which improvement (usually a decrease in the behaviour) may be judged. However, the variability could represent a meaningful trend, such as a steady increase in frequency indicating that the client’s behaviour is deteriorating. If one were to ignore the trend over time and simply calculate mean frequencies of behaviour, what could appear to be a slight increase overall could be masking the more serious problem of a steady, increasingly negative trend.

**The effects of auto-correlation.** Another complication with data gathered sequentially over time — a *time series* — is the likelihood of auto-correlation, which is the correlation between adjacent points in a time series: the closer the points in time, the more highly they will correlate. Following the meta-analytic procedure of treating data points within a single case as comparable to single data points across a group of cases, it would be assumed that each data point, like each participant's data point, would be independent of the others. In time series, however, this assumption cannot be supported. The essential reason for this is owing to ceiling and floor effects that are found in behavioural measurement. If a behaviour is of high frequency on one occasion but is declining, the frequency observation on the next occasion will reflect the fact that the behaviour had been at high frequency and thus will continue to be so for a while. In other words the level of behaviour at Time 1 will predict the level of behaviour at Time 2, even if the behaviour is truly changing over time. After much discussion of this issue in the behavioural assessment literature 20 years ago it was concluded that auto-correlation, which is typically revealed in time series, is not a statistical artefact but simply represents the reality that the behaviour at each point of observation will be influenced by the frequency of the behaviour at preceding points. The frequency of a particular behaviour is not free to be minimally low or maximally high each time it is observed; its frequency will be a function of the relatively slow change that occurs in behaviour over time.

**Measuring the meaningfulness of change.** A third consideration in meta-analysis with single-case designs is one that is also true with group designs, but less frequently recognised in group studies. Any meta-analysis, or any estimate of the size of an effect, reports the magnitude of change, but not its meaningfulness. Meaningfulness comes entirely from the researcher selecting an appropriate dependent variable as the outcome variable for the study. For example, a study designed to evaluate the effectiveness of a given intervention for modifying depression requires a reliable and valid measure of depression, such that improvement on that measure would be synonymous with no longer being depressed. However, the researcher might in fact be relying on some very indirect measure of depression, such as an instrument where the client self-rates in answering questions that have been related to being depressed. Scores on the measure do not indicate an individual's true position on the dimension being measured (Blanton & Jaccard, 2006). In addition to such a measure being arbitrary and indirect, it may also miss other important outcomes, such as improved quality of life, greater levels of satisfaction, or improved work/school performance.

The measure used in behavioural single-subject research is almost always more direct than those used in treatment studies comparing groups. The undesirable behaviour itself is generally the dependent variable that is measured. Thus treatment studies in this tradition do not rely on inferences regarding clinical improvement. However, as with group designs, single-case studies typically do not report on other possible benefits or negative side effects of treatment. In our earlier meta-analysis, for example, we criticised the treatment literature for failing to report possible collateral benefits of treatment, such as improvements in quality of life, movement of the client to a less restrictive home environment, increase in social interactions, and other important outcomes that were assumed to follow reduction in challenging behaviour (Scotti et al., 1991). The danger, of course, is that a treatment could be reported to be highly effective in reducing a challenging behaviour, but not really be *beneficial* to the individual if no improvements to the client's life situation occurred. The treatment may have even reduced the client's ability to express needs or desires.

**Calculating effects of an intervention.** Because behavioural measurement is less inferential than the indirect outcome measures relying on rating scales, self-report, and psychometric questionnaires, it is also possible to evaluate change based on absolute standards or criteria. Improvement can be demonstrated in different ways. For example, improvement could be demonstrated by showing that a problem behaviour that had been escalating was now reversed (an upward trend in frequency now becoming a downward trend). Alternatively, a high frequency problem could have become less frequent, or a rare but very serious behaviour could now have disappeared entirely from a client's repertoire. Each of these types of outcome can be represented by different ways of calculating single-case effect size. Thus, demonstrating a change in direction would require estimate of trend (or slope in the behavioural baseline), whereas demonstrating the elimination of a behaviour would require estimate of what percentage of the treatment baseline was at a zero level of occurrence.

While one can debate these issues from a statistical perspective, from a clinical point of view the different effect size statistics may simply demonstrate that there is no "best" measure of effect size in single-case meta-analysis — it depends on the behaviour. Different statistics for calculating effect size reflect different aspects of effect, that is, the success of the treatment outcome. One would have to return to the concept of the *meaningfulness* of behaviour change — which is not a statistical issue — to determine which effect size statistics reveal the most relevant information about the behaviour. For example, if a child's self-injurious behaviour is longstanding, we know that complete elimination of that behaviour is unlikely in the short term so that the more realistic statistic to use might be an algorithm that shows a decreasing trend or one that shows a reliable decrease in the behaviour to an overall lower level than prior to treatment. In this meta-analysis, we calculated the five most appropriate effect size algorithms as reported to date in the literature.

Effect size is typically derived from computations examining the difference between control and treatment groups. Normally these comparative groups are independent of each other and contain sample sizes of two or more. This is necessary for the calculation of standard deviations of relevant outcomes across participants. However, all but one of the studies reviewed for this analysis were of single-subject design, which graphically depict an individual's target behaviour response rate variability for baseline (before treatment) versus intervention and possibly follow-up phases of time for a particular challenging behaviour. In single-subject designs, the baseline phase as a (pre) *non-treatment phase* is conceptually parallel to the control group or *non-treatment group* in nomothetic or group design studies. However, single-subject research analyses rarely utilise statistical techniques to compare rates across the baseline and treatment phases, though some studies will summarise selected descriptive statistics such as average rates of the target behaviour across treatment phases. Conventional mean comparisons within one single-subject report are unable to be used with the relatively small number of data points reported. Interpretation of the effectiveness of single-subject designs is instead based on clinical judgement regarding patterns across time, as evidenced in the graphed data points for occurrence of the target behaviour.

Meta-analysis, however, allows the opportunity to analyse the larger sample of units of analysis across different single-subject studies in order to utilise comparative statistical procedures and tests of significance (that is, the likelihood that behaviour change is not simply a *chance variation*). Various alternative statistical approaches have been proposed for measuring the degree of change, effect size, across single case studies. Generally, these different statistical algorithms measure different aspects of treatment outcome, and there is debate as to which statistical approach

best captures the magnitude of change. Various authors have compared and contrasted different effect size computations, and some have carried out meta-analyses with more than one metric (e.g., Campbell, 2004; Olive & Smith, 2005; Parker & Brossart, 2003; Parker et al., 2005; Scotti et al., 1991).

Clearly, use of only one particular meta-analytic technique to explain outcome would affect our findings and limit the interpretation of our results accordingly. Consequently, we used a combination of approaches to represent effect size differences. In addition to the effect size statistic, we included standard deviation, confidence intervals, and number of participants. The next section summarises the five effect size statistics we calculated and what each statistic is designed to measure. More detail regarding the strengths and limitations of each of these metrics and in comparison to one another is provided in Harvey, Boer, Meyer, and Evans (2006).

### ***The effect size algorithms used in the meta-analysis***

#### Percentage of Non-overlapping Data (PND)

PND was designed by Scruggs, Mastropieri, and Casto (1987) to provide a measure of the percentage of improved behaviours in comparison to baseline behaviour. It is calculated by identifying the lowest baseline data point (the “best” behaviour prior to intervention) and then counting the number of intervention points below that figure (that is, better than the best behaviour during baseline). Dividing that total by the total number of intervention data points derives the percentage. (Note that for positive behaviours where high rates are desired, the procedure is reversed). The logic of this statistic is that an effective intervention should be able to produce an outcome that exceeds the best of the before-treatment condition. PND is sensitive to changes in level (but not slope), strongly correlates with qualitative “expert” ratings of improvement, and is widely used in meta-analysis (Scruggs & Mastropieri, 1994).

#### Percent Zero Data (PZD)

Percent Zero Data (PZD) was designed by Scotti et al. (1991) to measure the effectiveness of an intervention in maintaining a reduction of challenging behaviour to zero. PZD is an absolute statistic determined by outcome data, independent of baseline. The PZD statistic is derived by calculating the percentage of data points falling at zero in the intervention phase, starting from the first zero point. The logic of this statistic is that it measures the elimination of the challenging behaviour, presumed to be the goal of a successful intervention. PZD is only usable with ratio scale data, is not an indication of magnitude, and could be seen as overly stringent (Allison & Gorman, 1993).

#### Standard Mean Difference (SMD)

The Standard Mean Difference (SMD) was proposed by Busk and Serlin (1992) to calculate effect sizes. SMD is based on Cohen’s  $d$  statistic where the mean difference between treatment and baseline (or control group with Cohen’s  $d$ ) is divided by the standard deviation of baseline. This metric relies on the more traditional statistical assumption that the variability in the baseline (high variability produces a large standard deviation) should mediate the interpretation of a mean difference between baseline and treatment. Single-subject research designs may assume that a “steady state” is reached during baseline before an intervention is attempted. However, where a challenging behaviour is serious, variable and even increasing, one could wait indefinitely for a stable pattern and in the meantime the client is at considerable risk. The logic of SMD is that it can reveal whether there are true differences during intervention in comparison to variable behaviour during

baseline. Its advantage is ease of calculation and a resultant effect size ( $d$ ) that is commonly understood. SMD will be sensitive to the level of occurrence of behaviour, but can fail to account for trend. Identical means for both baseline and intervention could mask the fact that negative behaviour was increasing during baseline but decreasing during intervention — a positive result. Autocorrelation can also complicate interpretation (Gorsuch, 1983; Parker et al., 2005). We used SMD to complement the other statistics, consistent with Olive and Smith's (2005) recommendations.

#### Allison-Mean (Allison-M) & Allison-Mean plus Trend (Allison-MT)

Allison-MT evaluates mean and trend differences between phases after controlling for baseline data (Allison & Gorman, 1993). These statistics are designed to reveal whether a behaviour that had been getting worse during baseline is getting better as a function of intervention, thus is designed to detect linear trends. Use of such regression-based formulae can be complicated by unrealistic requirements for the amount of control data needed; for certain harmful problem behaviours, it is unlikely that more than a few baseline data points can be recorded prior to intervention (Huitema, 1985, noted that the median number of baseline data points in applied behaviour analysis reports was only five). Various other criticisms of these statistics would affect a meta-analysis reliant only on Allison-MT and Allison-M, but as a measure of reverse linear trends it adds value to the information gleaned from the other statistics we report. However, we calculated Allison-MT only for studies containing five data points or more in both baseline and treatment phases. This selected level was felt to be the best balance between the need to include a representative proportion of studies, and the requirement to calculate reliable and accurate effect sizes.

**Interpretation of effect sizes.** Table 1 displays the interpretation of effect sizes according to each type of algorithm used. Similar to Scruggs, Mastropieri, Cook, and Escobar (1986) and Scotti et al. (1991), we used the exclusion criterion of PND < 50% to detect "ineffective" results for PND. Additionally, PND was interpreted as "questionable" when PND ranged from 50% to 80%; "fair" for scores greater than 80% and less than 99%; and "highly effective" with scores higher than 99%. Additionally, we used a quartile split of the PZD described by Scotti et al. (1991) to interpret PZD results. In the present study, "ineffective" was defined as PZD < 12%; "questionable" as 12% to 42.9%; "fair" as 43% to 69.9%; and "highly effective" as PZD > 70% (see Table 1).

**Table 1. Interpretation of effect sizes**

Statistic	Ineffective Range	Questionable Range	Fair Range	Highly Effective Range
PND	<50%	50%-80%	80%-99%	> 99%
Quartile split (25%)				
PZD	<12%	12%-42.9%	43%-69.9%	> 70%
SMD	<.29	.30-.49	.50-.79	> .80
Allison-MT	<.03	.04-.18	.19-.46	> .47
Allison-M	<.05	.06-.26	.27-.55	> .56

The Allison-M and Allison-MT statistics are sometimes interpreted in a manner comparable to Cohen's correlation effect sizes. In brief, Cohen (1988) proposed that a correlation effect size is considered small if  $R^2$  is less than or equal to .01, medium when  $R^2$  equals .09, and large when  $R^2$  is greater than or equal to .25. SMD can be interpreted in a similar way, as SMD has also been transformed using the same algorithm. However, this needs to be interpreted with caution as Cohen (1988) felt that old effect-size guidelines might not be suitable for new analytic methods, much less used to interpret the magnitude of single-subject outcomes. Moreover, we found effect size percentage did not represent the distribution of outcome evenly. For instance, 81% and 76.5% of SMD data for three and five data points or more respectively could be considered a large effect size using this standard. Therefore, PZD, SMD, Allison-MT, and Allison-M were categorised according to a quartile split. Using this method, Allison-MT was interpreted as ineffective when the effect size was 0.03 or less; questionable between the values of 0.04 to 0.18; fair at 0.19 to 0.46; and highly effective when greater than 0.47. Likewise, Allison-M was understood to be ineffective when effect size was less than 0.05; questionable from 0.06 to 0.26; fair in the 0.27 to 0.55 range; and highly effective when greater than 0.56. Finally, a SMD score less than 0.29 was considered an ineffectual outcome; questionable between the scores of 0.30 to 0.49; fair between the effect sizes of 0.50 to 0.79; and highly effective when greater than 0.80.

Because each algorithm calculates effect size differently, they are arguably weighting different aspects of observed change. As we discussed above, the following is a summary of what each algorithm measures:

- PND measures change from baseline following treatment, without indicating the absolute magnitude of change
- PZD is more revealing of the degree to which undesirable behaviour is eliminated and remains eliminated
- SMD provides an overall estimate of change somewhat corrected for chance (the naturally occurring variability of behaviour during baseline), and
- Allison-MT and Allison-M detect linear trends in outcome.

These effect size statistics report differences in outcomes, hence calculation of all five allows further examination for different behaviours for which any one statistic might limit clinically useful interpretations of treatment impact.



**Moderator analysis.** Hunter and Schmidt (2001) warn against using tests of homogeneity when calculating mean effect sizes. They argue that when sample sizes are small, then a real moderator needs to be extremely large to be detected by this test. The opposite is true for analyses with large sample sizes. Since the number of studies in this present analysis is large, any divergence from homogeneity would signal the occurrence of a moderator variable when there may in fact be none. Thus, Hunter and Schmidt recommend that moderator variables be predicted a priori based on theory. Following this logic, we predicted moderator variables in advance and compared moderator mean values and confidence intervals across subsets. A moderator was assumed when a reduction in variance within the subsets occurred, where there were noted differences in effect sizes, and where the proportion of overlap between confidence intervals was approximately .5 or less (no more than about half the average margin of error) (Cumming & Finch, 2005; Hunter & Schmidt, 2004).

## Section 4: Results of the Meta-Analysis

We first summarise overall findings from our meta-analysis regarding the effectiveness of individualised interventions as reported in the empirical literature. Full details including tables and graphic illustrations for all analyses are available in a separate meta-analysis report (Harvey, Boer, Meyer, & Evans, 2006). We describe major patterns of our results and some selected reporting of data as necessary to support the description of those results. This section reports descriptive information regarding the characteristics of our study sample for the meta-analysis, including demographic child, setting and intervention agent characteristics. We then describe our results with respect to a number of moderator variables that could be expected to have an impact on outcomes. Next, we summarise the major findings for effectiveness with respect to both the focus of the intervention — the target challenging behaviours — and the nature of the intervention approach. Finally, we report the results of regression analyses to examine whether selected variables — age range and child diagnosis — were related to any particular pattern to outcome as indicated by effect size comparisons.

### Characteristics of the Study Sample

***Demographic variables and treatment context.***<sup>4</sup> The average age of participants in the research was 9.74 years, and 68% were male. No previous intervention was reported for a majority of participants (85%). Approximately 44% of individuals were diagnosed with Mental Retardation, 33% Autistic Disorder, and 17% with multiple disabilities. The types of behaviours treated appeared to be evenly distributed. The largest group included self-injurious (33%), followed by destructive (18%), stereotypic (16%), and aggression (12%). Disruptive and inappropriate social behaviour accounted for 10% and 11% respectively of individuals. Most of these behaviours were considered Level Two in severity (71%), with around 14% and 15% at the severity levels of One and Three respectively. Many studies failed to report significant attributes. Approximately 90% of studies left out information on ethnicity of participants, 84% failed to report sensory ability of the clients, 67% failed to report on motor ability, and 81% omitted any mention of secondary diagnosis.

Study characteristics were divided into setting/context of treatment and treatment approach. The majority of interventions were delivered in mainstream settings (71%). About one third of participants were either treated in a hospital or school setting. Of the remaining sample, 17% were treated in a residential setting, 8% in a treatment or therapy room, and 3% in the community. Although the smallest numbers of clients were treated in a community setting, this context made up the largest secondary setting where there was reference to multiple treatment environments (72%). This was followed by 24% in residential settings and 4% in schools. When the two contexts were included together, schools accounted approximately for 34% of interventions, hospitals 30%, residential 20%, community 8%, and therapy room 7%. Interventions were mostly delivered by professionals (64%), followed by staff within a treatment agency (23%), or parents (11%). One third of interventions involved peers and 19% included families.

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<sup>4</sup> The demographic statistics presented in this section are for the literature sample for which at least three data points were available for inclusion in the meta-analysis.

With regards to treatment approaches, 85% of studies were conducted within the existing allocated resources of the service provider; 14% of researchers supplemented the cost of treatment and only 1% contributed considerably. The majority of participants were either not medicated or medication was not reported (91%), and most studies did not rely on restraints (98%) or aversives (99%). Instead, 48% of treatments included antecedents, 31% skills replacement, 75% consequences, and 14% system change. The majority of studies reported using functional analysis (74%). Most treatments employed relatively simple AB reversal type designs (76%), with the remaining 12% evenly split in their use of ABC or ABCD+ designs. Two reversals were used by 43% of trials, 31% used three to four reversals, and 20% used more than four. The duration of treatment mostly went unreported (75%). Of the 25% of trials recording length of treatment, there was a relatively even distribution between the groups of 1-3, 3-5, 6-11, 12-20, and 20+ weeks duration. Finally, the majority of treatments were considered to be low in intrusiveness. Those judged to be intrusive at Levels 1 and 2 accounted for 91% of all interventions.

It is concerning that so many studies failed to report ethnicity, sensory ability, motor ability, secondary diagnosis, and duration of treatment. In addition, the disproportionate samples made it difficult to conduct accurate comparisons. The reason for missing information is unknown, but prevents the drawing of clear conclusions. Whether this exclusion of information resulted in the lack of differences we detected with participant characteristics is unknown. However, given the documented relationship between treatment duration and outcomes, careful inclusion of information such as this should be a necessary requirement for publication.

***Use of recommended best practices in treatment.*** In spite of the shift toward delivering services in a sensitive and inclusive manner, an apparent inconsistency with currently recommended best practices is still characteristic of published treatment research. On a positive note, the majority of treatments were delivered outside of the treatment room and within the wider community. Yet no interventions were reported evaluating systems change as the sole approach, and only 14% of all reports included attention to the broader issues of systems change alongside a focus on treating particular problem behaviours. Instead, researchers continued to opt predominantly for consequences and antecedents. Only a third of individuals treated were taught skills to replace challenging behaviour, despite theoretical consensus that negative behaviours have functional purposes such that the child would appear to need an alternative positive strategy to achieve those purposes in the long term. Finally, although treatments were largely delivered in natural referral environments, only professionals within the child's immediate environment were likely to be involved. Family members, parents, ongoing care staff, or peers typically did not carry out the intervention delivered in the published literature.

In contrast to the findings of Scotti et al. (1991), it is encouraging that most studies now make use of functional analysis. They also reported implementing changes within existing community budgets. Moreover, most of those interventions did not rely on restraints or aversive programmes that were highly intrusive. Prior to the period covered by our meta-analysis, the majority of the literature favouring positive interventions was theoretical and values-driven; there was some evidence of effective contextually based, positive approaches with severe behaviour, but this evidence was minimal in comparison to the literature using isolated and aversive treatments. It would appear that the risk taken by behavioural scientists in doing research on and implementing more contextually based and socially responsible interventions has proved fruitful. Had the professional research community not taken up this challenge, we might not have the strong empirical support we now have for

positive alternatives that can be shown to be effective as well as affirming of humane treatment of people with disabilities.

## **Overall Treatment Effects**

Using the quartile split to classify statistical outcomes as ineffective, questionable, fair, or highly effective, we found that the degree of change as a result of treatment ranged from questionable to fair. In general, outcomes were most likely to be classified as fair according to SMD, PZD, and Allison-MT, and questionable by PND and Allison-M standards. These findings indicate that behavioural treatments do produce beneficial if modest outcomes, even when spontaneous change and maintenance of zero rates of behaviour are accounted for. Interestingly, no improvements met the effect size levels required for categorisation as highly effective. More specific information regarding our findings for different variables is detailed below.

## **Moderator Analyses Results**

Treatment delivery involved a wide range of participant and study conditions. Thus, we sought to investigate the conditions under which therapy was most effective — we refer to these as *moderator variables* in showing some systematic relationship with treatment outcomes over and above general patterns regarding the different approaches.

***Child characteristics as moderator variables.*** Based on the current data, demographic characteristics such as age, gender, or ethnicity were unlikely to be moderators of outcome. This conclusion, however, is complicated by the lack of reporting on these variables. It is also important to clarify that our review encompasses English-medium publications only. This linguistic limitation also means that the review primarily reflects research carried out in countries that would be characterised as “western” in orientation, including the United States, Australia, Britain, Israel, and various European heritage nations.

Level of impairment was associated with differing levels of treatment effectiveness. An inverse relationship existed between the severity of sensory impairment and treatment effectiveness. The more severe the impairment, the less behaviour change was evident. However, this pattern was not consistent with the PZD statistic, where severity of impairment was related to higher maintenance of eliminated behaviour. This would imply that severity of sensory difficulties is related to better maintenance of eliminated behaviour. These results suggest that the degree of sensory impairment moderates outcomes. Summarised another way, behaviour change is more difficult for those with sensory impairment — whether the contingencies are manipulated by professionals or are spontaneous and/or non-contingent.

No relationship was observed for motor impairment. The impact of communication ability on treatment outcome was difficult to determine owing to mixed results. Three statistics found age-appropriate communication was associated with comparatively worse outcomes, but two statistics identified better outcomes. Evidence suggests this result could be either an example of differences in outcomes that these various statistics reflect or simply a reflection of random differences in measurement. To illustrate, similar to sensory difficulties, the overall level of change statistic (SMD) indicated better communication was significantly related to better outcomes, but less ability related to better maintenance of zero behaviour (PZD). However, different patterns of outcome with both Allison algorithms (which are based on similar

assumptions) were found, lending support to the idea that once natural change was accounted for, outcomes were inconclusive.

***Characteristics of the challenging behaviour as moderator variables.***

Behavioural characteristics included behaviour severity, target behaviour, and primary and secondary diagnosis. The severity of targeted behaviour corresponded inversely to treatment effectiveness. Treatment was more effective when behaviour was less severe. Again, the PZD statistic indicated once severe behaviour was eliminated; the likelihood of it staying this way was higher. It is not surprising that the severity of behaviour corresponded to history of prior treatment. Similarly, there was evidence to suggest intervention intrusiveness was also related to behaviour severity. The direction and shape of this relationship may require elaboration. Severe challenging behaviours typically do provoke more attention and frequent intervention, but this is not necessarily an indication of increasing treatment intrusiveness. The evidence from our meta-analysis does not support intrusiveness as a contributor to effectiveness, nor is this approach consistent with what is known about responsible and sensitive treatments.

The type of behaviour targeted influenced outcome. Self-injurious, stereotypic, socially inappropriate, and destructive behaviour responded well to behavioural treatments, aggressive and disruptive behaviour less so. Note that the child's primary or secondary diagnosis did not moderate outcomes. This suggests that when a behavioural treatment targets specific responses for intervention, the overall syndrome exhibited by the individual is of lesser importance than the nature of the challenging behaviour. Diagnoses are sometimes described as taxonomies of co-occurring behaviours, yet behaviour modification typically targets single topographical behaviours, taken one at a time. There is convincing evidence that changing one behaviour will, in fact, change other behaviours that are related in some way (Voeltz & Evans, 1982). However, it will be difficult to interpret these relationships with regard to the cluster occurring in a syndrome. Altering a single behaviour will not necessarily precipitate change in the co-occurring behaviours seen in the syndrome. But we will not have authoritative evidence on this issue until such time as the literature comprehensively reports what happens to other, possibly collateral behaviours comprising the syndrome but not directly targeted. Functional analysis of severe and challenging behaviour also relies on the notion of co-occurring behaviours.

The difference between syndromes and functional relationships is that component behaviours of a syndrome do not necessarily have the same function, whereas the key to functional analysis is the identification of possible relationships between co-existing behaviour. This would mean that targeting behaviours is only likely to change non-targeted behaviours *if a functional relationship exists* between these behaviours. If this were indeed the case, we would expect the use of functional analysis to act as a moderator. Interestingly, this was *not* supported by the findings. Instead, treatments involving functional analysis were generally *less* effective in modifying behaviour in the short term, whereas the use of functional analysis was better at maintaining behaviour extinction.

***Setting and intervention agent characteristics as moderator variables.*** Whether context acts as a moderator for outcome was evaluated. Variables analysed included primary and secondary contexts, intervention agents, and the involvement of family, siblings, and peers. The data were often inconclusive regarding the role of context in outcome. Treatments conducted in community settings showed the most promise, but a small sample size means this result has to be viewed with caution. When natural change was accounted for, treatment rooms, residential settings, and schools appeared most

effective. The provision of treatment in mainstream settings was unlikely to show better outcome.

Involving family members and siblings in the intervention did not result in superior effect sizes. It is important to qualify this finding, however, as the available evidence is limited by the small number of studies where these family members were a part of the intervention research. One would predict that positive intervention outcomes would be maintained and generalised best when persons in the natural environment (i.e., family members) were part of the study, but this issue cannot be investigated empirically given that follow-up data are so rarely included in the published research reports. Teachers and behaviour specialists were most effective at managing change during the period reported in the studies, and involving peers was found to result in better outcomes. These results suggest that an effective intervention is likely to involve peers, be organised by a professional or teacher, and carried out in a number of controlled contexts (residential, school, treatment room); that is, a combination of intervention variables was most likely to result in the best outcome. Again, in the absence of systematic follow-up data in the published research, critical questions such as the influence of family involvement on intervention effectiveness long term cannot be answered.

Thus, conclusions cannot be drawn too hastily from the results reported here. Less successful treatment outcomes with families and siblings in mainstream settings should not be interpreted as meaning that these contexts are detrimental to improvement. It is far more likely that intervention contexts involving wider settings and multiple treatment agents are more complex, complicating the delivery of treatments for challenging behaviours by presenting circumstances that contain many unforeseen contingencies or “real life events”. In contrast, treatments delivered in a controlled treatment room may be associated with initial success in changing behaviour. Treatment setting results are achieved in a context devoid of naturally occurring incidents the individual is likely to encounter in daily life. Without follow up of the maintenance of behaviour change beyond that reported in the majority of our intervention research literature, we do not know which approach might actually result in more durable and generalised effects. The degree of change revealed to date in this research might represent the degree of knowledge research-practitioners have with manipulating contingencies, interspersed with the degree of control they have over the child’s environment. In a very real sense, then, findings regarding what conditions are associated with effective outcomes can be artefacts of the length of the reporting period (e.g., immediately following treatment versus six months after “treatment” has ended) and the situations in which the outcomes are measured (e.g., in the treatment room with the professional intervention agent versus in home, school and community environments with persons in the natural environment).

### **Treatment Effectiveness**

The effectiveness of treatment approaches was compared. Aspects contributing to treatment delivery included cost of treatment, number and type of treatment phases, use of medication, aversives, and restraints, duration of treatment, involvement of functional analysis, type of treatment, number of treatment conditions, and intrusiveness of treatment.

***Treatment intrusiveness.*** Analyses of therapy involving use of medication, restraints, aversives, and treatment intrusiveness were marred by extremely disparate sample sizes. With such small samples treated with medication (18 individuals medicated), restraints (six trials), aversives (four treatment trials), and

higher levels of intrusiveness (nine trials with Level 3, one with Level 4, 16 with Level 5, and three with Level 6), care is needed in the interpretation of these results. Medication was associated with less effective outcomes. Interestingly, there was no evidence to suggest either medication use *or* effectiveness was linked to the severity of behaviour, a finding complicated by the fact that medication might have been prescribed for reasons unrelated to challenging behaviour (e.g., epilepsy). Any conclusions beyond this are difficult to make because of small sample sizes and lack of information on specific medications. Note also that our sample included studies where medication was recorded as part of an intervention, but we did not include studies where medication was the only treatment (we also did not include medical journals where research focussed on medication is more likely to be published as compared to behavioural intervention research).

Results were inconclusive for any comparison between aversives and non-aversives. There was some indication that high and low intrusiveness might lead to lower effect sizes. This pattern was reversed for PZD. The level of intrusiveness could not be appropriately identified as a moderator, however, mainly owing to small sample sizes. Finally, use of restraints was related to poorer change in behaviour but a higher percentage of maintained extinction. Any conclusions must be qualified owing to the large difference in the sample sizes making valid comparison questionable. Bearing in mind the limitations of sample size, however, there is promising evidence that best outcomes may occur when treatments are *not* driven by medication, aversives, intrusiveness, and use of restraints. In addition to producing the best results, a positive form of intervention lends itself to sensitive, ethical, and socially responsible service delivery. Given these preliminary findings, our review does not offer support for continued behavioural intervention research that involves the more intrusive and aversive components.

**Cost of treatment.** Although supplemented treatment programmes were most successful in changing behaviour, treatment conducted within the existing resources of the service provider maintained behaviour change best. In addition to funding, it would also seem that the old adage “less is best” is supported by the number and type of treatment phases delivered. Fewer phases and less treatment conditions generally equated to higher effect sizes. PZD differed again, with more treatment phases and types of conditions resulting in better maintenance. This is an interesting outcome considering the temptation may well be for inexperienced practitioners to “hedge their bets” by increasing the number of treatments phases and reversals. This outcome was supported by the data on treatment duration showing that treatments lasting less than three weeks or longer than 20 weeks were less effective. This may reveal simply that most treatments will not be successful within a very short timeframe — a logical finding with severe behavioural challenges that have been entrenched for some time — but should result in positive behaviour change within 20 weeks. Quite simply, it is time to stop and do something else whenever no behaviour change is taking place for an intervention that has been in place for as many as 20 weeks. In sum, a well targeted, carefully applied, and time-limited intervention conducted within or near the resources of the treatment provider is likely to be the most useful approach.

**Relative effectiveness of different intervention approaches.** Use of antecedents, skills replacement, consequences, and system change treatment approaches were compared. As the sole intervention, skills replacement appeared more effective than consequences and antecedents according to virtually all our analyses. However, we could not investigate the effectiveness of systems change as the sole intervention, as no studies used this as their only treatment approach. To explore the issue of intervention type further, we sought to systematically investigate effect size when

each treatment approach was included in delivery. Skills replacement performed better according to all algorithm calculations except regression-based methods, and outcomes with consequences and system change produced the reverse to this. Direct comparison indicated system change and consequences were successful when natural change was accounted for, whereas antecedents and skills replacement rated highest for percentage-based data. Finally, combined treatment patterns with or without system change were compared. Combined treatments consistently resulted in higher effect sizes than single treatments. Single versus combined treatments were not significantly different when system change was not included. When system change was included, combined treatments were effective in modifying behaviour. Single treatments in conjunction with system change were best at maintaining a zero rate of behaviour.

Overall, combined conditions with system change and unitary interventions without system change both produced satisfactory outcomes. All combinations were effective in maintaining eliminated behaviour. Based on these results, it would appear these forms of interventions performed relatively well. As a solitary treatment, antecedents and consequences appeared to perform best when non-contingent change was accounted for. This pattern did not change for consequences when it included other conditions, but antecedents performed comparatively poorly when combined. Although it fared poorly with regression techniques, skills training outperformed other treatments as a solitary intervention and performed well in combination treatments with non-regression based analysis techniques. This remained the pattern when other conditions were included. Although system change did not appear to produce superior outcomes with non-regression formulations, it performed well when spontaneous change was accounted for. Moreover, system change consistently improved effect size when combined with other interventions.

An analysis of interactions was carried out between intrusiveness of treatment and treatment type with the three client characteristics – behaviour severity, primary diagnosis, and behaviour type. By further dividing up groups to conduct interaction analysis, the risk is smaller sample size and therefore increased probability of spurious results. No interactions were found between intrusiveness of treatment and any of the three client characteristics. The analysis of interactions between treatment type and behaviour type and severity revealed a range of outcomes. Figure 15 of 3+ PZD results illustrates that antecedents performed better than consequences for severe behaviour, but comparatively worse than skills replacement and consequences for mild behaviour. With the exception of regression techniques, all statistics indicated skills replacement was related to the best effect sizes for medium level behaviour (but most studies were in this category). Antecedents were generally highly effective across statistics for self-injurious behaviour and disruptive behaviour, suggesting that these two behavioural categories are more likely to be influenced by external antecedents than other categories such as stereotyped or aggressive behaviour. This level of outcome corresponded across two or more algorithms to the use of skills replacement with aggressive, socially inappropriate, and destructive behaviour, and consequences with socially inappropriate behaviour and stereotypic behaviour. Unfortunately, only tentative judgements can be made in the analysis of interactions between treatment type and identified behaviours because of low sample size.

### **Analyses of the Impact of Age and Diagnosis on Outcomes**

Does effectiveness vary as a function of the child's age (developmental status) and diagnosis? It must be remembered that our sample of children whose treatment has

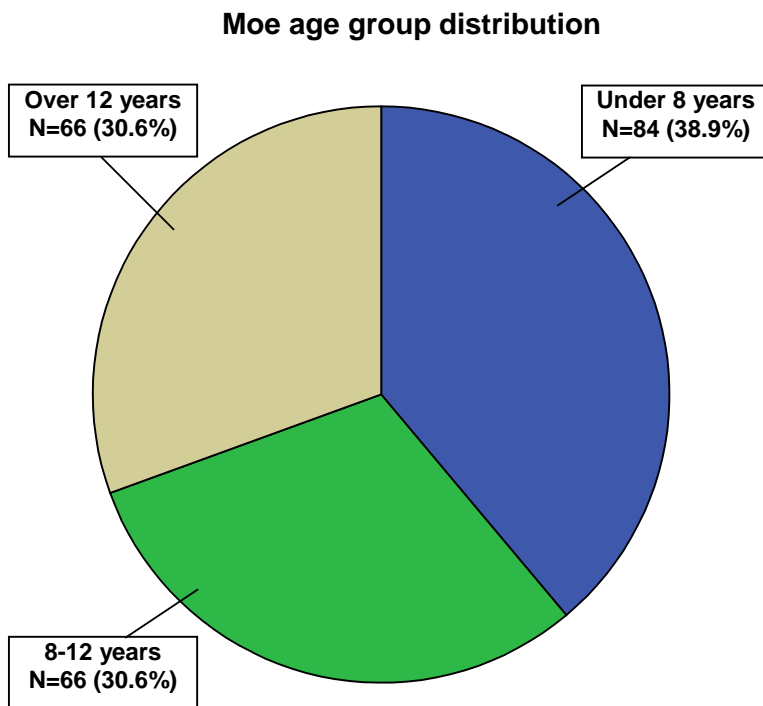
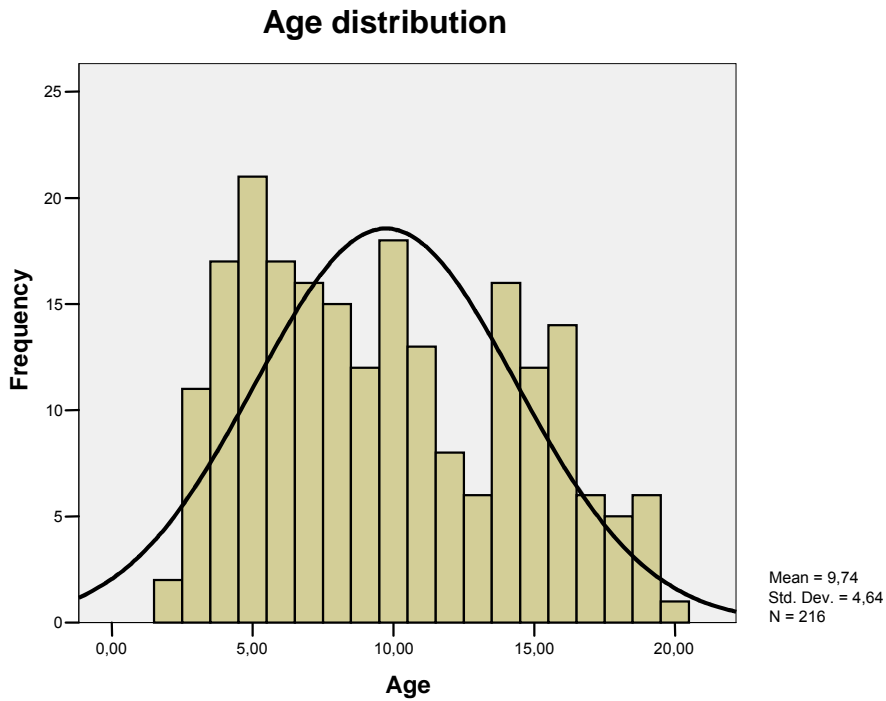


been reported in the literature involves an extremely low incidence population with highly individualised demographic characteristics and behavioural needs. The result is an idiosyncratic population with numbers too small to allow the application of experimental procedures that could work with a higher incidence educational population. Nevertheless, we determined that we could segment selected sub-groups comprising sufficient numbers of single-subject studies to allow regression analyses to address two educationally relevant questions. These are discussed below.

***Examining the impact of age.*** Taking up the issue of age firstly, educational systems typically structure different delivery environments for children at different developmental stages. For relevance to New Zealand, we examined the impact of three major age ranges representing generally varied educational opportunities available to children and youth during particular developmental periods. The three age ranges of interest to the Ministry of Education in Aotearoa New Zealand are early childhood/early years (birth to eight years), middle childhood (ages 8 to 12 years), and the adolescent/secondary years (ages 13 to 21 years). We will review highlights of available information in the existing literature regarding differential intervention approaches and/or services for children in these three age ranges in Sections 5, 6 and 7 of this report. In this section, we report the results of regression analyses to determine whether these age ranges are functionally related to patterns of treatment outcome as represented by the effect size statistics for different treatment variables. It would be useful to know, for example, whether a particular intervention approach — such as skills replacement training — is more likely to be effective with a particular age group. Patterns of effectiveness of various treatments by age could suggest which approaches might generally be higher priority at which age levels, with implications for staff training, family supports, and similar needs.

Our analysis is limited to some extent by the evidence available for different age ranges. Figure 1 provides summary displays of the age distribution of the research reports for which at least five data points were available for inclusion in the meta-analysis sample where the age range was from 2 to 20 years of age (mean age = 9.74, with a standard deviation of 4.64 years).

**Figure 1. Age distribution of participants in the meta-analysis research article sample**

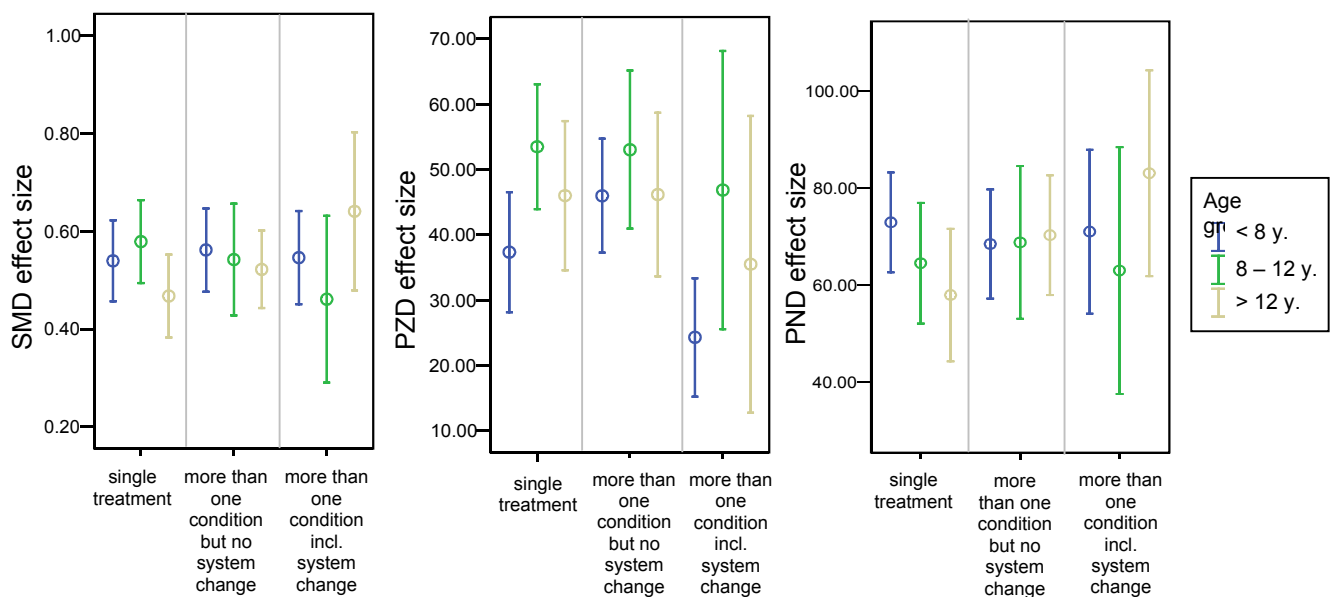


Of course, the evidence for a relationship between these age ranges and the outcomes is influenced by whether or not the intervention was carried out in an “age-appropriate” school or community environment. As many interventions continue to

be conducted in highly restrictive contexts, bearing little resemblance to normalised settings for the ages involved, any conclusions that can be drawn based on our sample would be limited accordingly. Secondly, research reports may fail to specify whether any effort was made to implement or even later transfer outcomes to age-appropriate settings. Thus, we may have evidence that something “works,” but in an atypical setting of limited relevance to what would ordinarily be available to children in that age range. It is fair to comment that patterns of intervention research for children and youth with challenging behaviour largely fail to reflect adequately the major differences that typify school and community environments for these three age ranges. This is part of larger issues and problems reflecting the placement of children with severe challenging behaviour and the absence of consideration for the educational and ecological validity of interventions. Our later recommendations by developmental stage thus require some extrapolation based on the following findings, rather than simply an observed empirical function of the interaction between age, intervention, and outcome.

We conducted MANOVA for the three designated age groups for three aggregated treatment groupings: single treatments, two or more treatments but no systems change, and two or more treatments including systems change. These results are illustrated below (Figure 2):

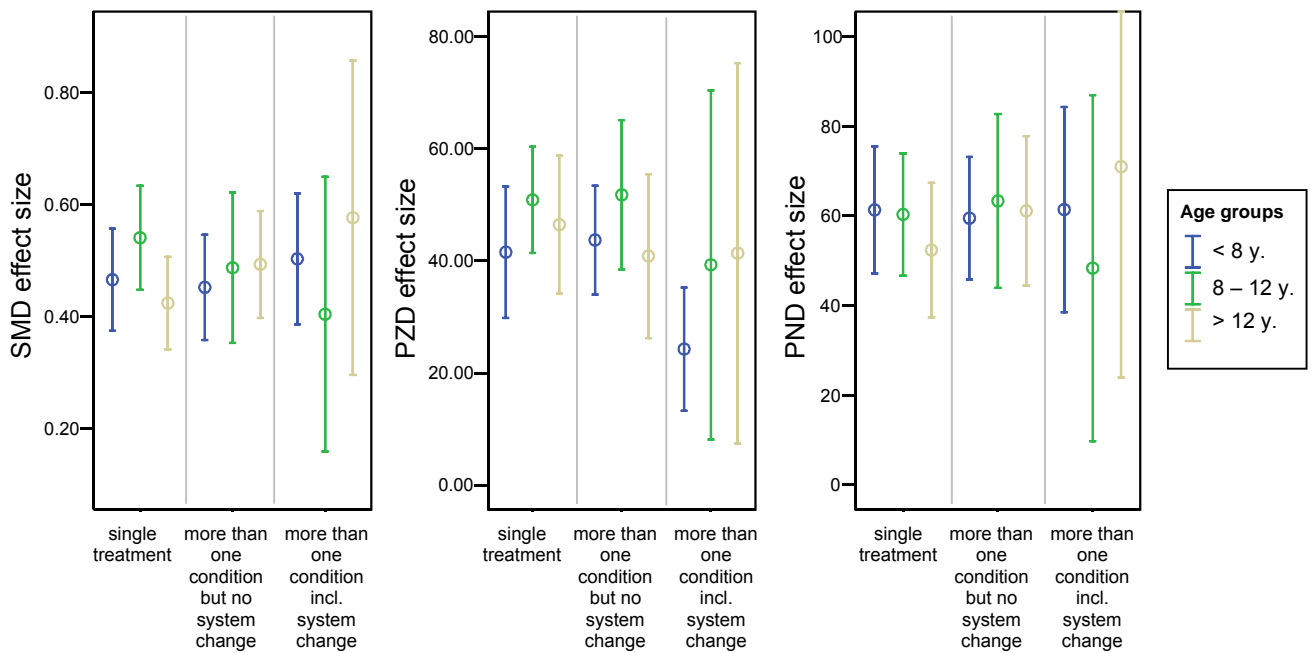
**Figure 2. Effect size statistics by treatment conditions**



**Figure 2 a.**  
SMD effect size across interventions  
(3+ baseline/treatment data points)

**Figure 2 b.**  
PZD effect size across interventions  
(3+ baseline/treatment data points)

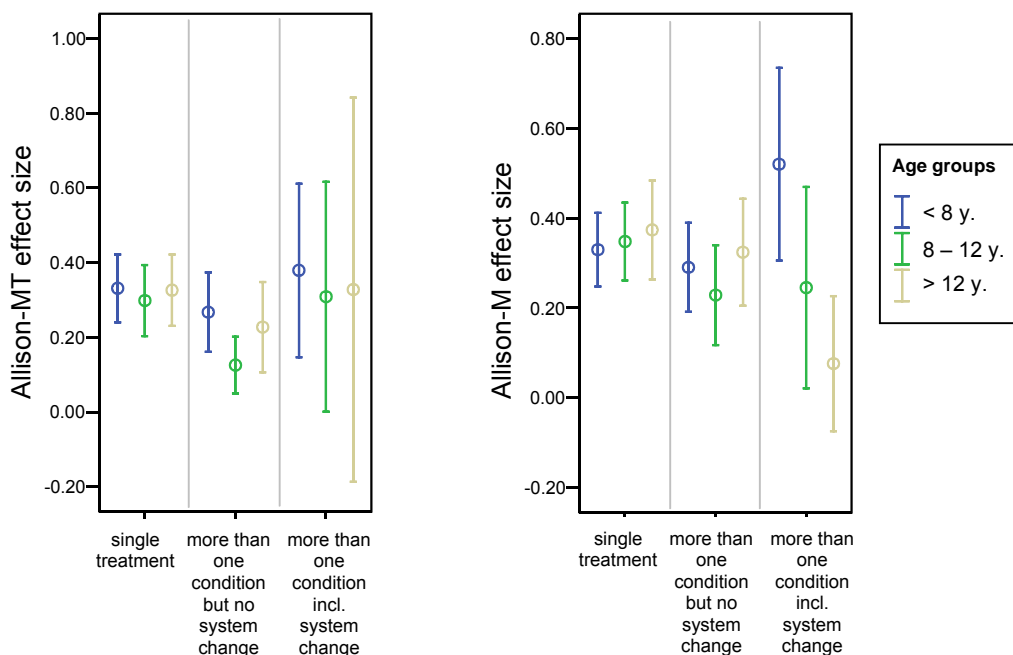
**Figure 2 c.**  
PND effect size across interventions  
(3+ baseline/treatment data points)



**Figure 2 d.**  
SMD effect size across interventions (5+ baseline/treatment data points)

**Figure 2 e.**  
PZD effect size across interventions (5+ baseline/treatment data points)

**Figure 2 f.**  
PND effect size across interventions (5+ baseline/treatment data points)



**Figure 2 g.**  
Allison-MT effect size across interventions (5+ data points)

**Figure 2 h.**  
Allison-M effect size across interventions (5+ data points)

Note that the middle age group had consistently higher PZD effect sizes for the data set using 3+ data point; PZD is of course a measure of the percentage of maintenance of zero behaviour. For the 5+ data set, the confidence intervals are so

broad as to call into question the validity of drawing any conclusions regarding relative effect sizes.

Subsequent analyses for the four treatment categories of Antecedents, Skills Replacement, Consequences and Systems Change did not support a hypothesis of significant differences for any age group in comparison to the others. Our results did reveal that for all age groups, skills replacement training was an effective treatment to intervene with challenging behaviour. There were more examples of systems change with the early childhood age group, and the inclusion of a systems change approach had very positive effects on young children particularly regarding regression-based effect sizes. Treatment approaches that focussed on antecedents seemed to produce lower effects in the middle age group and higher effects in the adolescent age group. In general, it would be fair to conclude that differences in the effects of particular intervention approaches were minimal, suggesting that these interventions are best individualised based on child needs and the results of a functional analysis of the behaviour — not based on a demographic characteristic such as age. Further, the finding that skills replacement training was apparently equally effective across all ages should affirm the importance of viewing the presence of challenging behaviour in students with developmental disabilities as reflecting skills deficits signalling the need for special education. Finally, there appears to be insufficient research on the inclusion of a systems change component with older children compared to early childhood. This may be owing to the increasing complexities of this issue with older ages in combination with restrictive placements. It seems counter-intuitive that teenagers should be those least likely to experience interventions that incorporate a systems change component, given that their behaviours would be expected to be more intractable with increased age and patterns entrenched over longer time periods. Clearly, more research is needed with teenagers as opposed to continuing to publish further replications of interventions with younger children where effectiveness has already been demonstrated.

***Examining the impact of diagnosis.*** Our sample sizes are too small to allow analyses across all possible variables of interest by the many different child diagnoses. However, one analysis likely to be of interest to both advocates and policy makers is whether or not the presence of multiple disabilities (such as sensory and motor impairments) or a differential diagnosis of autism/ASD versus another diagnosis can predict different patterns in intervention outcomes for different treatment approaches. Service providers, advocates, and parents are often persuaded that the needs of certain differential diagnoses, such as Autistic Spectrum Disorder, are functionally related to intervention decisions. It has been argued that programmes need to be tailor-made for children with such a diagnosis in comparison to programmes for the broader population of developmental disabilities. We have already discussed our findings with regard to the impact of sensory and motor impairments as moderator variables. In this section, we report the results of regression analysis to examine for differences as a function of the diagnosis of autism/ASD in comparison to any other diagnosis.

Table 2 shows the results of MANOVA comparing three effect size statistics (SMD, PZD and PND) found for interventions with autistic versus non-autistic subjects for treatments categorised as antecedents, skills replacement, consequences or systems change in orientation. These results are complicated by the fact that the treatment categories are not independent. Because each intervention may actually have involved with more than one of these four interventions, the categories overlap; for example, some of the cases reported as information regarding “Antecedents” also involved the use of “Systems Change” and so on—as explained in Section 2.

**Table 2. Comparison of treatment outcomes for autistic and non-autistic children and youth (3+ baseline/treatment data points)**

Type of Treatment	3+ baseline/treatment data-points											
	95% CI					95% CI					total	
	ES	SD	lower	upper	N	ES	SD	lower	upper	N	N	
	Autism					not Autism						
SMD	Antecedents	.51	.29	.42	.60	44	.53	.27	.48	.58	105	149
	Skills replacement	.53	.30	.42	.64	34	.58	.26	.52	.65	63	97
	Consequences	.49	.31	.42	.57	67	.54	.27	.50	.58	161	228
	System change	.39	.22	.05	.74	4	.54	.26	.46	.62	44	48
PZD	Antecedents*	36.48	37.28	25.15	47.81	44	50.54	33.66	44.02	57.05	105	149
	Skills replacement	49.01	30.11	38.50	59.51	34	44.59	33.25	36.07	53.10	61	95
	Consequences	42.76	33.20	34.67	50.86	67	43.73	32.26	38.69	48.76	160	227
	System change	27.60	26.62	-14.77	69.96	4	34.69	31.55	24.86	44.53	42	44
PND	Antecedents	62.66	38.73	50.88	74.43	44	70.81	38.06	63.45	78.17	105	149
	Skills replacement**	63.74	38.35	50.36	77.16	34	82.33	30.08	74.63	90.04	61	95
	Consequences	60.06	42.02	49.81	70.31	67	69.19	38.70	63.14	75.23	160	227
	System change	54.86	42.11	-12.14	121.87	4	73.44	37.72	61.68	85.19	42	44

\* mean difference between autistic and non-autistic children/youth significant at the 0.05 level (2-tailed; t-test for Equality of Means for independent samples)

\*\* mean difference between autistic and non-autistic children/youth significant at the 0.01 level (2-tailed; t-test for Equality of Means for independent samples)

In the next analysis, we removed this overlap through multiple hierarchical regression analysis (also called sequential regression) and found a significant difference only on the Allison-MT statistics, favouring responsiveness of children with autism to treatment manipulations involving Antecedents in comparison to other children (see Table 3). This seems logical, as antecedent interventions focus on “triggers” for behaviour, and persons with ASD may be more sensitive to triggers in comparison to students whose diagnosis is intellectual disabilities. The sample sizes are adequate to allow valid comparison of the ASD versus non-ASD group and thus validate these findings regarding differences or lack of differences. It is also the case that the magnitude of the actual effect size statistics are quite small for both groups.

Table 3 below reports findings to investigate for differences between outcomes where the diagnosis is ASD versus non-ASD with different treatments. As overlapping effects have been removed from these data, the tests for differences are complicated by very small sub-sample sizes.

**Table 3. Comparison of treatment outcomes for autistic and non-autistic children and youth (5+ baseline**

Type of Treatment		5+ baseline/treatment data-points										
		total					95% CI					
		ES	SD	lower	upper	N	ES	SD	lower	Upper	N	
		Autism					not Autism					
SMD	Antecedents	.50	.28	.41	.60	36	.45	.25	.38	.50	67	103
	Skills replacement	.54	.30	.39	.61	30	.56	.25	.44	.61	39	69
	Consequences	.46	.30	.37	.53	56	.48	.25	.43	.52	106	160
	System change	.39	.22	.05	.74	4	.52	.26	.40	.61	26	30
PZD	Antecedents	37.24	35.08	25.37	49.10	36	50.03	33.3	40.27	40.3	67	103
	Skills replacement	48.44	29.51	37.47	59.59	30	38.26	28.3	30.57	49.6	36	66
	Consequences	44.72	32.62	36.32	53.91	56	41.43	29.1	35.72	47.2	107	163
	System change	27.60	26.62	-14.77	69.96	4	34.48	30.7	20.48	45.3	26	30
PND	Antecedents	58.59	38.82	46.16	72.33	36	60.34	41.5	48.36	69.2	67	103
	Skills replacement	66.48	36.58	50.57	78.78	30	73.46	35.8	61.88	85.6	36	66
	Consequences	56.53	42.04	44.62	67.14	56	57.93	42.4	49.16	65.5	107	163
	System change	54.87	42.11	-12.14	121.9	4	62.57	43.3	41.90	78.3	26	30
Allison-MT	Antecedents*	.33	.31	.22	.44	34	.19	.26	.12	.25	62	96
	Skills replacement	.27	.27	.17	.37	30	.24	.29	.15	.34	35	65
	Consequences	.29	.28	.21	.37	54	.28	.28	.21	.33	103	157
	System change	.48	.47	-.26	1.22	4	.33	.41	.16	.49	26	30
Allison-M	Antecedents*	.41	.31	.31	.52	36	.26	.28	.19	.33	66	102
	Skills replacement	.32	.25	.23	.42	30	.23	.23	.16	.32	35	65
	Consequences	.34	.27	.27	.41	55	.30	.30	.24	.35	105	160
	System change	.45	.31	-.04	.94	4	.33	.38	.18	.49	26	30

\* mean difference between autistic and non-autistic children/youth significant at the 0.05 level (2-tailed; t-test for Equality of Means for independent samples)

Table 4 addresses the problem introduced by small sub-sample sizes in the results illustrated in Table 3 and provides a comparison of the outcomes of single treatments as well as treatments in combination with others for the two groups of autistic versus non-autistic participants.

**Table 4. Single and combined treatment outcomes for autistic and non-autistic children and youth (5+ baseline/treatment data points)**

		5+ baseline/treatment data-points												
		Autism						not Autism						
		Single Treatment			Combined			Single Treatment			Combined			<i>total</i>
Effect size	Type of Treatment	ES	SD	N	ES	SD	N	ES	SD	N	ES	SD	N	N
SMD	Antecedents	.54	.23	19	.46	.33	17	.39	.25	13	.47	.25	54	103
	Skills replacement	.71	.25	5	.51	.30	25	.51	.31	6	.57	.25	30	66
	Consequences	.42	.29	24	.50	.30	32	.50	.26	35	.48	.25	72	163
	System change	-	-	-	.39	.22	4	-	-	-	.52	.26	26	30
PZD	Antecedents	26.98 ***	35.19	19	47.85	32.4	17	78.19 ***	27.23	13	43.2	31.2	54	103
	Skills replacement	62.06	28.82	5	45.71	29.5	25	51.41	18.65	6	35.6	29.4	30	66
	Consequences	43.96	35.48	24	59.76	41.4	32	44.93	26.88	35	40.0	30.1	72	163
	System change	-	-	-	27.60	26.6	4	-	-	-	34.5	30.7	26	30
PND	Antecedents	66.14	34.83	19	50.15	42.3	17	56.66	48.06	13	61.2	40.2	54	103
	Skills replacement	71.40	32.92	5	65.50	37.8	25	90.50	12.18	6	70.1	38.1	30	66
	Consequences	52.21	43.13	24	59.76	41.4	32	52.11	43.64	35	60.7	40.6	72	163
	System change	-	-	-	54.87	42.1	4	-	-	-	62.6	43.3	26	30
Allison-MT	Antecedents	.42	.29	19	.24	.31	17	.16	.17	13	.20	.27	51	100
	Skills replacement	.27	.14	5	.27	.29	25	.38	.24	5	.22	.29	30	65
	Consequences	.36	.29	22	.25	.28	32	.30	.26	34	.27	.34	69	157
	System change	-	-	-	.48	.47	4	-	-	-	.33	.41	26	30
Allison-M	Antecedents	.46*	.34	17	.35	.28	17	.33*	.27	11	.24	.27	53	98
	Skills replacement	.33	.23	5	.32	.26	25	.43	.20	5	.20	.22	30	65
	Consequences	.31	.26	23	.35	.28	32	.30	.22	34	.29	.32	71	160
	System change	-	-	-	.45	.31	4	-	-	-	.33	.38	26	30

\* mean difference between autistic and non-autistic children/youth significant at the 0.05 level (2-tailed; t-test for Equality of Means for independent samples)

\*\*\* mean difference between autistic and non-autistic children/youth significant at the 0.001 level (2-tailed; t-test for Equality of Means for independent samples)

A reasonable conclusion from these analyses is that there is no meaningful evidence of difference in treatment responsiveness for children diagnosed as Autistic Disorder or ASD in comparison to children with other diagnoses. The one exception is that the Allison regression effect size statistic revealed higher effectiveness for interventions involving antecedents for students with ASD in comparison to students with other diagnoses. As noted previously, these differences are still quite small. Overall, skills replacement training appears to work best for children with autism as it does for children with other diagnoses.

### Methodological Issues and Limitations



Several methodological restrictions operated to limit this analysis. Although the outcomes were homogeneous within each statistic, they often produced different results using the same data. Given that the observational data are essentially the same, the differences could be considered surprising. However, such a range of outcomes may strengthen the argument that a multi-method approach is necessary for interpretation of effect sizes. As mentioned earlier, approaches are likely to measure different aspects of outcome. To illustrate, although both PND and PZD are percentage-based approaches, PND measures percentage of improved behaviours (relative to how it was before intervention), and PZD represents percentage of maintained zero behaviour (during and post intervention, regardless of the behaviour's previous level). SMD is considered to be an overall estimate of change, whereas the regression-based Allison approaches are methods that attempt to account for movement in baseline data. Approaches that can predict baseline changes are useful, but rely on assumptions of trend and require sizeable amounts of data. The issue of regression deteriorating with higher magnitude effect sizes was problematic but has been reported elsewhere by Parker et al. (2005) and was dealt with by neutralising deteriorating data.

Our decision to use a minimum of five data points as inclusion criteria for the regression-based approaches is likely to have influenced conclusions regarding outcome. The power to detect small effect sizes necessitates longer phases of data in regression-based approaches. Unfortunately, including only studies containing longer phases could also substantially *reduce* the power of the analysis to detect smaller effects because of smaller sample sizes that also risk misrepresenting the current literature. Our compromise involved including studies with five or more data points. It should be noted that the inability to detect smaller effect sizes might not be detrimental to this study. This is because we were interested in seeking out practices that produced outcomes of medium to large magnitude — which one could argue are more likely to be seen as clinically meaningful behavioural change. Thus, our analysis was appropriate for capturing medium to large effect sizes, rather than smaller effect sizes useful for efficacy studies testing a theory but unlikely to reflect effectiveness in practice.

In Sections 6, 7 and 8, we highlight selected intervention approaches and major findings regarding the characteristics of effective interventions for children and youth with disabilities across the three major age ranges. In each of these sections we also include descriptions of four exemplars of more comprehensive “systems change” intervention research. These either met the necessary methodological criteria for inclusion in our quantitative meta-analysis (and are marked by an asterisk\*), or present particularly clear case study descriptions of procedures validated by other reports but in a manner providing sufficient information to allow practitioners to adapt the approach to their own needs.

## **Section 5: Interventions in the Early Years (Birth – Age 7)**

Children with disabilities and challenging behaviour are likely to be identified early in life. However, these children and their families may or may not have access to appropriate intervention services and supports, which are dependent upon service provision in a particular country or region as well as geographic or resource access to those services that are available. In some countries such as the United States, preschool children with disabilities are entitled by legal right to received individualised services but their non-disabled peers do not necessarily have access to publicly funded educational or day-care programmes. In New Zealand, early childhood services for typical children are widespread, but the provision of services for children with disabilities is less systematic. In many countries, as in New Zealand, parent-managed and parent-directed programmes have emerged to fill the gap in services — particularly for children diagnosed with autism or autistic spectrum disorder — or to supplement existing public services.

### **The Lovaas EIBI Model**

One programme that has been adopted and adapted widely and internationally is the UCLA early intensive behavioural intervention (EIBI) model for children diagnosed as autistic (Lovaas, 1987; McEachin, Smith, & Lovaas, 1993). In 1987 Lovaas reported that 47% of an experimental group receiving intensive discrete trial training procedures before 46 months of age demonstrated normal functioning educationally and cognitively at age seven years. Follow-up at ages ranging from 9-19 years reported that eight of these nine children had maintained normal functioning (McEachin, Smith, & Lovaas, 1993), where normal functioning was defined as having maintained an IQ in the normal range and being rated as normal in adaptive behaviour and personality by their parents.

These positive results are widely regarded as dramatic, so that parents and parent organisations have advocated strongly for funding of the 40-hour weekly EIBI training model, sometimes incorrectly labelled as “ABA”. However, the method and outcomes are controversial. Schreibman (2005) has summarised the major methodological criticisms of the EIBI reports: (a) the children in the experimental group were six months younger than those in the less intensive treatment group; (b) Lovaas excluded a relatively large percentage of possible subjects from the original study, such that there is general acceptance those in the analysis were higher functioning than autistic children generally; (c) children were not randomly assigned to groups, but were assigned based on convenience, such as living close to UCLA; (d) all assignments to groups and evaluations were carried out by the authors with no independent checks; and (e) outcome ratings were fairly “global” ratings of normality and included only parent judgements regarding social adjustment. Schreibman (2005) also notes the continued failure to replicate even these limited results despite multiple attempts to do so (Rogers, 1998). Given that the Lovaas programme requires upwards of \$60,000 per child to fund the treatment — in the context of trained personnel and fully involved parents — this is still regarded as minimal evidence of effectiveness as justification for what is a major expenditure of both funding and a preschool child’s educational time.

Bibby, Eikeseth, Martin, Mudford, and Reeves (2001) estimated that as many as 650 children in the UK alone were receiving some form of parent-managed, behavioural

intensive programme modelled after Lovaas' UCLA programme and that worldwide figures would run into the thousands. The British research team has reported disappointing child outcome results for English parent-managed intensive interventions for autism modelled after EIBI. Bibby and his colleagues point out the difficulties in replicating the programme and note that these less dramatic results were attained by programmes that did not demonstrate fidelity to what may be crucial components of the EIBI model. Probable differences that may have affected the outcomes include unknown treatment content (i.e., the actual "curriculum" used), fewer weekly hours of treatment, and differences in the clinical population with child participants who were older and lower functioning than those in the original Lovaas research (Bibby et al., 2001; Mudford, Martin, Eikeseth, & Bibby, 2001). The work by this British group in summarising the results of efforts in the UK to replicate the original results suggests that, for a variety of reasons, attempts to implement the UCLA EIBI programme towards achieving normal functioning have not been successful to date. If even researchers have been unable to replicate the findings from the one original study, this represents a serious challenge to the likelihood that typical practitioners and educational agencies could do so (Schreibman, 2005).

### **Positive Behaviour Support**

In contrast to the highly structured EIBI programme, there are numerous recent reports of individualised interventions with young children that follow general principles of behavioural intervention in a variety of clinical and more typical educational and community settings. In their major conceptually oriented review, Horner, Carr, Strain, Todd, and Reed (2002) report the difficulties encountered in attempting to identify empirically valid, effective behavioural interventions for children with autism who are eight years of age or younger. From an initial potential database of 41 studies published between 1996-2000, only nine reports met the criteria for their final analysis focussed specifically on young children. Many of the remaining research reports failed to use an appropriate experimental design or did not report the data in a form that allowed comparison (e.g., fewer than three measurements at pre-intervention and at post-intervention), and some did not address challenging behaviour or did not specify that the children were eight or younger.

Horner and his colleagues highlight a major and important shift in focus of intervention research with this population in recent years. Earlier intervention research tended to emphasise the use of rewards and punishments to intervene with challenging behaviour in young children — consequence-based procedures. More recent research has shifted the emphasis to intervening with setting events and antecedents as well as instruction in teaching young children new skills to replace problem behaviour (Horner et al., 2002). This shift is supported by evidence that children in this age range who exhibit challenging behaviour are most likely to be those with lower language and social interaction skills (see also Murphy et al., 2005). If a child has few skills, the existing challenging behaviour may be the only functional, substitute communication or social interaction skill the child can use — and it works at least some of time. In this situation, a problem behaviour is unlikely to be changed in a lasting way until the child has learned an alternative, positive behaviour to substitute — something that then works better and more effectively. In addition, the environment can have a major impact on young children as a more motivating range of "reinforcers" are made available, including peers who can act as further stimuli to support new and more adaptive behaviours.

The existing evidence supports the following as features of a positive environment and approach to intervention with individual young children who exhibit challenging

behaviour in early childhood and the early years: (a) motivating social settings and activities; (b) individualised interventions to modify behaviour problems based on functional assessment; (c) systematic instruction to include communication and social interaction skills; (d) trained and responsive adults — teachers and family members — committed to responding to the child consistently as planned; and (e) shared activities with normally developing peers with support for positive social interactions. There has been considerable research carried out regarding individualised interventions with individual children during the preschool years in clinical or typical childcare and preschool settings. There has been less research focussed on caregiver training, particularly of a kind that could be implemented as part of an array of public services. Kuhn, Lerman, and Vorndran (2003) note:

More research is needed on low-cost training strategies that are uniquely suited for teaching individually prescribed treatments to current and future caregivers of a child with problem behaviour. Results of the current study indicate that one member of a child's family could rapidly learn to train other caregivers and, thereafter, could teach multiple future caregivers (e.g., family members, babysitters) without the assistance of professionals (Kuhn et al., 2003, p.86).

Durand and Rost (2005) note that information on selection and attrition of students is not included in this literature and that results (such as those we have reviewed) come only from those committed and motivated teachers and families who are willing to become involved in what can be a demanding process — implementation and evaluation of a systematic intervention. They note that little information is available regarding whether Positive Behavioural Support is most likely to be effective at particular ages and with particular behaviours. They argue that until we know more about the selection and attrition of participants in this research, we may only know that something works with some — those most committed — rather than in typical circumstances. Nevertheless, “typical circumstances” may represent a barrier for any intervention, just as an effective drug can only be of value if taken compliantly as prescribed. There are many barriers to parents and families being able to implement systematic programmes, and such barriers have to be overcome or managed just as in any other clinical/educational intervention relying on non-professionals. There is a large literature that clearly demonstrates the stresses on parents and the negative impact on cohesive family dynamics of having a child with a disability, far less a child with a disability and challenging behaviour. All interventions that are designed for early years need to understand and accommodate broader parental needs. Some examples of how this can be done are provided in practical workbooks for parents, for example, Lockshin, Gillis, and Romanczyk (2005).

### **Pivotal Response Treatment for Autism**

One relatively focussed and specialised treatment for children with autism or ASD is the approach referred to as Pivotal Response Treatment (PRT), and this has relevance to challenging behaviour regardless of the young child's diagnostic category. This approach is theoretically and empirically driven by what are seen as core areas of deficit for this population — communication, social interactions and initiations, and self-regulation of behaviour. Koegel and Koegel (2006) refer to these as “pivotal areas” that must be addressed by focussing on four aspects of intervention:

1. Family involvement

2. Natural contexts
3. Treatment of key pivotal target behaviours as the primary goal, with the modification of individual behaviours given secondary consideration, and
4. Intervening early and comprehensively, both at home and at school (p xiii).

Koegel and Koegel (2006) define PRT as “a comprehensive service delivery model that uses both a developmental approach and applied behaviour analysis (ABA) procedures” and that “aims to provide opportunities for learning within the context of the child’s natural environments” (p. 4). Pivotal areas are defined as “areas that, when targeted, lead to large collateral changes in other, often untargeted, areas of functioning and responding” and “Pivotal responses, once acquired, result in widespread and generalized improvements in children with autism” (p. 4). A range of pivotal areas have been studied including motivation, responsiveness to multiple cues, self-management, self-initiations and empathy (*cf.* Koegel, Koegel, & McNerney, 2001).

Like Lovaas’s EIBI model, PRT emphasises early and intensive intervention including adhering to the standard of at least 20-45 hours of intervention weekly at as young an age as possible (National Research Council, 2001). Unlike the Lovaas EIBI model’s reliance on clinicians, PRT emphasises the importance of parents as the primary intervention agents but joined by multiple additional intervention agents including siblings, teachers and school personnel, peers and any others who interact with the child with autism. PRT advocates note that involvement of the family in intervention is also a way of ensuring naturalistic approaches to intervention, resulting in a goodness of fit such that maintenance is enhanced by use of treatments that fit naturally within the sociocultural context of the family system (Bernheimer, Gallimore, & Weisner, 1990). Families are also present for the long haul and 24/7, hence in the best position to deliver treatment “across multiple settings and throughout the child’s waking hours to produce rapid, generalized, and sustainable improvements in their child’s behavior and development” (Koegel, Openden, Fredeen, & Koegel, 2006, p. 12).

Finally, PRT interventions always take place in the context of natural, inclusive settings on the basis that effective intervention with autism requires ongoing availability of communicative partners in the context of natural activities and motivating environments. Such environments with ongoing interactions with same-age peers and others also support the development of natural language, with generalisation and maintenance “essentially built into the intervention, making them readily applicable for natural settings and environments” (Koegel, Openden, Fredeen, & Koegel, 2006, p.12; see also Camarata, 1995, 1996).

Because Pivotal Response Treatments were developed particularly for students diagnosed as autistic, the majority of the research and intervention literature on this approach is also directed to the early childhood and early primary school years.

### **The SCERTS Model**

The strengths of traditional Applied Behaviour Analysis (ABA) — based primarily on learning theory and the principles of operant conditioning — include consistency and accountability in the design and implementation of an intervention with challenging behaviour. Prizant, Wetherby, Rubin, and Laurent (2003) note that contemporary ABA practice has moved beyond planning interventions based primarily on learning theory and operant conditioning principles. Contemporary ABA-based intervention

models are more likely also to be informed by knowledge of child development, evident in Koegel and Koegel's Pivotal Response Treatments for autism (Koegel & Koegel, 2006). Further, contemporary ABA-based interventions incorporate information about conditions in natural environments experienced by children and youth at different ages, represented by the concept of "contextual fit" in the Positive Behaviour Support literature (Lucyshyn, Albin, & Nixon, 1997). In contemporary ABA approaches, interventions for challenging behaviour will be based on specific priorities for a particular child. Further, they may be designed for implementation by persons who are part of the child's natural environment — teachers, peers, parents and so on—rather than for specially trained clinicians. While these developments are well intentioned, Prizant and his colleagues critique the "patchwork quilt" approach that is sometimes the result, which can compromise the consistency and accountability that were the strengths of traditional applied behaviour analysis. They emphasise the need for an early education model that is systematic, comprehensive and multidisciplinary, incorporating the technical rigour of traditional ABA alongside more contemporary considerations for child development and environmental context (Prizant & Wetherby, 1998).

To address this issue for young children with ASD, Prizant's team developed a model to prioritise Social Communication, Emotional Regulation and Transactional Support (SCERTS) based on recommended evidence-based practices individualised for children's needs (National Research Council, 2001; Prizant & Rubin, 1999). Prizant, Wetherby, Rubin, and Laurent (2003) provide a detailed description of the SCERTS Model applied to problem-solving, planning and regulating behaviour, and regulating emotional arousal and reactions to others. Their model includes explicit consideration for modifying educational and learning supports at home and school that they see as crucial to supporting more adaptive behaviour:

That is, children are not "choosing" to be disengaged from social interaction and relationships due to a primary lack of interest or desire. Because of challenges in social-communicative, social-cognitive, and emotional-regulatory capacities, they are limited in the requisite abilities and skills to be more successful, active participants. Additionally, some communicative partners who regularly interact with children may also lack the knowledge and skills to support their efforts. Therefore, children with ASD are at risk for developing a sense of interpersonal interaction as overwhelming, confusing, and stressful based on a history of repeated unsuccessful experiences, while others are at risk for limited engagement and low motivation to participate in social interactions secondary to processing difficulties and hypo-responsive bias toward interpersonal events.... We believe an important key to ... success is interpersonal support (Prizant et al., 2003, p. 308).

Advocates of contemporary approaches to ABA with children with disabilities argue that generalisation of behavioural change is most likely to occur when interventions occur in the natural environment and the persons in those environments develop skills in responding adaptively to the child's behaviour — including teachers, parents, peers and siblings alike (Meyer & Evans, 1993; Meyer & Evans, 2004). This means that, somewhat ironically, effective interventions require both systematic, rigorous intervention design and the incorporation of typical, varied (and sometimes unpredictable) social and environmental contexts. As Prizant and Meyer (1993) emphasised, daily routines and family events provide the experiential opportunities in which children learn and practise new behaviours and skills in the context of developing secure and trusting relationships.

Prizant, Wetherby, Rubin, and Laurent (2003)

### **Stepping Stones Triple P**

Church (2003) has described major features of the Australian-developed Triple P programme, the acronym for *Positive Parenting Program* (Sanders, 1999; Sanders, Markie-Dadds, & Turner, 1998; Sanders, Turner, & Markie-Dadds, 2002) which was developed for use with children in families with marital problems, children whose parents have clinical conditions such as depression, children from low socio-economic homes, children at risk for child abuse, and children who are diagnosed as having emotional or behavioural disorders such as Attention Deficit Hyperactivity Disorder (ADHD). The Triple P programme has a strong evidence-base in Australia in particular, and has been adapted for New Zealand use (Church, 2003). However, the original Triple P model was neither developed nor validated for use with the children and youth who are the focus of this review.

The Stepping Stones Triple P (SSTP) programme has subsequently been adapted from the original Triple P model by Sanders and his colleagues to address the needs of families with children who have developmental disabilities and challenging behaviour (Sanders, Mazzucchelli, & Studman, 2003). SSTP has incorporated issues relevant to these families including inclusion, community living, family supports and increased caregiving needs. Further, SSTP includes behaviour change protocols for behavioural challenges such as self-injurious behaviour, pica, and stereotyped behaviours (Sanders, Mazzucchelli, & Studman, 2004). While it is early days in the development and validation of SSTP, early results are promising regarding its effectiveness in generating positive outcomes. It also parallels strengths of Triple P in provision of a detailed and practical manual or guides for the use of SSTP by practitioners working with families outside Sanders' own clinical and research teams (Sanders et al., 2003).

Roberts, Mazzucchelli, Studman, and Sanders (2006) recently published the first randomised control trial involving SSTP, focussed on 48 children with behaviour problems ages two to seven from nearly four dozen families participating in an Australian state's early intervention programme. Multiple and selected standardised measures were used to compare the experimental group of 24 families with a wait-list control group of 20 families, including child development scales, parent checklists of child behaviour, a family observation schedule, a measure of parental stress, and purpose-designed client satisfaction measures. Implementation of SSTP with the experimental group was associated with significant changes in both parent and child behaviour, including reductions in problem behaviour in both "treatment" and generalisation settings. Parent stress and behaviour were also reported to have improved, though not as markedly or consistently as that of the children. Interestingly, parent behaviour changed in target settings but not in generalisation settings; it is also interesting that mothers were the ones reporting success overall, but the intervention group fathers reported changes in their own parenting behaviour but not the child's behaviour.

### **Engaging Peers in Interventions during the Early Childhood Years**

As noted above, Pivotal Response Treatments emphasise the importance and advantages of involving non-disabled peers as part of interventions for children with autism in particular; this is seen as particularly important given that a core deficit of autism is social-communicative and a lack of appropriate social interactions. Further,

involving peers is common sense for children in the environment of someone with severe behaviour problems. Peers who know how to and can react constructively when problem behaviour occurs will not only be safe themselves but will help to ensure that the target child will receive appropriate feedback rather than be reinforced inadvertently (Hedeen, Ayres, Meyer, & Waite, 1996). Strain and Odom (1986) identified the following set of criteria, advocating that children selected in preschools as peers to participate in interventions and/or interactions with children with disabilities should:

- be compliant with requests made by teachers and other school personnel
- have regular attendance at preschool
- have age-appropriate play skills
- have either no history or have a positive history of interaction with the target child/ren (that is, not have a negative interaction history)
- be in the same class as the target child, and
- express a willingness to interact with the child.



## **Exemplar 1**

### A Pyramidal Caregiver Training Model

Kuhn, Lerman, and Vorndran (2003)\* investigated the impact of “pyramidal training” for families of children with problem behaviour, which is a “train the trainers” model. They trained three primary family members — whose children were preschool to primary school age with various diagnoses of developmental delay or, in one case, no other diagnosis — to implement individualised interventions for their children’s behaviours; they then trained those family members in how to use selected instructional strategies (such as prompting and feedback) to teach other family members to also implement intervention. The caregivers included mothers, a father, grandmothers, a brother, a sister and a stepfather who had a range of educational levels from secondary school to two who had a bachelor’s degrees. Training was conducted across approximately three one-hour home visits for two children and one two-hour home visit for the third child. This would appear to be a cost-effective as well as efficacious approach, though it is dependent upon identifying a key family member whose presence will be consistent in the child’s life and who will expend the time and effort needed to become a “trainer” for other current and future caregivers. This report is also one of those in our meta-analysis revealing the most significant effect sizes — the subset of articles reporting single treatments in conjunction with systems change.

## **Exemplar 2**

### Do-able Interventions

Schindler and Horner (2005)\* report the effects of functional communication training to replace significant behaviour problems (tantrums, screaming, biting) in three young children with autism. Teachers, teacher aides and parents were trained to deliver “high-effort” three to five 10-minute sessions of instruction in functional communication skills for each student in primary teaching settings followed by “low effort” training involving multiple opportunities presented in secondary generalisation settings including preschool and home routines. The children showed generalised reduction of problem behaviour associated with this specific plan to intervene for generalisation of behaviour change. The authors emphasise that, just as importantly, the carers reported that the low effort interventions had good contextual fit and the teachers reported that these interventions were “less effortful” than functional communication training (p. 45). They stress that interventions should be selected not only for their effectiveness but also for contextual fit since this will affect whether an intervention will be carried out correctly in those different settings. This research is an important example of attending to the do-ability of an intervention strategy for ordinary caregivers and teachers in typical home and school settings: Otherwise, the most successful intervention in clinical settings will not work in real world environments (Meyer & Evans, 1993).

### **Exemplar 3**

#### Multi-component Intervention for Complex Needs

Hieneman and Dunlap (1999) describe comprehensive positive behavioural support implemented and evaluated for Joey, aged six and diagnosed autistic. Joey also had severe allergies, a hearing loss, and major dietary and digestive problems in addition to profound developmental delay. His self-injury included banging his head on furniture and other fixtures, so that his otherwise attractive appearance included severe facial scars accumulated since infancy. He wore protective restraints most of the time to prevent his self-injury, and his family had just arranged residential placement; they visited him regularly and he had been going home on weekends, but even those visits were jeopardised by behaviour that was increasingly unmanageable. Joey's functional assessment process was complicated by his illnesses and need for almost continuous restraint to prevent serious self-injury, but the detail provided in this case study report provides a useful illustration for others dealing with similarly complex situations. The authors included detailed interviews his parents, sister, extended family members, teacher, other therapists and aides and care personnel in the residential setting. They also collected observational data both informally and formally. Patterns of behaviour identified included highest rates of self-injury when noise level and commotion was high, when he could not predict activities, for difficult tasks and those where he did not seem to understand the instructions, with persons with whom he seemed to have little rapport, and when he seemed to be using his self-injury to communicate such as requesting physical contact from adults.

Joey's needs were extremely serious and agencies serving him were under pressure to consider an even more restrictive placement for him. His comprehensive behavioural support plan included multiple components involving environmental changes, teaching alternative communication skills, teaching adults how to interact with him, and positive strategies to increase the time he spent engaging in daily activities. One of the outcome measures for Joey was the amount of time he did participate in activities without wearing protective equipment. This case study showed limited success overall in that more positive expectations by caregivers overshadowed somewhat the actual changes in Joey's behaviours, though they had improved somewhat. Improvements were regarded as sufficiently significant so that the family resumed home visits on the weekend including overnights that had previously ceased owing to the self-injury; Joey was also now participating in more school activities without the use of restraints. This case study can be a helpful reference for others who are realistically dealing with very complex needs that will in fact require systematic intervention over a longer period of time when behaviour has become entrenched over many years as in Joey's case.

## Exemplar 4

### Identifying Child Reinforcer Preferences

Lalli and Kates (1998)\* describe a systematic approach for identifying reinforcer preferences in very young children with functional analyses to develop intervention programmes to intervene with challenging behaviour. The three children in their study were diagnosed as having developmental delays, including a two- and a half-year-old boy with self-injurious behaviour (SIB) and aggression, a three year old boy also with SIB and aggressive behaviours, and a three- and a half-year-old boy with aggressive and disruptive behaviour. All lived at home with their families, and the interventions were carried out in a hospital treatment unit specialising in severe problem behaviour in a large US city. The assessment processes adhered to rigorous experimental conditions unlikely to be replicable in typical home and school situations, and the report lacks sufficient detail for it to be used by teachers or parents to design a do-able version without expert advice.

Nevertheless, a focus on identifying reinforcer preferences as a contributing explanation for the occurrence of serious behavioural challenges in very young children is an essential component in the design of treatment programmes, particularly for the early years. The children did show different preferences, ranging from access to toys to adult attention; problem behaviour was particularly likely to occur when the child appeared to be seeking these reinforcers when another child was present. The authors demonstrated that family members could be trained to use the relevant procedures, so that problem behaviour when it did occur was not rewarded inadvertently with access to materials or attention; equally important, these reinforcers were made available following alternative positive child behaviour. Particularly because of the methodological sophistication of such a report, such results may sound like an oversimplification of intervening successfully with serious behaviours such as aggression and self-injury. Yet, the credibility of the basic approach and the possibility of creating *do-able* versions for use by typical teachers and family members are supported by clear and dramatic demonstrations on television programmes such as *Supernanny* (Frost, 2006).

## **Section 6: Interventions in the Middle Years (Ages 8 - 12)**

A higher number of the published intervention research reports meeting the criteria for inclusion in our meta-analysis involved children of primary school age (or what is referred to as elementary school in the USA, where the majority of the research has been conducted). The slightly smaller number of studies involving children in the early years is probably an artefact resulting from the proportionately higher availability of special education services in the primary years. There are also obvious issues of challenging behaviour becoming much more problematic as the child becomes larger and stronger. Furthermore, in the school context, focus often shifts to externalising types of problem, such as aggression, noncompliance, and disruptive behaviour. These can be contrasted to problems families might be experiencing at home but which primarily disrupt the family rather than external communities in society — typical examples are sleep and feeding difficulties, enuresis and incontinence, and self-stimulation and stereotypic mannerisms. These cause considerable distress to parents, but externalising, “acting out” types of challenging behaviour become especially salient at primary school.

### **Functional Communication Training**

Functional Communication Training (FCT) was originally developed by Carr and Durand (1985) and further elaborated by Durand (1990). The concept arose from recognition by various clinicians that challenging behaviour could be seen as having communicative intent: for someone with limited verbal communication skills, such that challenging behaviours are actually a means of controlling one’s environment. The basic principle of FCT is quite simple: if the challenging behaviour has a specific function, then teaching the child an alternative and more conventional communication skill to achieve that same outcome (function) should result in reduction of the less appropriate behaviour. The recognition of the specific function of the challenging behaviour was made easier by the appearance of a simple assessment device (Durand & Crimmins, 1988). Durand and Crimmins argued that there were essentially four typical functions of challenging behaviour: escape from demands or unpleasant situations (Mildon, Moore, & Dixon, 2004); obtaining some desired tangible object, gaining social attention, and reducing boredom. Studies by Durand and colleagues demonstrated that challenging behaviour was only reduced if the alternative communication response taught to the child was one that produced the same reinforcer as that maintaining the challenging behaviour.

If the maintaining reinforcer is something that the individual may have but has an inappropriate method for obtaining it, then it follows that FCT is actually a special case of the differential reinforcement of other behaviour (known in applied behaviour analysis as DRO). However, in the case of FCT, the “other” behaviour is a specific communication skill. For FCT to be effective, therefore, the environment has to ensure that the desired communicative skill does result in the reinforcement, and the inappropriate behaviour does not. Therefore until the individual has acquired the new communicative skill, it would be simplest for the social environment to provide the desired reinforcer (say social attention) in a noncontingent way. In other words, social attention would be delivered on some kind of basis as long as it did not follow the inappropriate behaviour. This latter arrangement is known as noncontingent reinforcement, and it alone can produce significant reduction in challenging

behaviour. Numerous rather artificial studies in the literature have examined how FCT and noncontingent reinforcement can best be interfaced.

It is clear that FCT also requires that a suitable and teachable communication response be selected as the adaptive alternative to the challenging behaviour whose function is known or reasonably hypothesised. A variety of such responses have been proposed, including signs, verbal utterances, and other symbols, such as pictures. Consequently, there is considerable overlap between the teaching aspect of FCT and the entire area of alternative/augmentative communication. It becomes an important area for teachers, speech-language therapists and parents to collaborate on in order to choose the most suitable communicative skill. This is one reason why the approach is so important during the primary school educational years. A communicative response becomes a priority if it is one that is easily acquired and that is going to be understood by others in the social environment. For this reason New Zealand schools have been quite quick to adopt strategies such as the Picture Exchange Communication System (PECS) for children with limited speech. In PECS, the student is taught to exchange a single picture for a desired item, and from this picture-based sentences can be developed to elaborate the child's request (Bondy & Frost, 2001).

We have elected to describe Functional Communication Training principles and practices in this section of our report focussed on the middle childhood years. We have done so based on the presumption that teaching children verbal communication skills (whether vocal or non-vocal) is a priority by this age to support positive interactions with others. However, we emphasise that FCT is relevant to and should be a part of an intervention programme at *any* age where the young person with challenging behaviour lacks functional communication skills, given the strong evidence that problem behaviour often serves communicative purposes regardless of any negative impact on the environment.

One of the criticisms of FCT is not of the procedure itself but the manner in which it has been promulgated at the professional level. It sometime seems that the reason one might focus on a child's communicative skills in terms of instruction is as a "treatment" for a challenging behaviour. However, it is obviously more appropriate to recognise that a child who lacks effective communication strategies needs these as a matter of priority, not simply to reduce challenging behaviour. Without verbal communication, a child lacks the ability to express emotions as well as needs, relate to others, and regulate the social environment. Communication skills are important not solely because they replace problem behaviour — they are pivotal.

### **Systems Oriented Approaches**

Sugai and his colleagues present a systems-level model of school-based "best practice" interventions for children and youth with developmental disabilities and challenging behaviour (2000). Positive behaviour support models increasingly reference the need to encompass systems-level change, with implications for funding, staff development, staff time allocation, and ongoing evaluation of the programme and school model if appropriate supports are to be in place for effective interventions. It is important to acknowledge that this systems-level model neither expects nor requires typical educational settings such as schools to adopt an "artificial" or intensive behaviour management structure that does not reflect the wider school needs. On the contrary, an essential feature of modern interpretations of what is referred to as *Positive Behaviour Support* is that it encompasses a school-wide approach to discipline that is consistent with regular education structures as

well as being amenable to individualised adaptations to meet the needs of students whose repertoires challenge the overall disciplinary structures (Carr et al., 2002; Freeman et al., 2006).

### **Family Support and Involvement**

If children with developmental disabilities exhibit severe challenging behaviour in the middle years — most often continuing from early childhood — parent support and services will be crucial as supplemental to educational services during the school day. Families of children with autism, in particular, report increased stress, negative impact on the quality of family life, and, ultimately, difficulty in maintaining the child at home whenever behaviour problems are correlated with severe cognitive impairment, dependence, and a restricted range of recreational and leisure time activities in which the child can engage (DeMyer & Goldberg, 1983; Plienis, Robbins, & Dunlap, 1988). Luiselli, Wolongevicz, Egan, Amirault, Sciaraffa, and Treml (1999) note that an important consideration for these families is that children with such disabilities typically receive formal instruction away from home for only about one-fourth to one-third of their waking hours across a typical year — leaving the families to cope outside these times, most often without support or training. Exemplars of family support programmes supported by evidence of empirical and social validity include Lalli et al. (2003), Luiselli et al. (1999), and Vaughn, Clarke, and Dunlap (1997). Given the evidence from Murphy et al. (2005) that children do not “grow out” of such behavioural challenges but will require increasingly restrictive and expensive supports in the absence of treatment, funding to provide increased instruction and support outside the school day would seem to be cost-effective if improved outcomes result.

### **Engaging Peers in Interventions during the Middle Years**

Lord and Hopkins (1986) presented evidence of better results when same-age peers ages 8 to 12 rather than younger peers are engaged in interactions with children with autism at the same age — in contrast to attempting to match children on the basis of so-called “developmental age.” They found that same-age, typically developing children initiated communication more often than younger children, and they were better able to modify their initiations to obtain a response from children with autism. Lee and Odom (1996) describe an interesting example of the impact of a peer-mediated social interaction intervention on rates of stereotyped behaviour in two children ages seven and eight diagnosed as autistic. The intervention directly targeted social initiations — not stereotyped behaviour — and was associated with an increase in the planned target but also a decrease in the challenging behaviour that had not been targeted.

### **Exemplar 5**

#### Parent-directed Intervention at Home and in the Community

Another family-based research report by Vaughn, Clarke, and Dunlap (1997)\* describes a systems change approach to intervene with an 8-year-old boy's severe behaviour problems in "a natural family context" (p.713). Sessions were held twice-weekly with Andrew's mother in areas associated with problem behaviour, including a fast-food restaurant and the bathroom at home; no times are specified for the training sessions. The mother was successful in using "contextually appropriate interventions" based on functional assessment to decrease the child's disruptive behaviour at home and in the community setting — circumstances that had been identified by the family as most problematic.

### **Exemplar 6**

#### A Systems Change Intervention in School

Lalli, Browder, Mace, and Brown (1993)\* report a systems change intervention to train three teachers and two teacher aides working with students aged 10 to 14 years who exhibited severe to profound mental retardation and ongoing behaviour problems interfering with instruction; these students were being served in self-contained, special education classrooms. An outside consultant conducted functional assessments to develop hypotheses regarding the functions of the students' behaviours based on teacher-reported information as well as direct observation. Although no costs are specified, the description suggests considerable consultant time was required for the development of the intervention programme and the teachers were trained to deliver the programme in two four-hour training sessions which included guided practice. The results were positive both in reducing challenging behaviour and increasing positive verbal skills taught to the students to replace the negative behaviours. The authors note that a logical next step would be to train the teachers to carry out the assessment and hypothesis development as well as deliver the intervention, and it would appear that this would involve significant skill development as well as release time for staff to conduct the observations needed.

### **Exemplar 7**

#### A Case Study of Positive Behaviour Support

Our meta-analysis sample did not include book chapters, but there are helpful case study descriptions that practitioners can access to illustrate the intervention process for positive behavioural support. In one such case study report, Heineman and Dunlap (1999) detail their positive behavioural support programme in sufficient detail to guide others working with students with severe disabilities who also exhibit severe aggression and disruptive behaviours. Roland had a primary diagnosis of autism and was 11 years of age. He engaged in behaviours such as head butting, hitting, and faeces

smearing that had become progressively worse at home and in school; most recently, he had injured his teacher and the teacher aide, both of whom had been granted leave to recover from injuries sustained while attempting to restrain him. Staff at school and in his group home had been using “facilitated communication” with Roland, which apparently was not effective and is now widely acknowledged to lack validity (Schreibman, 2005).

His positive behavioural support intervention included functional assessment of the purpose of his behaviour, teaching communicative alternatives, and changing his daily schedule so that he could predict the situations that were problematic for him including transitions. The plan included explicit mechanisms to generalise and maintain behaviour change across environments at school and at his group home. One particular component of his programme was to teach him to tolerate gradually increasing time periods when he had to wait for something—a naturally occurring circumstance in most settings that can be difficult for students such as Roland. He was also taught positive strategies for interactions with peers. The authors report highly successful outcomes for Roland, such that he was participating fully at school socially and academically, going to church, playing in softball games in the community, and performing chores at his group home as expected. His aggressive and other behaviours had decreased to near zero levels.

## **Exemplar 8**

### Evaluating Multiple Outcomes

Malette, Miranda, Kandborg, Jones, Bunz, and Rogow (1992) summarise interventions and results to evaluate the efficacy of the data-based *Lifestyle Development Process (LDP)* for four case studies carried out in British Columbia in Canada. One of these focussed on Carol, an 8-year-old girl with Sanfilippo syndrome (also known as mucopolysaccharidosis III, or MPS III) which is a progressive, degenerative neurological disorder associated with rapid deterioration of language, self-care, behaviour, and other skills. Although regarded as ultimately fatal, some individuals have lived into their 20s and 30s. At the start of intervention, Carol had no speech, no response to yes/no questions, and no obvious receptive language; she required substantial help with all self-care routines and previous academic skills had been lost. She slept only four hours nightly and when awake engaged in frequent screaming, tantruming and aggressive behaviour toward her younger sister and other, smaller children.

Carol’s intervention programme was supported by a consulting team comprising a speech-language pathologist, behavioural consultants and an instructional consultant who trained school personnel and family members in the principles and practices of LDP, which essentially incorporates many of the now accepted “best practices” associated with other approaches to positive behavioural support. What is particularly interesting about this case study is not only the evaluation of the impact of the programme on Carol’s challenging behaviour but the reporting of evidence of how her daily life and engagement in natural routines and activities had improved. One true, if indirect, measure of the success of an intervention for challenging behaviour will be changes in these rates of engagement and participation — often seen as impossible when challenging behaviour is serious and at a high rate. Carol’s participation in community activities increased 500% over



baseline; further, after intervention she engaged in significantly more and different types of school and activities than she had previously. These authors also used a measure of programme quality to assess whether or not staff and the programme overall had changes; they administered the *Program Quality Indicators (PQI)* checklist (Meyer, Eichinger, & Park-Lee, 1987) that assesses the extent to which a child's special education programme is aligned with best practices. Prior to the intervention, Carol's *PQI* score was 43% but had increased to 63% after training and intervention.

## **Section 7: Interventions in Adolescence (Ages 13 – 21)**

By adolescence, the ongoing presence of challenging behaviour increasingly interferes with family life, opportunities to attend secondary school with age-peers and participation in the range of community environments and activities enjoyed by teenagers and young adults. A combination of physiological (hormonal) change with puberty, deteriorating behaviour in the repertoire of the young person with developmental disabilities, and new environments with higher expectations, less flexibility, and less supportive peers can result in a downward spiral towards more restrictive placements and escalating service needs and costs.

### **The Secondary Context**

Secondary schools as natural environments in the life of adolescents can be highly intolerant of behavioural deviance in comparison to educational environments for younger children. Secondary schools are carefully structured and have stringent expectations for the range of acceptable behaviour; in contrast, early childhood centres and primary schools are typically viewed as being more accommodating and accepting. The secondary environment presents other challenges: the secondary curriculum in most subjects appears greatly discrepant from the educational needs of a student who has severe intellectual delay in comparison to his or her peers.

Challenges are also presented by the mismatch of the needs of students with disabilities and the predispositions, repertoire and behavioural expectations of most secondary teachers. Secondary teachers typically complete their undergraduate degrees in academic subjects; they become teachers by supplementing this disciplinary education with a “top-up” year of teacher education. Most secondary teachers have had little to no experience or training in how to adapt materials and learning objectives within typical subjects to meet the needs of students with disabilities. This pattern of recruitment to teaching and teacher education contrasts sharply to the more extensive pedagogical emphasis in primary and early childhood teacher education programmes.

Everything would appear to work against an easy, or even possible, solution for an adolescent student with challenging behaviour and developmental disabilities. The need to find practical and feasible solutions has thus often led to placements in segregated and alternative centres, schools and clinical settings. In New Zealand, the majority of students with severe disabilities and perhaps virtually all those who exhibit serious challenging behaviour are either at home or educated in separate schools or separate special education units within secondary colleges (Church, 2003; Moore & Anderson, 2005; Moore, Anderson, & Sharma, 2006).

Similarly, the presence of a teenager in the home who exhibits challenging behaviour can be extremely disruptive and exceed the capacity of many families to cope. The literature includes case studies of teenagers with severe behaviour problems reporting the results of interventions focussed on supporting families and intervening directly in the home, the community, and various activities. Such programmes require specialised expertise to provide advice to the family, and some require in-home consultation and guided practice for implementation. The provision of services by a network of advisors or consultants requires additional resourcing as well as the availability of people who actually have the specialised expertise to support families.

## **Behavioural Characteristics at Secondary Level**

The behavioural repertoire of the individual teenager and the cumulative effects of many years of behaviour problems becoming worse rather than better account for part of the escalating difficulties. Interactions with the family are likely to have become increasingly problematic, and strategies to intervene may have escalated to the point where almost nothing seems to work at home or in the community. The increased intransigence of the behaviour is exacerbated by the potential threat presented by a young person who is now bigger and whose behaviour can consequently be more dangerous to self and others than it was at a younger age.

Teenagers with developmental disabilities who also exhibit severe behaviour problems represent a significant challenge for their families, schools and the community. By adolescence, these young people have developed a repertoire that has become quite entrenched and will otherwise provoke growing dysfunction in all environments inside and outside the home. For a student with severe behavioural challenges, an intervention which can lead to significant improvement might still be judged cost-effective in comparison to the costs, financial and otherwise, of failing to support the family. Eventually, of course, young people who become adults with challenging behaviour will require extensive support from government when their families are no longer able to manage their behaviour and/or parents age so that they can no longer provide a home for them. A lack of services and supports during the teenage years will eventually cost far more overall than would have been the case if effective programmes had been available during the developmental period. Just as importantly, a poor quality of life for these youth and the associated costs regarding compromised lifestyles, added stress, and potential of health risk for them and their families add to the hidden costs of not addressing needs when they are easier to meet.

## **Individualised Behavioural Intervention Priorities**

The majority of the studies included in our meta-analysis involving young people in the age range from 13 years to 21 years are individualised interventions in relatively restrictive settings, generally self-contained special education programmes. As with younger age ranges, the results of our meta-analysis suggest that interventions most likely to be effective are those that include skills replacement training, attention to antecedents and report treatments in combination with a systems change approach — which in turn can signify altering environmental contingencies so that the natural environment is refocused on providing incentives and motivation for using new skills rather than problem behaviour to attain needs and wants.

Given that disruptive and aggressive social interaction behaviours in particular can jeopardise school, home and community placements, that they are likely to be high priority intervention targets. Implementing an effective individualised programme to intervene with such behaviours can facilitate not only a change in the child's behaviour but also improvements in social adjustment that in turn facilitate less restrictive placements. The literature involving teenagers is replete with individualised behavioural programmes to modify such target behaviours, but unfortunately it appears — based on the findings of our meta-analysis — that interventions focussed on aggressive and disruptive behaviours are least likely to be effective, regardless of approach. The situation is complicated by the fact that there are fewer intervention research reports with older children and these kinds of behaviours in comparison to the literature on young children and other behaviours, thus decreasing the possibility of identifying promising directions empirically. More

intervention research with teenagers who exhibit these kinds of behaviours is urgently needed. Furthermore, given the complex relationship with family, school and community context whenever an older child continues to exhibit aggressive and disruptive behaviours, intervention research should address context and not focus solely on attempting to change the child's behaviours.

One intervention that has been developed specifically to address disruptive behaviours interfering with social interactions is the "Social Story" (Gray, 1998). A social story is constructed specific to a particular young person and focussed on a social situation or event, telling the "story" of each cue from others, the appropriate social-communicative behaviour for the child to use in response, and cognitive structures around those events (Gray & Garand, 1993; Kuttler, Myles, & Carlson, 1998). Scattone, Wilczynski, Edwards, and Rabian (2002) reported the results of a successful social stories intervention programme to address challenging behaviour by three children with autism in school settings. Two of their participants were younger children, but the report includes also an intervention for inappropriate staring at females at school, often followed by public masturbation, by a 15-year-old boy with autism. This young man could read, so he would read his eight page, printed social story to his teacher aide an hour before recess when his problem behaviour typically occurred. His social story was entitled *It's okay to look at girls* and included reminders that looking for too long would make girls mad or sad. Strategies to stop looking were also part of the story, such as looking at something else while slowly counting to ten. The intervention was related to a significant reduction in his inappropriate behaviour.

Social stories are easy to implement in school environments, are relatively unobtrusive, and are said to be particularly appropriate for children with autism who may be described as adhering to strict routines or rules. Gray (1998) developed the original guidelines for social story interventions based on logic and clinical experience, but did not experimentally validate their effectiveness. More work is needed demonstrating the effectiveness of social stories as interventions, particularly to develop further their potential for use by teachers, parents and others to produce the best outcomes in the kinds of problem situations teenagers typically experience (Scattone et al., 2002).

### **Exemplar 9**

#### Positive Behavior Support in the Home

Lucyshyn, Albin, and Nixon (1997)\* described embedded, comprehensive positive behaviour support strategies for the family of a 15-year-old girl with multiple disabilities of severe intellectual delay, blindness and a long history of problem behaviours such as self-injury, aggression, property destruction, and disruptive behaviours. The first author conducted the functional assessment and designed a multi-component positive behavioural support plan, then trained family members to implement the strategies in the four priority intervention settings in the home with the family. In addition to clinically significant behavioural improvement, increased participation in community activities occurred that was maintained at follow-up. The parents reported high satisfaction with the "contextual fit" of the intervention and the outcomes that were achieved including collateral benefits.

## **Exemplar 10**

### A Family Support Programme

Luiselli and his colleagues described the outcomes for seven children with autism and pervasive developmental disorders who participated in a family support programme designed to prevent residential placements and to return children from residential placements to less restrictive settings (Luiselli et al., 1999\*). The mean age of their sample was 11.2 years with an age range from six years eight months to 16 years six months. Unfortunately, the authors fail to identify the ages of individual children beyond this general information, so it is not possible to identify specific features associated with a particular age range. On the other hand, as we noted elsewhere in this report, it is not uncommon for children and youth with both developmental disabilities and severe challenging behaviour to be exposed to intervention programmes that are not differentiated by age in parallel to early childhood, primary and secondary school programmes for typical children and youth. Students in the programme were provided services for an average of 14 months (range from 10-23 months). The authors report that “all seven students evidenced fewer challenging behaviours and displayed improved, independent performance of daily living skills as an outcome of their participation in the Family Support Programme” (p. 12), and five of the seven children were still being maintained at home with their families a year later on average. The report includes a description of how the programme was funded by the state government to support community school districts, with individual schools provided incentives to participate, as there was no cost to the individual school for participation.

## **Exemplar 11**

### Functional Communication Training

Berotti and Durand (1999) describe a *functional communication training* programme in sufficient detail for use by others working with students with needs similar to Teri, who was 18 years old, legally blind and diagnosed as having mental retardation requiring major support. Her challenging behaviours included frequent tantrums, severe aggression (biting, head butting, scratching), and self-injurious behaviours such as knee biting. Teri attended a special education class in a public school, a setting similar to a New Zealand special unit classroom located in a wing of a state secondary school; she also lived at home with her mother and younger sister, who were very involved in her education including visiting school frequently. This case study presented the processes of functional assessment, developing hypotheses regarding the communicative functions of her behaviour, a review of the outcomes associated with previous interventions, training for staff and family members so that they could deliver the intervention programme, and details regarding the actual functional communication training programme including procedures for generalisation and maintenance. Teri's significant decreases in challenging behaviours as a function of the intervention had maintained at follow-up more than a year later, and for the first time, Teri was participating actively in classroom activities on a regular basis. Finally, her behaviour was no longer threatening to others so that adults and peers interacted with her positively.

## **Exemplar 12**

### Targeted Treatment and Systems Change

Hetzroni and Roth (2003)\* report the results of positive behaviour support plans accompanied by alternative functional communication interventions for five teenagers with moderate and severe mental retardation who exhibited challenging behaviours such as self-injury, pinching, pulling, screaming and crying. Ages of the youth were 12, 14, 16 and two 19-year-olds, all of whom had for several years previously attended the segregated school for students with mental retardation (located in a medium size city in Israel) where the intervention took place. This report is illustrative of those studies included in our meta-analysis for which we found the most significant effect size for improvements in challenging behaviour following intervention in comparison to negative trends in behaviour at baseline. This subset of studies with the highest effect size incorporated a focussed treatment of targeted challenging behaviour along with systems change, and this particular study provides a good example of functional communication training in augmentative or alternative communication in the context of broader systems changes consistent with positive behavioural support.

## **Systems Change and Contextual Fit**

Our meta-analysis revealed a relative dearth of research on the effects of including attention to systems change as one component in interventions with teenagers in comparison to the available research with younger children who have challenging behaviours. One reason for this is probably an artefact of the most likely placement for adolescents with developmental disabilities and behaviour problems: As we discussed earlier, these young people become increasingly challenging for typical educational settings, ordinary teachers, and parents. Thus, they are most likely to be attending more restrictive, segregated educational programmes and to no longer be living with their families but are instead placed in residential settings with professional caregivers. It may even be that resolution of challenging behaviour is a “condition” of placement back into a less restrictive or inclusive educational setting or back into their homes or a more family-like living environment. Use of an intervention such as FCT is more feasible than one incorporating meaningful aspects of systems change, such as the study we feature as Exemplar 11 by Berotti and Durand (1999). In this research, the 18-year-old teenage girl with severe challenging behaviour was attending a self-contained classroom not unlike New Zealand’s special unit classrooms located in a secondary school. The young person in this study was still living at home but it would appear that even her segregated school placement had been in jeopardy given her aggressive, disruptive and self-injurious behaviours prior to intervention, which succeeded in reducing these behaviours to the point that she was engaging positively in classroom activities at follow-up a year later.

In contrast to FCT, systems-change intervention approaches entail incorporation of features of the natural environment and normalised expectations into treatment design, and such features are difficult to incorporate into residential treatment and segregated hospital-based programmes. Hence, attention to the contextual fit of an intervention may be possible only by creating artificial, analogous situations. Similarly, parent and teacher training may be carried out in a treatment context

outside the natural environment that by definition lacks the looseness of natural contingencies in ordinary, everyday homes and schools. We do feature several exemplars of efficacious interventions that reflect aspects of systems change despite having been carried out in atypical treatment environments. One such example is Hetzroni and Roth's (2003) research in Israel on positive behaviour support and functional communication training programmes for five teenagers attending a segregated school (see Exemplar 12). What is notable about this study is that the authors achieved improvements in challenging behaviour through attention to environmental variables along with specific focus on teaching each student appropriate augmentative or alternative functional communication skills.

We feature two additional studies that report programmes focussed on ensuring that children with severe challenging behaviour can live at home with their families rather than in residential placements outside the home. Luiselli and his colleagues (1999) describe a family support programme in the USA focussed on children with autism and intellectual delay, with individualised services provided for an average of more than a year (Exemplar 10). While improvements in challenging behaviour were reported for all seven young people in the study, another crucial outcome indicating effectiveness is the fact that at follow up a year later five of the seven children were still living at home with their families. This report is helpful in providing information regarding state funding support and incentives available to individual schools to motivate and enable participation.

Lucyshyn, Albin, and Nixon (1997) reported another excellent example of incorporating comprehensive positive behaviour support strategies in parent training for a teenager with severe developmental delay, multiple disabilities and serious challenging behaviour (see Exemplar 9). This report is notable in that the intervention included implementation in multiple priority natural settings by family members with professional support as well as follow-up data on community participation by the 15-year-old who was the focus of the intervention. Of significance as well is that the authors were able to confirm that parent satisfaction was particularly high with regard to the "contextual fit" of the programme as well as with the outcomes achieved.

### **Cultural Considerations and Opportunities**

The Hei Āwhina Matua project provides one model of an approach that has been used successfully for culturally appropriate interventions with Māori children and youth who have developmental disorders and serious challenging behaviours. This project emerged in the Tauranga region over a decade ago as Māori teachers and elders called for more positive and effective behaviour management strategies and educational resource materials to address the needs of Māori children of all ages in a culturally appropriate way (Berryman & Glynn, 2004). The project component developed for years seven and eight mainstream settings reflected growing concerns regarding the suspension and expulsion rates of Māori students — still a major issue at all ages.

While this project was developed for young people who were not diagnosed as having developmental disorders (and were more likely to have been regarded as "behavioural disordered"), aspects of the processes for involving schools and home communities according to Māori cultural protocol should be equally fundamental to interventions discussed in our review. For example, caregivers and teachers were supported in developing understandings about ten underlying principles of Hei Āwhina Matua that be respected in the design of any intervention plan for changing

behaviour according to Māori cultural values and contextual cultural fit (Berryman et al., 2001). Berryman and Glynn (2004) report that parents, teachers, students and others in the community were able to incorporate these principles and appropriate changes in practice in order to experience success in addressing student behaviour problems.



## Section 8: Summary of Evidence-based Best Practices

Our review has identified the range of intervention approaches, critical patterns of successful outcomes as a function of those approaches, and major shifts in thinking over a relatively short period of time regarding what is appropriate in the design and implementation of interventions to modify challenging behaviour. This section summarises the evidence supporting the development of standards for identifying those treatments or interventions that can be described as effective — treatments that have worked, resulting in positive behaviour change and meaningful community outcomes for children and their families. We also discuss the growing consensus regarding other factors that need to be considered in making treatment decisions and designing educational programmes: some of these are supported by empirical evidence, but others are reflective of cultural, family and community values that will influence which approaches are acceptable as the focus of intervention research.

This summary begins with an overview of how educational and behavioural intervention decisions are made. Next, we summarise the critical features necessary for the planning of effective interventions. We include consideration for contextual fit: We know that effective interventions are based on learning theory and principles of operant conditioning but must also attend to the child's developmental needs as well as expectations and capacities of age-appropriate settings and situations. We highlight cultural context as an overriding and critical background to the design of interventions likely to be adopted and sustained. Finally, we highlight information available regarding building the understandings, knowledge, and skill levels of *significant others* in children's lives. It is perhaps obvious that children and youth with developmental disabilities must acquire adaptive behaviours and new skills if they are to function successfully in their communities. It is equally important that the capability of professionals, family members, peers, and others be enhanced and extended, so that children and youth with developmental disabilities and challenging behaviours will have ongoing access to supportive educational and community environments that promote and sustain positive outcomes.

### Intervention Decision-making

Agency personnel, teachers, and family members do not necessarily make decisions about treatment for children and youth with behavioural needs based solely on evidence about what will be effective. Treatments and intervention strategies are selected and implemented based on multiple decision criteria. Firstly, the seriousness of the behaviour will influence whether or not it is targeted for treatment in the first place. Secondly, the characteristics of available intervention approaches will influence choice of treatment. These factors will also interact with other child needs, family values, cultural context, agency philosophies and commitments, and existing policy and practice to shape intervention choices and judgements about the outcomes of treatment. The meta-analysis component of this report focuses on the *effectiveness* of a treatment — whether or not it works to change behaviour in the predicted direction, in real-life settings but sometimes with exceptional levels of professional involvement and other resources. However, it is important to acknowledge that the choice to intervene and how to intervene will be influenced by factors that are not directly related to empirical evidence about efficacy.

***Factors in treatment decision-making beyond empirical validity.*** Some factors relate to treatment context and capacity rather than reflecting child characteristics or

needs. Cost is one of these, and treatment decisions in the health and education sectors can be influenced by the relative expense of adopting a particular approach over another particularly in relationship to the expected outcomes associated with each. The financial and psycho-social costs likely to occur in the moderate to longer term without intervention will also have an impact on the willingness to commit to an expensive treatment in the immediate term if it can be shown that these costs will actually be less over time than those associated with not adopting the treatment. This is, essentially, one major argument that influenced the implementation of special education entitlements for children with disabilities: Special education is expected to increase the child's independence and participation in society across the lifespan, as opposed to outcomes of lifelong dependency without the provision of an appropriate education. Another factor influencing choice of treatment and whether to intervene involves judgements about the seriousness or the priority assigned to intervening with a particular behaviour: There may even be an expectation of parity, such that society would be unwilling to pay for an expensive treatment to change a behaviour that may be *different* only, rather than one that is seen as life-threatening, dangerous to others, a significant impediment to learning, and so on.

Adoption of an intervention also requires that the treatment be *do-able* in the context of the capacities and resources of agencies, services and personnel responsible for delivery of the treatment (Barwick et al., 2005; Meyer & Evans, 1993; Meyer, Park, Grenot-Scheyer, Schwartz, & Harry, 1998). For example, the treatment may require highly specialised personnel who are not available even if they could be afforded (Schreibman, 2005). Where such barriers exist to using a particular treatment, an alternative treatment that "works" with less cost, in typical settings and/or with readily available personnel is more likely to be implemented.

Finally, the acceptability and adoption of particular treatment approaches will be influenced by societal values, the philosophy of a particular agency or setting, the culture of the family and community, and other values held by intervention agents, those who are the focus of the intervention, and/or their family members. For example, the use of aversives to intervene with challenging behaviour was quite common two decades ago, and there was widespread debate regarding their appropriateness for persons with disabilities. Subsequently — supported by evidence that positive intervention alternatives were available and were equally effective — the international disability community took the philosophical position that it was indefensible to use treatments that inflicted pain with persons with disabilities who could not give their consent or protest (Helmstetter & Durand, 1991). Controversy regarding the ethics of using such procedures escalated in the 1980s leading to formal resolutions against their use by major international disability associations (Guess, Helmstetter, Turnbull, & Knowlton, 1986) and in New Zealand (Parsonson, 1997).

Cultural issues also affect the acceptability of an intervention approach. Something that is appropriate for use in the United States may simply not be culturally acceptable elsewhere (Meyer, 2003). Here in New Zealand, we now recognise that consultation with the whānau/family and cultural community is a crucial component to educational decision-making (Bevan-Brown, 2001, 2003; Macfarlane, 2005). Māori explanatory models around the causes (function) of challenging behaviour may well influence the formulation of the child or young person's needs (Evans & Paewai, 1999).

Is it appropriate to make treatment decisions based on factors such as these that do not focus solely on whether a treatment works? Firstly, whatever one's opinion, the reality is that treatment decisions will be and are influenced by such factors so that it is impossible to ignore them. Barwick and her colleagues present a persuasive case

for understanding and investigating the knowledge transfer process as part of decision-making in education and mental health (Barwick et al., 2005). Without understanding these other factors and accommodating multiple issues as part of the intervention design, programmes and treatment approaches will be short-lived and totally dependent upon extraordinary circumstances unlikely to be sustained. At the same time, there should be evidence that the treatment programmes that are selected and implemented are supported empirically by evidence that they are efficacious: There is little point in continuing to expend time, energy and financial resources on interventions and programmes that have not been demonstrated to make a difference.

**Standards for evaluating effectiveness to inform treatment choice.** Whether or not a particular intervention approach is supported by empirical evidence that it *works* — that is, it actually results in a positive change in the behaviour that is the focus of the intervention — is clearly a critical issue of concern to agencies and advocates. And while the factors discussed above will vary depending upon circumstances and contextual variables, the validity of a particular intervention should be testable.

Criteria for evaluating treatment effectiveness along with validated interventions to date were disseminated by the Task Force on Promotion and Dissemination of Psychological Procedures of the Division of Clinical Psychology of the American Psychological Association (Chambless et al., 1995, 1996). The report notes:

The question of whether the research evidence is adequate to warrant a treatment's implementation is especially relevant to the current environment, in which professional groups and others are making clinical recommendations based on the research literature (p. 4).

Chambless and her colleagues proposed two categories of treatment efficacy—*well-established treatments* and *probably efficacious treatments*—and labelled treatments that do not meet these criteria as *experimental treatments*. Their criteria for *well-established treatments* requires at least two “good group design studies conducted by different investigators” or a “large series of single case designs demonstrating efficacy.” In addition, such treatments must clearly specify the intervention sample characteristics and must be conducted with treatment manuals (which would allow subsequent replication and adoption). For *probably efficacious treatments*, fewer studies are acceptable, the studies will be flawed by the heterogeneity of samples, and it will not be evident that a manual was available or used to guide the treatment. Chambless et al. include “behaviour modification for developmentally disabled individuals” in their listing of empirically validated treatments that are well established, citing our previous meta-analysis as support for this decision (Scotti et al., 1991). These evaluative criteria promoted by the APA Taskforce are now widely cited as the standards to be met (Lonigan, Elbert, & Johnson, 1998), thus requiring both explicit description and systematic replication of an intervention for judgement that a particular intervention strategy is empirically validated as efficacious or effective.

**Intervention focus and behaviour change targets.** The broad category of “behaviour modification for developmentally disabled individuals” is listed as a well established treatment that has been empirically validated (Chambless et al., 1995, p. 22). The literature and empirical evidence on which this judgement was based are not so much a package one might label “behaviour modification” but instead consist of multiple single-subject intervention reports. While these studies follow the general set of principles and practices referred to as behaviour modification, individually they

report particular behavioural interventions with one or more specific target behaviours.

Thus, the intervention literature for the children and youth who are the focus of this review has tended to emphasise particular behavioural problems, with studies typically reporting the effects of an intervention designed to reduce particular problem behaviours in one or more children who exhibit that behaviour. This focus on individual targets contrasts sharply with the major pattern in interventions designed for students with emotional disturbance or behavioural disorders who do not have developmental disabilities. For these students, a “behavioural level systems” approach is typically used whereby a system of contingencies is implemented for an entire group or classroom of students, who are presumed to respond positively to identical or similar conditions. Concerns have been expressed regarding whether it is effective, appropriate, or even legal to apply group interventions to address problem behaviours for any of these students who have disabilities and who may be entitled to individualised programmes (Scheuermann, Webber, Partin, & Knies, 1994). Interestingly, a recent intervention research report by Hagopian and his colleagues (2002) notes the paucity of evidence that group interventions are effective despite their widespread use; these researchers report the effectiveness of an alternative individualised approach.

At a fundamental if somewhat superficial level, “outcome” can be regarded simply as the impact of the intervention on a single target or problem behaviour. We found that much of the existing intervention literature continues to do just that, despite the obvious fact that children and youth with serious challenging behaviour have multiple needs. Another factor that should also mitigate against modifying one behaviour at a time is that children’s behaviours interrelate, forming a behavioural system of sorts for each child such that decreasing one behaviour can result in an increase in something even more troubling (Voeltz [Meyer] & Evans, 1982). The literature is replete with published intervention studies reporting changes in unintended behaviours when the target behaviour changes, and there is also growing evidence regarding the kinds of concomitant behavioural changes that occur when particular behaviours are targeted. If such patterns were predictable, we could attain maximum treatment efficiencies by targeting those behaviours with the greatest positive and the least negative impact across a child’s repertoire. This is the logic behind the work described most recently in Koegel and Koegel (2006) regarding Pivotal Response Treatments for autism, which are grounded on the assumption that certain behavioural responses are “pivotal” as foundation for subsequent positive behaviours and skills.

***The shift in the nature of intervention approaches.*** There has been a defined shift away from *consequence-based* to *antecedent and instructional interventions* to modify challenging behaviour. This shift reflects the understanding that children and youth are likely to use challenging behaviours as functional — if somewhat unconventional and unpleasant — equivalents to alternative, more positive social and communicative skills typical of their age-peers (Durand, 1990, 1999; Durand & Carr, 1991). It has also been argued that for intervention to be effective, it must be based on information gathered through a functional assessment to determine the purposes of challenging behaviour and the antecedents predicting its occurrence (Horner, Carr, Strain, Todd, & Reed, 2002; Scotti, Evans, Meyer, & Walker, 1991; Scotti, Ujchich, Weigle, Holland, & Kirk, 1996). Further, the presence of problem behaviour is often associated with placement in restrictive settings and situations that are objectively non-reinforcing if not actually unpleasant, thus depleting the child’s environment of positive antecedents to motivate positive behaviour and interactions even if new skills were learned (Meyer & Evans, 1989). There is strong support for the value of

teaching skills to replace challenging behaviours. However, teaching a child new skills will only work if the child can use those skills in positive environments and activities, and the use of such new skills in natural contexts will generally be part of any behavioural intervention plan (Evans & Meyer, 1985; Meyer & Evans, 1989).

Thus, the literature has shifted away from consequence-based interventions towards antecedent-based or ecological interventions, instructional programmes to teach replacement skills, and systems-oriented interventions that comprehensively address context as well as individual child needs. We now know that this shift has been rewarded by empirical evidence of the enhanced effectiveness of these alternatives. This shift away from consequence-based interventions also signals a move away from the use of aversive events and stimuli. The use of painful or “dehumanising” punishments to decrease severe problem behaviours has been critiqued on both social and treatment validity grounds (Horner, Dunlap, Koegel, Carr, Sailor, Anderson, Albin, & O’Neill, 1990; Meyer & Evans, 1989). This issue has not, however, remained grounded in philosophical debate. Alternative positive interventions are socially valid, that is, more acceptable to the community and to various intervention agents — teachers, family members and others. Just as importantly, there is now clear evidence that alternative positive interventions are both theoretically sound and more effective. The research literature has validated this shift in practice towards more educative and positive interventions, and an extensive evidence-base now exists to support the effectiveness of positive interventions for even the most severe behaviour problems. Consequently, there is international acceptance and widespread adoption and advocacy of educative and positive systems approaches (Carr, Dunlap, Horner, Koegel, Turnbull, Sailor, Anderson, Albin, Koegel, & Fox, 2002).

### **Context and Critical Features for Intervention**

Information about the efficacy of a particular treatment for problem behaviour that has been trialled in a research-oriented clinical or educational setting will provide a starting point for any practical intervention plan. However, families and educational systems need a great deal more information on which to base decisions regarding adoption of a particular intervention programme or choice of approach. Knowing that a technique has the potential to change single behaviours has limited usefulness in comparison to knowing that certain approaches — which may include particular techniques—will have ongoing effectiveness in the natural environment and can be carried out by the people in that environment. Other interventions may be highly efficacious in particular cultures or settings, but could be inappropriate in other cultural contexts or demand levels of resources or expertise that are simply not available in the environments accessible to the child, family and others in the life of that child. Hence, information about other variables surrounding the adoption of particular approaches is directly relevant to decisions and choices regarding the implementation of specific behavioural interventions.

Our review does not offer conclusive evidence regarding the relationship between mainstream placements and treatment effectiveness. Across our meta-analysis data examining different effect size statistics, the differences for treatment in mainstream vs. segregated settings were small and not statistically significant. There was only one significant effect size favouring non-mainstream treatment settings (out of ten possible results), with only the three+ database revealing a higher effect size for PZD which reports that an undesirable behaviour is eliminated and remains eliminated in the time period reported in the study. However, unless the goal is to maintain the child in a non-mainstream (restrictive) setting for life, this could be regarded as a

limited outcome of questionable significance given that the educational goal of interest would surely be improved behaviour in life's more typical settings and situations. Note also that the results of the cost analysis reveal that behavioural improvements were most likely to be maintained when the original treatment had been carried out within the constraints of available resources rather than with extra or extraordinary resources. These results suggest that expensive treatments may work in the short run but have less benefit once the additional resources are removed — as they inevitably would be.

Our meta-analysis also showed that community settings appear to be consistently effective for creating and maintaining positive behaviour change. Schools and hospitals as treatment settings were reasonably effective for eliminating behaviour. Regarding who delivers the intervention, the meta-analysis results found teachers, professionals, peers and parents all associated with some degree of success as intervention agents, whereas siblings were not found to be successful. We would argue that the influence of family involvement cannot be determined solely from the results of the meta-analysis, as effectiveness issues are complex and have a great deal to do with the longer term implications for both the child and family members for the involvement of the family. Peer involvement was associated with better outcomes for maintaining behavioural improvements. Incorporating systems change into intervention approaches — again, referencing the general environment and events — was significantly related to better outcomes. Finally, incorporating skills replacement training in combination with attending to environmental antecedents had the more positive results, with combined treatments being most effective overall.

If overall effectiveness is the critical factor of interest, these various contextual variables, including who delivers the intervention and in what setting, are critical. The literature has moved from viewing *efficacy* alone as the factor of interest — whether one can reliably change behaviour under experimental conditions — given that our concern is now longer focussed primarily on proving that behavioural intervention can work but has shifted significantly to demonstrating that it can make a difference in the lives of people with disabilities and their families. Interventions that are effective have to be those that will work, can be done, and will, if implemented, make a meaningful contribution to quality of life.

***The context of behaviour change and quality of life issues.*** Our meta-analysis provides a comprehensive summary of the technical evidence of the effectiveness of particular interventions for different children and in different circumstances. However, it is important that decisions regarding the adoption and implementation of treatment approaches look beyond reports of the efficacy of interventions on challenging behaviour in specialised settings and during the short term. Interventions that are successful under laboratory-like conditions with expert assistance may not be readily transferable to typical communities, schools and family circumstances. To adopt a particular intervention approach, there must be a presumption that the strategies will work in the actual settings and treatment environments of relevance to agencies and families (Feldman, Condillac, Tough, Hunt, & Griffiths, 2002; Lucyshyn, Albin & Nixon, 1997; Luiselli, Wolongevicz, Egan, Amirault, Sciaraffa, & Trembl, 1999).

For example, what interventions have ecological validity for use in natural environments by caregivers and teachers so that children can live at home and attend regular school? Alternatively, what interventions are those that appear “effective” in the narrow sense of changing behaviour temporarily for the better, but cannot be carried out in typical homes, centres and schools or by non-specialised personnel? What levels of expertise and training are required to implement interventions in different settings? Knowing the answers to issues of “contextual fit”

is essential background for decisions that must be made by educational agencies and by families to identify what is affordable, practical and best for children both in the short and longer term (Albin, Lucyshyn, Horner & Flannery, 1996; Meyer & Evans, 1993; Moes & Frea, 2000). This is the kind of behavioural change that has a meaningful impact on the quality of life for children, their families and their communities.

There is strong empirical evidence that inclusive, as opposed to self-contained, educational environments are associated with statistically significant positive gains on measures of adaptive behaviour, social competence, language development, and other traditional developmental domains (Fisher & Meyer, 2002; Laws, Byrne, & Buckley, 2000). Thus, children with disabilities who exhibit challenging behaviour could also be presumed to benefit most, educationally, from inclusive and integrated placements. The dilemma is, however, that their challenging behaviours interfere with placements in mainstream environments unless persons in those environments are prepared for and comfortable with the inclusion of a child with both developmental disabilities and severe behaviour problems. Professional training and preparing peers in classrooms are essential ingredients for the delivery of effective interventions in real-world schools and classrooms rather than in specially created, segregated settings.

***Critical features of effective interventions.*** Across ages, the following factors were reported to be associated with successful programmes to intervene with challenging behaviour in children and youth with developmental disabilities:

- Environments that are Motivating and Reinforcing: High rates of interesting and motivating activity in the environment, including the availability of choosing desirable and preferred events, activities, and objects.
- Functional Assessment: Strategies to assess the functions of challenging behaviour and circumstances associated with varying rates of that behaviour must be part of any effective intervention approach. Caregivers are also taught how to use the results of such assessments to generate hypotheses that will lead to appropriate intervention design. In contrast to cumbersome, expensive and time-consuming functional analysis procedures advocated by some, functional assessment strategies are reported in the literature that are do-able in typical settings with available resources (Evans & Meyer, 1985; Meyer & Janney, 1989; Schindler & Horner, 2005; Scott & Nelson, 1999) and according to cultural values (Evans & Paewai, 1999).
- A Focus on Teaching Critical Skills: Systematic individualised instruction by typical teachers and/or caregivers to teach the child new skills. Adults should be trained to intervene building on the child's existing repertoire, with learning objectives designed to enable the child to attain preferred reinforcers through positive rather than negative behaviour. Critical skills could be those "pivotal" to further development as well as those that provide the child with a positive "replacement" that can be used instead of a problem behaviour to achieve something that he/she wants.
- Tackling Challenges: An individualised level systems plan developed to intervene with priority target behaviour problems (e.g., aggression, tantrums) based on functional assessment and regular review of the evidence of effectiveness. Intervention planning can be varied, individualised and quite innovative, provided that it is tailored to evidence of functional behavioural relationships for the child and is do-able for those in the natural environment (e.g., Charlop-Christy & Haymes, 1996).

- Effective Communication Channels: Clear communication systems in the environment with responsive adults who recognise emerging communicative systems and systematically support developing verbal repertoires.
- Peer Interactions: Ongoing access to age-peers who demonstrate age-appropriate language, social, and play skills, whereby the child with disabilities is part of structured interaction opportunities in “zones of proximal development” consistent with learning theory (Vygotsky, 1978). Peers can also play a crucial role in the generalisation of newly acquired positive behaviour changes outside the specific “treatment” setting: They can either reinforce the new positive behaviours or they can work against the maintenance of behaviour change by inadvertently reinforcing negative behaviours instead.
- Family and Caregiver Training: Caregivers at home and in centres or schools should have access to training towards the design and implementation of individualised treatments for challenging behaviour. A cost-effective “pyramidal” training model has been shown to be both do-able and highly effective in addressing children’s behaviours and family support needs (Kuhn, Lerman, & Vorndran, 2003). As we commented regarding the impact of peers, family members will also play a crucial role in supporting the generalisation of positive behaviour change or contributing to the child reverting to old, negative behaviours if these continue to “work” in the home environment.

Several approaches clearly meet the effectiveness criteria described by Chambless et al. (1995, 1996) and have also been shown to maintain integrity through appropriate accommodation for contextual fit. These include Positive Behaviour Support (Bambara, Dunlap & Schwartz, 2004; Carr et al., 1999; Carr et al., 2002), Pivotal Response Treatments for autism (Koegel & Koegel, 2006), Functional Communication Training expanded to include augmentative systems (Durand, 1990), Triple P (Sanders, 1999) and the SCERTS Model (Prizant et al., 2004). Positive Behaviour Support (PBS) is a multi-component or *systems change* approach that includes attention to each of the variables noted above in the design of interventions to meet the needs of children in context. Similarly, Pivotal Response Treatment represents a systematic, comprehensive approach to a similar set of key variables for young children with autism. These and the other approaches mentioned have been validated with the use of intervention manuals and a variety of supplemental materials and case study illustrations, thus providing the needed information and guidance for replication. Alternative behaviour modification programmes for children and youth with challenging behaviour have traditionally focussed on the modification of single target behaviours with minimal consideration for the overall impact on a child’s repertoire or whether the intervention and behaviour change was generalisable and sustainable in the natural environment (Meyer & Evans, 1993; Scotti et al., 1991; Scotti et al., 1996).

Unlike other attempts to brand a particular approach to behaviour modification (e.g. EIBI) however, these approaches do not attempt to promote the rigid application of a package but instead emphasise treatment in natural environments and the application of sound principles of applied behaviour analysis. These principles include functional assessment, best practice instruction in teaching new skills, attention to contextual fit, inclusion in typical age-appropriate routines, and ongoing considerations of effectiveness, generalisation, and maintenance (Horner et al., 2002; Koegel, Openden, Fredeen, & Koegel, 2006). In each, there is an emphasis on involvement of the family as critical to child outcomes and family adjustment—a recommendation supported by the results of our meta-analysis as well. Positive Behaviour Support has been embraced as good behavioural practice internationally



and across sectors in centres, schools and community environments (Bambara et al., 2004).

By attending to social validation as well as the efficacy of this systems approach intervention, researchers and practitioners have promoted widespread adoption and appropriate, contextual adaptations of a model with maximum do-ability. Thus, the approach can be adapted to be culturally appropriate for use by Māori in immersion programmes and for other cultures as well. These approaches meet the high standards of evidence required in the published literature in internationally refereed journals and the requirements described by the American Psychological Association Division of Clinical Psychology's Task Force (Chambless et al., 1996). What would now be most useful are applications of these principles in New Zealand in the development of appropriate interventions nationally and regionally through an evidence-based, action research approach to enhance capacity across the sectors while ensuring the integrity and validity of results for children and their families.

### **The Importance of Culture and Cultural Context**

There is limited information available in the published intervention literature regarding cultural considerations in the design and implementation of effective interventions. We noted earlier in this report that our literature review was restricted to English language publications, which also would have an impact on the extent to which these findings can be regarded as applicable to non English-speaking cultural groups. Recent research does present some evidence across differing national groups, including extensive information from the USA and the UK, and a growing database internationally including, for example, evaluations from Australia (Sigafoos & Meikle, 1996), Canada (Ducharme & Popynick, 1993; Feldman et al., 2002), Israel (Hetzroni & Roth, 2003), New Zealand (Bevan-Brown, 2004; Church, 2003; Moore & Anderson, 2005), and Ireland (Taylor, O'Reilly, & Lancioni, 1996).

While the emergent international nature of this literature is promising, there has been little attempt to illuminate the impact of nationality, culture and/or ethnicity of participants on intervention approaches. With rare exception, the available literature still does not identify ethnicity of participants, and important issues remain unexamined regarding the impact of culture and ethnicity on disability needs and services. Dyches, Wilder, Sudweeks, Obiakor, and Algozzine (2004) recently noted differences in prevalence rates across ethnicity for autism and found little information regarding adaptations and supports that might be relevant for culturally diverse families. They emphasised the need for research on the relationships between culture and intervention needs of children with autism such as communication, social skills and behavioural repertoires.

As noted earlier in this report, our meta-analysis found no significant differences by ethnicity for the effectiveness of interventions with behavioural challenges. This does not provide any information regarding whether an intervention that was designed to be culturally sensitive would result in improved outcomes, given that virtually all intervention research is silent on the issue of cultural adaptations. Furthermore, even if the intervention design itself might not be different as a function of culture, using a planning process that is culturally sensitive could increase "treatment integrity" (the likelihood that an intervention would be implemented and maintained) which could, in turn, result in enhanced outcomes.

For the purposes of this review of effective programmes for Aotearoa New Zealand, it is crucial that recommended and available practices be culturally appropriate for

different groups. New Zealand as a country has historically comprised immigrant groups from overseas, and recent years have evidenced a major increase in immigration from very diverse cultural backgrounds and nations. Furthermore, Māori are the indigenous people in partnership with the Crown and later immigrant groups so that culturally appropriate practices for Māori — whether in immersion or mainstream context — must be a priority for further development and research on effective interventions.

***Culturally Appropriate Practices for Māori.*** At present, empirical intervention research validating culturally appropriate, effective planning or intervention approaches for Māori is lacking. However, there do exist considerable theory and best-practices guidelines in areas relevant both directly and indirectly, and in this section we discuss promising directions for intervention research.

Culturally sensitive and appropriate interventions require adaptations demonstrating “contextual fit” with Māori culture as well as for specific communities (Bishop, Berryman, Tiakiwai, & Richardson, 2003; Glynn & Berryman, 2005; Wearmouth, Glynn, & Berryman, 2005). Such considerations are critical to the suitability and sustainability of an intervention or programme. While the literature has not yet explicitly addressed the issue of what might be termed “cultural fit” as an overarching principle, such considerations are conceptually consistent with the systematic investigations of contextual fit that have characterised the Positive Behaviour Support literature in particular (*cf.* Feldman et al., 2002; Schindler & Horner, 2005). The action research model described in Meyer and Evans (2000) provides an example of the facilitation of appropriate evidence-based adaptations of best practice. This approach was endorsed by the Ministry of Education Reference Group on Autistic Spectrum Disorder and empowers local communities and groups to adapt practices to meet children’s needs through strategies that address community context. The model is evidence-based in requiring that adapted practices be formally evaluated and guided by a *critical friend* who is part of a national network of expertise in this area.

Similarly, Bevan-Brown’s (2003) *Cultural Self-Review* provides practitioners with a generic checklist for culturally effective, inclusive education for Māori learners. Evaluated through trials carried out in 11 schools and early childhood centres, her checklist is grounded in research on how exemplary educational practices (e.g., policy, processes, assessment) should be influenced by eight guiding principles:

1. Partnership/whakahoā
2. Participation/whai wahi
3. Active Protection
4. Cultural Development
5. Empowerment (individual)
6. Tino Rangatiratanga (iwi and hapu)
7. Equality and Accessibility
8. Integration

Bevan-Brown’s (2004) research on Māori families with a child diagnosed as ASD provides numerous examples of how the absence of accommodation of important cultural values can have negative effects on the family and the child. She describes the perceptions of Māori families for whom cultural considerations add another layer to the complexities of having a child with a severe disability such as autistic spectrum disorder. Whenever a child exhibits problem behaviours, there will be particular challenges for social relationships and social interactions. Interventions to address behaviour that interferes with social interactions must accommodate particular

expectations for behaviour in cultural routines—something that cannot occur in the absence of genuine consultation with Māori in carrying out assessments, designing interventions, and evaluating outcomes. At the same time, there is need to acknowledge that Māori children with disabilities and challenging behaviour also have authentic intervention needs that must be met by specialised services that are culturally sensitive as well as being clinically appropriate. At present, culturally appropriate interventions for students with challenging behaviours in immersion context including *kura* have not been accompanied by needed resources and expertise. As one Māori parent commented:

Teachers tend to treat children all the same in Māori immersion education—the “tātou tātou” attitude, but they are not all the same. There is a need to recognise impairment and use appropriate, specialised teaching methods with these children (Bevan-Brown, 2004).

Of course, this parent is reflecting her impression of the services currently available: There is a need for comprehensive educational initiatives to address specifically the important issue of these services and supports in immersion settings. These practices are developing, as evidenced by experienced Māori staff in Special Education on behalf of children receiving Ongoing and Reviewable Resourcing Schemes (ORRS) and Early Intervention (EI) services within a Māori framework and in genuine consultation with Maori. These staff and the activities of the Ministry of Education Māori Advisory Group (MAG) are providing developing models of partnership around assessment, designing interventions, and evaluating outcomes in both *kura* and *kohanga reo*. However, there remain significant shortages of Māori Speech and Language Therapists and Psychologists — two groups of professionals who play key roles in the design of culturally appropriate interventions for Māori children and youth with disabilities including those with challenging behaviours. If Aotearoa New Zealand is to meet its commitment under the Treaty of Waitangi to ensure that Māori children with disabilities have equitable access to *kohanga reo* and *kura* without having to sacrifice their individual needs, priority must be given to implementation of culturally appropriate supports and services delivered in immersion programmes for these children and their families.

A promising model of intervening in a culturally appropriate way is provided by Glynn, Berryman, Atvars, and Harawira (1997) and Glynn, Berryman, Walker, Reweti, and O'Brien (2001). These authors describe intervention planning on behalf of Māori communities, families and students who have challenging behaviours by working collaboratively with whānau and with respect for the mana and contribution of the Māori community. Their approach, *Hei Āwhina Matua*, emphasises how critical it is to assess behaviour in social and physical context, thus differing significantly from more traditional (now dated) approaches in which an intervention plan could be designed based on information about the child's behaviour but not about the circumstances and contexts in which the behaviour occurs.

Macfarlane (2005) highlights “Māori ecologies” reflecting a Māori worldview for the understanding of child development and environments supportive of the individual as an integral participant in his or her whānau, school and community. He describes, for example, the importance of teacher feedback to a child about behaviour that is culturally responsive. He also cautions that certain approaches or even values that may be widely regarded as universally affirming of the rights of children with disabilities can actually be intimidating and alienating to Māori families. The *Individual Education Plan (IEP)* is one such approach. A Māori-appropriate approach to making intervention decisions would instead emerge from the hui following Māori

protocol and encouraging diverse and multiple participation. In contrast, professionals draft the typical IEP according to technical and written protocols grounded in Anglo traditions, and family members are expected to consent without significant input into the process. Beth Harry and her colleagues have written extensively about these issues on behalf of other more collectivistic cultures that do not assign priority to individualistic interventions drafted through legalistic frameworks by persons outside the immediate circle of the child, family and community (Harry, 1992; Harry, Allen, & McLaughlin, 1995; Harry & Kalyanpur, 1994; Kalyanpur & Harry, 1999).

***Culturally appropriate practices for immigrant groups.*** Our caveats regarding the availability of culturally sensitive practices for working with Māori partially hold for work with children from refugee and immigrant backgrounds and their families. It is necessary to distinguish between the rights and expectations of these refugee and immigrant groups and the significance of Māori led and initiated practices, since immigrant groups are not Tangata Whenua and are tau iwi with respect to Treaty imperatives. On the other hand, it is logical that incorporating a culturally respectful approach should be a strong professional value and, as part of the intervention process, will enhance the likelihood of positive outcomes. This is because culturally sensitive approaches are far more likely to be understood and used by the young person, the family, and the immigrant community who comprise the context for the child's behaviour.

The Ministry of Education in New Zealand has prepared draft *Intersectoral Guidelines for Children from Refugee Backgrounds and their Families* (November 2006) that include general principles and specific cultural considerations for working with various refugee groups. This publication advocates that initial communications with a child's family should, whenever possible, be conducted by someone who speaks their language and who has knowledge of the cultural values of that community. The guidelines include discussion of particular Issues likely to be relevant for work with Arabic-speaking Middle-Eastern families; Eritrean and Ethiopian families; Somali families; Sudanese families; Burmese families; and Afghani families; these nationalities represent significant groups of immigrants to New Zealand in recent years. Afghani families, for example, are described as valuing keeping their affairs private so that full confidentiality is expected from the case worker; they would generally not want even their immediate community to know their business (p. 52). There will often be quite strict cultural rules around gender, with major implications for communications between practitioners and family members. Another section of the guidelines lists various Arabic and Muslim sayings that "may be useful in a therapeutic context at the interviewing Assessment and Intervention phases" (p. 112), many of which reference cultural values that are also evident in the values of those from English origins (e.g., "Do as you would be done by"). The manual includes tools and resources that can be used by practitioners towards providing more culturally appropriate practices.

### **Building Capability for Intervention Effectiveness**

The literature on behavioural intervention focuses on the behavioural repertoire of the person with developmental disabilities and challenging behaviour. Ironically, this literature seldom makes explicit the level of training and skill needed for the delivery of the intervention programme described. One notable exception is the growing literature on effective models for parent training, such as the Triple P and SSTP programmes developed and validated by Sanders and his colleagues in Australia (reviewed in Section 5 of this report). There is less available regarding the level of

skill needed and delivery of appropriate professional supports and training to enable teachers, teacher aides, speech language therapists, and other professionals to meet the needs of these young people with confidence.

Indeed, the published intervention literature could be interpreted as dramatic examples of service delivery failures. Had the carers, teachers, and other professionals in the lives of the participants in this research had ongoing access to appropriate positive skills and understandings about intervening in typical community environments, these young people would never have made the pages of our professional journals and books. Instead, they would be quite ordinary with far less serious behaviours or perhaps no challenging behaviours whatsoever because those in their everyday environment could intervene and had intervened effectively. It is precisely because their teachers and others in that everyday environment were unable to intervene effectively that they became part of the kinds of extraordinary intervention research that have become part of our published knowledge-base.

Dunlap, Hieneman, Knostrer, Fox, Anderson, and Albin (2000) emphasised the critical need to build capacity among educators and other professionals so that children can receive effective and appropriate interventions in their schools and communities. It is generally assumed that the acquisition of the necessary specialised skills will be the focus of staff professional development — often referred to as “inservice training” — rather than comprising a meaningful part of the preservice professional curriculum prior to employment in a role responsible for planning children’s programmes. Dunlap and his colleagues stress that the learning objectives for inservice training in this area must provide both “practical knowledge and a generalisable process for intervention” and list the following as essential, interdependent professional development content areas:

1. A collective vision and goals for intervention
2. A collaborative team of families and professionals working together
3. Use of functional assessments that identify the relationship between behaviour and the environment
4. Understandings about multi-component support plans based on reasonable judgements about the meaning and purpose of the child’s behaviour
5. How to design and use intervention strategies such as changing environmental conditions, teaching replacement skills, modifying consequences, and enhancing lifestyles
6. Usable and valid strategies to monitor and evaluate the results of an intervention
7. How to infuse positive behaviour support into the broader system of the child’s every day environments and situations (Dunlap et al., 2000).

Dunlap’s research team has presented an overview of various training models that have been supported in the United States with special government funding, including a national inservice training model to provide professionals and family members in 20 states to design positive behaviour support programmes (Anderson, Russo, Dunlap, & Albin, 1996).

Some years ago, Meyer and Janney (1992) also described how teams can provide support across an entire region enabling school personnel to design, implement and

evaluate effective interventions for challenging behaviour. Durand and Kishi (1987) similarly demonstrated the effectiveness of a technical assistance model whereby specially trained consultants worked with teachers and other professionals across a region to address severe behaviour problems in children and youth who were deaf-blind. Both models entailed ongoing access to a network of consultants with expertise in selected best practices who worked collaboratively alongside children's teachers but who also communicated with one another. This sharing of expertise among regional consultants enables each consultant to acquire enhanced knowledge and understandings exceeding what would otherwise be possible for low incidence challenges within any one school. The principles and practices of this model were incorporated into the "critical friend" consultant network adapted for the New Zealand context by Meyer and Evans (2000) to enable children with ASD and challenging behaviours to receive effective educational services and supports in their local communities.

## **Section 9: Key Findings and Recommendations for Service Delivery**

### **Key Findings**

In this section, we highlight key findings from our meta-analysis and other sources of evidence of best practices based upon the published international literature on challenging behaviour in children and youth with developmental disabilities. These key findings are organised into best practices and evidence of intervention effectiveness.

#### ***Best practices in behavioural intervention***

- A functional analysis of the purposes of behaviour for the child is incorporated into intervention planning for the majority of research reports in the published literature.
- Positive interventions implemented in a variety of environments now predominate in the published literature in comparison to reliance on restraints, aversives or other intrusive approaches more commonly used in reports published prior to 1990.
- The best outcomes appear to occur when treatments are *not* driven by medication, aversives, intrusiveness, and use of restraints. In addition to producing the best results, positive interventions lend themselves to sensitive, ethical, and socially responsible service delivery.
- Multi-component interventions are both recommended and increasingly common in the published literature across all categories of challenging behaviour.
- The published literature continues to favour programmes tailored to individual child needs rather than diagnosis or age per se, but increasingly incorporates attention to the child's developmental level as well as the contextual fit of an intervention with the child's environment and culture.
- In Aotearoa New Zealand, it is essential that there be involvement and collaboration with whānau whānui respectful of the mana and contributions of community to intervention design, and evidence is promising that the incorporation of culturally appropriate principles and practices will have a positive impact on child and family outcomes.

#### ***Evidence of intervention effectiveness***

- Self-injurious, stereotypic, socially inappropriate, and destructive behaviour responded well to behavioural treatments, and the results for aggressive and disruptive behaviour were less successful.
- A child's primary or secondary diagnosis did not moderate outcomes, that is, the child's "syndrome" and cluster of behaviours associated with that syndrome is of less significance to the success of an intervention than the nature of the challenging behaviour.
- Published interventions carried out in schools, treatment rooms, and residential settings appear to be the most effective, and intervention in mainstream settings is not associated with better outcomes.
- Effective interventions are likely to be implemented by a professional or teacher, involve peers in that setting, and be carried out in a number of controlled contexts (residential, school, treatment room).

- Involving family members and siblings in the intervention did not necessarily result in significantly better outcomes.
- Combination treatments incorporating systems change and single treatments without system change both produced satisfactory outcomes. All combinations were effective in maintaining eliminated behaviour, consistently produced better effects than single treatments, and performed well in modifying challenging behaviour. Single treatments in conjunction with systems change were best at maintaining a zero rate of behaviour.
- Skills replacement training outperformed other single treatments (e.g., antecedents or consequences) and performed best in combination with systems change. Further, skills replacement training was equally effective across all ages and diagnoses.
- There is no evidence of difference in treatment responsiveness for children diagnosed as Autistic/ASD in comparison to children with other diagnoses, with the exception of a slight effect for the inclusion of an antecedent treatment component for children with ASD in comparison to other children. Overall, skills replacement training significantly outperforms all other treatment approaches for children with autism as it does for children with other diagnoses.
- A well-targeted, carefully applied, and time-limited intervention, conducted within or close to the resources readily available to the treatment provider, is likely to be more useful and effective than alternatives requiring extraordinary resources, supports and extended durations of treatment.

### **Recommended Levels of Behavioural Support**

The results of our review of the literature provide substantive evidence of the services and support that should be provided towards positive outcomes for children and youth who have developmental disabilities and challenging behaviours. Clearly, the provision of educational and behavioural interventions to these young people and their whānau/families can make the difference between escalating costs of management versus increased independence and participation in the community without threat to self and others. We delineate three levels of support that have face validity as a reasonable interpretation of the information available in intervention research, theoretical discussions, and other development materials published regarding the treatment of severe behavioural challenges.

Unlike the results of our meta-analysis revealing which types of treatments result in which types of outcomes, we do not have a systematic body of evidence that could be similarly analysed regarding the relative effectiveness of different approaches to behavioural support or different types of services provided to schools, families and individual children. Nevertheless, the information reported in the research indicates that the kinds of supports described below reflect those factors characteristic of successful interventions associated with efficacious interventions. These interventions not only work in reducing problematic challenging behaviour and enhancing the adjustment of child and family, they encompass educational best practices, capacity for culturally appropriate adaptations, individualised accommodation to meet children's needs, and realistic expectations for caregivers and professionals in typical environments to acquire the skills required for effective intervention. Listed below are three broad categories of levels of support to address the needs of the children and youth who are the focus of this review report:



### **Level 1 Behavioural Support:**

**Placement in integrated school and community environments with a positive behaviour support programme that makes possible access to participation with peers in a normalised if partially restrictive range of school and community activities leading to meaningful educational and social outcomes.**

The majority of students with significant challenging behaviour can be accommodated within safe early childhood centres/services and schools, provided that support and specialised training services are available to teachers and caregivers within an inclusive educational model. Typical centres and schools must have in place a transparent, comprehensive behavioural environment that supports positive behaviour for all children and youth in the programme, augmented by additional individualised special education services for those children with significant needs (Carr et al., 2002; Scott, 2001; Weigle, 1997).

Our review indicates that virtually all children in the early childhood to middle years who exhibit severe challenging behaviour can be accommodated in typical school and community environments with the availability of positive behavioural support and supplemental caregiver training and support. For very young children who have disabilities and challenging behaviour, there is evidence that placement in proximity to appropriate non-disabled peer models is essential as supplemental to structured educational intervention. Our review supports the effectiveness of inclusive school placements in classrooms with same-age non-disabled peers for most children and youth with severe disabilities and challenging behaviours, provided that schools have in place systemic child supports and capacity for individualised interventions including the availability of trained personnel and family supports.

### **Level 2 Behavioural Support:**

**Placement in a more restrictive school setting with a positive behaviour support programme that facilitates at least some access to typical educational/community settings and activities plus participation with non-disabled peers.**

There will be a subset of students with significant challenging behaviour whose needs may exceed the capability of typical New Zealand early childhood centres, primary and secondary schools without extensive wrap-around services and recourse to more restrictive settings. However, based on our preliminary review of the evidence, the number of students in this category is small and will comprise primarily those whose challenging behaviour was not successfully addressed at an earlier age. Thus, this is most likely to be an issue at secondary levels. Whenever such placements are necessary, the timeframe for these placements should be time-limited and subject to periodic, scheduled review (Moore & Anderson, 2005). From a systems perspective, the Ministry of Education should openly and publicly acknowledge that more restrictive placements are necessitated primarily because of the lack of experience of our centres and schools, rather than because of the characteristics of the children and youth. Such acknowledgement is reasonable, given that similar students are being accommodated in inclusive settings in selected regions internationally where more mature and perhaps better resourced services are available.

Our review indicates that a minority of children in the middle years and the majority of secondary age youth who (continue to) present with severe challenging behaviours may require this level service at varying, limited periods of time—but with ongoing access to typical schools provided throughout the programme and as the goal for placement following successful intervention. As children become older, the

preparation of significant others in the child's natural environments—family members, teachers, and peers — with appropriate management responses to challenging behaviour will ultimately determine the extent to which those behaviours can be managed long term to facilitate community placements and participation.

**Level 3 Behavioural Support:**

**Level 1 or Level 2 plus wraparound child-centred services and/or parent training outside the range of the normal school day and/or school year to support families.**

There is evidence that wraparound services are essential at certain time periods and/or for certain family circumstances if the child with significant challenging behaviour is to have a fair chance of staying at home and attending a school in his/her community with siblings and peers. In particular, providing such services during the child's early and middle years has been demonstrated — internationally and with diverse cultural groups — to increase significantly the likelihood of successful remediation of challenging behaviour and participation in typical environments. An investment in family support services will be crucial not only to reduce stress in the child and his/her family, but also to prevent a necessity for far more extensive and expensive special services on a lifelong basis if family and child needs outside the school day are not addressed. Parent training services may also be warranted, but the potential effectiveness of these services will vary as family circumstances vary and according to the age of the child. Note also that wraparound services may be supplemental to parent training or may be needed regardless of parent training options. Providing such services extensively to young children and on an as-needed basis to older children will reduce financial and social costs to both families and government in the long term.

Our review supports the provision of wraparound support and training services to all families with a child aged birth to eight years who has severe challenging behaviour dependent upon voluntary participation and at a level appropriate for caregiver capacity and preferences. This is because of the overwhelming evidence of the effectiveness of structured educational interventions accompanied by family and peer intervention support programmes. Our review also supports the provision of wraparound community-based services for families with older children on an as-needed basis. This is because of the severe needs represented by this age if earlier interventions have not by that time resulted in the necessary reductions in serious challenging behaviour. Without wraparound community-based services, families and typical school environments are unlikely to be able to accommodate the level of risk to safety represented to self and others.

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## Appendices

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## Appendix A

### Glossary of Less Familiar Terms and Abbreviations<sup>5</sup>

Antecedent	An event that occurs prior to the behaviour and that serves as a stimulus or trigger for behaviour (i.e., in reliably predicting the behaviour). Antecedents can be actions by other persons, environmental factors, and the physical state of the person exhibiting the behaviour (e.g., fatigue, anxiety).
Aversive	A punishment consequence that is painful, humiliating, and/or extremely uncomfortable for the individual such that it would generally not be acceptable for use in typical situations and environments.
ASD	Autistic Spectrum Disorder (including both Autism and Asperger syndrome).
Baseline	A formal record or measure, usually by observation, of the frequency or occurrence of a behaviour over a period of time before any formal intervention has been introduced. The baseline reflects the level of the behaviour prior to specific intervention
Case Conceptualisation/Formulation	Developing a comprehensive model of the likely internal and environmental factors that influence the individual child's current behaviour, including indication of deficits in the repertoire as well as strengths
Challenging Behaviour	Behaviour that presents a challenge for the person with special needs and/or others in that person's life. Challenging behaviour exceeds in nature and scope what might be regarded as typical variations in behaviour and, unless modified, is likely to interfere significantly with the person's social adjustment, interactions and participation in natural environments and typical contexts.

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<sup>5</sup> This Glossary of Terms and Abbreviations is not intended to be comprehensive but is instead focused on selected terms that are somewhat specialised within some disciplines

Consequence	An event that follows a behaviour and is associated with that behaviour, whether positive (reinforcement) or negative (punishment).
Do-Able	Whether or not an intervention can be carried out in natural environments, using available resources, by those likely to be present long term to follow through, and under typical circumstances.
Ecological	Relating to an individual's environment (both social and physical).
Educative	An intervention that involves teaching new behaviour and/or skills rather than an approach that involves manipulating pre-existing behaviours.
Effectiveness	Whether or not an intervention works to change behaviour in the predicted and desired direction of meaningful behaviour change in real world settings and situations.
Effect Size	Literally the size of the effect that the intervention or treatment has produced. Effect size has become an important index for understanding the impact of a treatment, since any treatment might produce a statistically significant change but one that is not socially meaningful or valuable to the individual.
Efficacy	Whether or not an intervention works to change behaviour in the predicted and desired direction, generally demonstrated through well-controlled, specialised clinical trials, with preselected problems/syndromes.
FCT	Functional communication training: a method designed to eliminate challenging behaviour by teaching the individual a communicative skill (words, signs, or symbols) that will result in the same social consequences as the challenging behaviour, but in a way that is more acceptable and likely to be understood by others.

Functional Analysis	A formal process for determining what it is that the behaviour is achieving for the individual; developing hypotheses for understanding the variables that currently control the behaviour as opposed to possible past influences.
GSE	Group Special Education (the agency within the Ministry of Education in New Zealand that provides specialist services to students with special needs).
Moderator Variables	Factors that show a systematic and predictable relationship with treatment outcomes over and above general patterns for different approaches. Moderator variables can encompass demographic factors such as gender, culture, age, and diagnosis as well as characteristics of the target behaviour (e.g., the severity of the behaviour) or intervention (e.g., the level of treatment intrusiveness).
Positive Behaviour Support	A positive intervention package including changes to the environment, the behaviour of others, and various situational variables in addition to specific intervention with challenging behaviours exhibited by a person with special needs.
Reinforcer	Any event that serves to maintain the behaviour that produces it, somewhat similar to the idea of a reward. The process of increasing or maintaining behaviour by a positive consequence is called reinforcement.
Skills Replacement	Providing positive, socially acceptable, and effective skills or competencies, usually those skills that will work in achieving the same outcomes (function) as the undesirable behaviours which the skill is expected to replace.

Social Validity	Determining the acceptability of a treatment plan and/or the meaningfulness of a behavioural outcome by judgement of the individuals most closely connected to the client as well as by consideration of developmental norms (is this the sort of outcome that would be expected for any child from that cultural group at that developmental stage).
Systems Change	An intervention that addresses both the special needs of the individual and contextual variables, often involving significant changes to the environment and the behaviour of others in the environment. A system is the various inter-related components of any complex organisation.
Wrap-Around Services	A comprehensive network of intensive services and supports that are child-centred, generally involving multiple agencies (e.g., both the Ministry of Education and the Ministry of Health/Mental Health), interdisciplinary (e.g., education, speech therapy and psychology), and contextual in providing family and community supports outside the school day. Wrap-around service delivery models are generally recommended to address special needs that are persistent and severe in nature such that the needs of the child and family exceed what can be provided during a school day.

## Appendix B

### Coding Form Challenging Behaviour

	Variable	Categories
	Article	code
	study type	1=single-case 2=group studies
<b>Child / Adolescent</b>	Age	numerical
	Gender	1=male 2=female
	ethnicity/culture	
	diagnosis – primary	1=mental retardation 2=autism/ASD 3=multiple disabilities 4=traumatic brain injury 5=others
	diagnosis – secondary	As above
	target behaviour	1=SIB 2=aggression 3=destructive behaviour 4=stereotypic behaviour 5=inappropriate social behaviour 6=disruptive behaviour
	behaviour severity	1=level 1; 2=level 2; 3=level 3
	IQ/intellectual level	Numerical (scale)
	sensory impairments	1=none 2=mild 3=significant (blind; deaf) 99=none reported
	motor impairments	1=none 2=mild (mildly cerebral palsy; unsteady ambulatory) 3=significant (nonambulatory) 99=not reported
	communication ability	1=none 2=some 3=age adequate 99=not reported
	Assessment	
	previous interventions	0=no; 1=yes
<b>Setting + Context</b>	setting – early childhood setting – primary	1=residential (home) 2=school 3=community 4=treatment room 5=hospital
	setting – secondary	same as above
	mainstream	0=no; 1=yes
	intervention agent	1=staff 2=professional 3=parent/adult family 4=sibling 5=peer 99=not reported
	family context	0=no; 1=yes
	peer involvement	0=no; 1=yes
	Agencies	

	Variable	Categories
<b>Treatment</b>	designated by author	
	secondary intervention	
	Design	
	functional analysis	0=no; 1=yes
	drugs/medication	
	Restraints	
<b>Practicality</b>	Cost	
	Specialisation	0=no; 1=yes
	Duration	
	Doable	0=no; 1=yes
	positive behaviour support	0=no; 1=yes
<b>Raw Data</b>		
<b>Outcome</b>	M(B)	
	M(I)	
	SD(B)	
	SD (I)	
	SD (P)	
	r (B)	
	r (I)	
	Lowest (B)	
	N below B	
	% below B	
	<i>R</i> <sup>2</sup>	
	<i>D</i>	
	SMD	
	PZD	
	PND	
	collateral change	1=positive 2=negative
	follow-up length / trajectory	numerical / trajectory
	Independence	1=increase 2=decrease
less restrictive environment	0=no; 1=yes	
quality of life	1=increase 2=decrease	
normalised social + family relation	0=no; 1=yes	

## Appendix C

### Articles Included in the Meta-Analysis

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## Appendix D: Key Books, Monographs, and Unpublished Reports

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