

UNIVERSITY OF SOUTHAMPTON

FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES

School of Psychology

**Home-Based Early Intensive Behavioural Intervention
for Young Children with Autism:**

**Development of a Measure of Perceived
Therapeutic Self-Efficacy**

by

Matthew David Symes

Thesis for the degree of Doctor of Philosophy

September 2005

CORRECTION SHEET

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES
SCHOOL OF PSYCHOLOGY

Doctor of Philosophy

HOME-BASED EARLY INTENSIVE BEHAVIOURAL INTERVENTION
FOR YOUNG CHILDREN WITH AUTISM: DEVELOPMENT OF A
MEASURE OF PERCEIVED THERAPEUTIC SELF-EFFICACY

by Matthew David Symes

Research has shown that young children with autism can benefit considerably from home-based early intensive behavioural intervention (EIBI) founded on the principles of applied behaviour analysis. Interventions devised by highly trained and experienced supervisory staff are delivered on a daily basis by teams of therapists. Despite the potential for improvement in many areas of children's functioning, variability in outcome is commonplace with only 50% of children at most achieving the high levels of functioning reported for best outcome children.

The variability in outcomes observed in home-based EIBI is likely in part to be the result of the quality of therapist performance during intervention sessions. Therapist behaviour in this context is, however, poorly understood. Perceived therapeutic self-efficacy may be one factor responsible for governing therapist behaviour. Exploration of this factor is, at present, hampered by the lack of a valid and reliable measure of perceived therapeutic self-efficacy; the aim of the present thesis was to devise such a measure. To achieve this, it was necessary to identify barriers that therapists considered to impede their ability to deliver home-based EIBI. In the first study, 19 therapists delivering home-based EIBI to young children with autism in the South of England were interviewed. Barriers to intervention delivery included child factors such as challenging behaviour and lack of progress, supervision factors such as being observed during sessions, therapist factors such as emotional reactions to children's behaviour, and factors related to the intervention such as advanced skill targets.

Following the identification of barriers to delivering home-based EIBI, two further questionnaire studies sought to clarify the nature of perceived therapeutic self-efficacy and explore predictors of therapists' beliefs. Factor analyses of therapists' responses identified two dimensions of perceived therapeutic self-efficacy relating to (i) teaching a child who is difficult to engage with and (ii) teaching a child whilst being observed. Subsequent regression analysis revealed the former dimension was predicted by therapists' perceptions of their own experiences, general self-efficacy and supervision frequency. There was also evidence to suggest that general self-efficacy beliefs act as a protective factor in this domain when therapists experience difficulties. The latter dimension was predicted by therapists' perceptions of their own experiences, general self-efficacy beliefs and knowledge of behavioural principles. The final chapter presents a summary of these findings, explores future research directions and considers the theoretical and clinical implications for home-based EIBI.

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ACKNOWLEDGEMENTS

Many people have provided me with support and guidance throughout the planning and production of this thesis. I would like to acknowledge their input here. If I have failed to recognise anyone's contribution, please accept my apologies.

I owe a great deal to my wife, Paula. She has listened patiently when I have felt the need to explore ideas in the middle of the night and provided encouragement when I needed it most. In addition, she has put up with me working over many evenings and weekends; I look forward to devoting this time to you in the future. I am also grateful to my family and friends for their continuous and seemingly unconditional support.

The research included in this thesis has benefited from the input of a number of adept academics and clinicians. I have been in the fortunate position of being able to draw from the combined skills, knowledge and expertise of three supervisors for the duration of this research. I have had many interesting discussions and benefited from the guidance of Professor Bob Remington, Dr. Tony Brown and Professor Richard Hastings (now at University of Wales, Bangor). Their differing perspectives on the literature, research findings and practical implications have helped me to broaden my consideration of relevant issues. I would also like to thank my advisor, Dr. Narinder Kapur (now at Addenbrooke's hospital, Cambridge), for his support and advice.

In addition to my regular supervisory contact, I have also been assisted by a number of other generous individuals. Mei Li and Tess Bryant, both postgraduate research students within the School of Psychology, have been instrumental in helping me to construct the materials and analyse the data that are contained within this thesis. Bryan Newman, Senior Technician, has also provided practical support. I must also thank the following people for helping me gain access to research participants: Paula Filby, Monika Lemiac and Ruth Littlewood from the Southampton Childhood Autism Programme and Mandy Williams, Chief Executive Officer of the UK parent-led charity Parents for the Early intervention of Autism in Children (PEACH). Given the difficulties inherent in conducting research in home-based early intensive behavioural intervention for young children with autism, I am indebted to their goodwill. I would also like to thank the therapists who gave up time in their busy schedules to participate in the present research.

This thesis would have been impossible to complete without the financial support of Remedi, a registered charity supporting research regarding all aspects of rehabilitation and disability in the UK. I thank the Trustees and donors for their assistance.

Finally, I would like to thank George Gover and his family for providing me with my initial experiences of working with young children with autism. It seems a long time since they first helped bring the discipline of psychology to life for me; if this thesis were to carry a dedication, it would be to them.

CHAPTER ONE

Home-Based Early Intensive Behavioural Intervention for Young Children with Autism: Process and Outcome

Chapter Summary

The aim of the start of this chapter is to introduce early intensive behavioural intervention (EIBI) for young children with autism. The first part of Chapter 1 defines the key elements of this intervention, focusing on home-based delivery. The nature of early intervention, intensive intervention, and behavioural intervention will be explored. Typical instructional sequences and staff roles will also be explained, emphasising the different responsibilities that staff members have in delivering the intervention to young children with autism.

In the second part of Chapter 1, I critically review various outcome studies that claim to demonstrate the effectiveness of home-based EIBI. This literature reveals that, despite methodological flaws, home-based EIBI is the most effective intervention at present for alleviating the symptoms of autism. I will conclude this chapter, however, by demonstrating that not all children benefit to the same extent, with few attaining the levels of success those best outcome children achieve.

Home-Based Early Intensive Behavioural Intervention for Young Children with Autism: Process and Outcome

1.1 Early Intensive Behavioural Intervention

Of all the proposed interventions and treatment strategies for young children with autism, early intensive behavioural intervention (EIBI) has the most scientific support of demonstrable effectiveness (Smith, 1996). The goal of early intensive behavioural intervention is to “maximize cognitive, adaptive, and socioemotional functioning in preschool-aged children with autism so that they can take better advantage of educational opportunities available in their communities in later life” (Smith, Donahoe, & Davis, 2000, p.29). For the purposes of clarification, I will briefly describe the elements of an early intensive behaviourally based intervention.

1.1.1 Early Intervention

Intervention for children with autism is considered to be most effective for young children, ideally prior to attending school. As with all intervention for children at risk of cognitive and social delay, earlier rather than later involvement is more likely to be successful, when the gap between typical and atypical developmental trajectories is relatively narrow (Ramey & Ramey, 1998). With regard to behavioural intervention, Lovaas (1987) assumed that young children would be expected to generalise and maintain any benefits of intervention, as it is unlikely they are able to discriminate between different environments. It has been suggested that the optimal age of commencing EIBI for children with autism is prior to the age of 5 years (Green, 1996), although a recent case-study has reported intervention to be very effective with a 14-month-old child (Green, Brennan, & Fein, 2002). At the neurological level, it is suspected that early intervention could act on malleable neural circuitry, neurotransmitter systems, or genes that are dependent on environmental stimulation (Lovaas, 2003; Ramey & Ramey, 1998). Specifically, Huttenlocher (1984) predicts that to be effective, environmental stimulation would need to be provided before school age, when the human nervous system is most ‘plastic’ (i.e. is able to make systematic

functional and structural adjustments in response to internal or external stimulation; Stiles, 2000). At present, however, there is no evidence that EIBI actually causes change in the neurobiology of young children with autism. Potentially useful methods for ascertaining these effects include functional magnetic resonance imaging research concerning the reorganisation of visual, language and motor cortices in children (e.g. Johnston, Nishimura, Harum, Pekar, & Blue, 2001), and evoked response potentials accompanying vocal language tasks (Lovaas, 2003). Due to the importance of early involvement, this thesis will focus on intensive behavioural interventions that are applied to children with autism from a young age.

1.1.2 Intensive Intervention

Individuals learn throughout the course of their lives. It seems appropriate that learning opportunities for young children with autism should reflect the learning opportunities of typically developing children, with intervention being intensive in terms of hours per week and overall duration. Research demonstrates that the most effective outcomes for young children with autism are likely to occur if they receive at least 30 hours per week of intervention for at least 2 years (Green, 1996). Although children enrolled on EIBI within preschool- and centre-based settings have shown promising developments (e.g. Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991), it has been suggested that intervention begin in a child's home, where more time can be devoted to individualised (i.e. one-to-one) intervention in an environment with fewer distractions (Luce & Dyer, 1996). Initiating intervention in the setting where the child spends most of their time (i.e. their home) is likely to be most beneficial (Green, 1996). This thesis will concentrate on home-based EIBI for young children with autism, as this is the environment most likely to provide sustained intervention over many years.

It is important to note that there is likely to be an interaction between the age of initiation of intervention and the intensity of intervention. Thus, interventions starting early in a child's life may be ineffective if they are not delivered intensely (Ramey & Ramey, 1998). The focus of this thesis will be on intensive interventions that are delivered early in a child's life, for many hours per week over many years.

1.1.3 Behavioural Intervention

There have been a wide variety of explanations proposed for the existence of autism. These range from medical reasoning regarding the role of genes and early brain development through to psychological accounts encompassing theory of mind deficits, weak central coherence and executive dysfunction (Baron-Cohen, 2004; Hill & Frith, 2003). Research expanding these accounts is useful, but is unlikely to give rise to interventions in the near future. There is, at present, no way of ‘curing’ autism and the benefits of psychopharmacotherapeutic approaches are limited at best (Bryson, Rogers, & Fombonne, 2003). In contrast, a behavioural theory of autism has been the most productive to date in terms of intervention prospects (Fombonne, 2003; Volkmar & Pauls, 2003). Home-based EIBI programmes for young children with autism are based on the principles and techniques of applied behaviour analysis (ABA), and in particular, operant learning. ABA extends the experimental investigation of operant behaviour to settings of clinical, educational, and/or social significance (Baer, Wolf, & Risley, 1968, 1987). The focus is on creating significant change in observable behaviour, with emphasis placed on demonstrating the factors accounting for behaviour change, (Kazdin, 2001). Since the 1960s over 550 published studies have contributed to the knowledge-base of behavioural intervention for children with autism, focusing on reducing challenging behaviour and developing social, communication, self-help and academic skills (DeMyer, Hingtgen, & Jackson, 1981; Hingtgen & Bryson, 1972; Lovaas, 2000; Matson, Binavidez, Compton, Paclawskyj, & Baglio, 1996). The catalyst for this vast body of research was a paper presented by Ferster in 1961. Ferster described a functional analysis of the behaviours observed in children with autism. The essence of this analysis was that the behaviours of these young children were operants that were maintained by reinforcement. Tantrums, self-injurious and self-stimulatory behaviour, for example, were thought to be maintained by social reinforcement from parents who found these occurrences aversive. All of these operants could be observed in normally developing children, but it was the relative frequency of occurrence of these behaviours that indicated that a child had autism. It was suggested that, in order to alter these operant behaviours, the environment would need to be changed. This formed the basis of the behavioural approach to autism intervention.

Following this functional analysis, Ferster and colleagues attempted to add substance to the argument by demonstrating that environmental modification could lead to changes in the behaviour of children with autism. The first of these experiments was based in the laboratory, and was an attempt to broaden the behavioural repertoire of children with autism (Ferster & DeMyer, 1961). Two children participated in the research. These children were placed individually in a room that contained a coin-vending machine and numerous stimuli, such as a pinball machine, a vending machine containing toys and food, and a portable electronic organ. The children were required to press a key on the coin-vending machine to obtain a coin. By placing this coin in the relevant slot next to the preferred stimulus, the child could access their chosen reward. Ferster and DeMyer found that the children's key pressing could be controlled by different reinforcers or schedules of reinforcement. In addition, children learnt to press the key in the presence of a new stimulus, such as a light, and not perform this response in its absence (i.e. an example of stimulus control). This approach was extended to a more ecologically valid environment, being a children's hospital (DeMyer & Ferster, 1962). In this study, it was found that social behaviour, toy play, and self-help skills could be increased through teacher's use of social reinforcement. In addition, self-injurious behaviour could be eliminated. Thus, the use of reinforcement procedures to further the behavioural development of children with autism was not confined to laboratory settings, but had the potential for immense practical benefit.

Despite the success of the research of Ferster and colleagues, a fundamental weakness in this account of the behavioural development of children with autism resides in the hypothesis that parents are the main cause. This account seems to represent, to some extent, a psychodynamic explanation of autism given in behavioural terms. Ferster considered, in much the same way as psychodynamic writers (e.g. Bettelheim, 1967), that well-educated and socially active parents were the source of a child's autism. One of the main criticisms of such a stance, however, is that there is no evidence that the parents of children with autism differ from other parents in such domains (DeMyer, 1975). The power of behavioural techniques in promoting the development of children with autism has, however, continued. Although other writers have proposed behavioural theories of autism (Bijou & Ghezzi, 1999; Koegel, Valdez-

Manhaca, & Koegel, 1994), the most influential account has been that of Lovaas and Smith (1989). This theory formed the basis of the seminal research and intervention programmes based at the University of California – Los Angeles that remain the most successful demonstration of home-based EIBI for young children with autism (Lovaas, 1987).

The continuity model is a behavioural theory of autism that dismisses the traditional notion of a common core deficit (Lovaas, 2003; Lovaas & Smith, 1989). This rejection is based on the observation that children given a diagnosis of autism are extremely heterogeneous in their presentation and response to intervention. In addition, all of the behaviours displayed by children with autism (e.g. self-stimulation, echolalia) are apparent in normally developing children. Rather than embracing the concept of autism as a single disorder, Lovaas and colleagues approached the challenge in a different way. Autism was divided into separate behaviours that could be observed and reliably measured. This allowed research concerning the behaviour of other groups of people to be utilised, as behaviour was the target of intervention, and not autism per se. It was also considered that each of these behaviours might be caused by separate neurobiological deviations. Thus, autism was viewed as the outward display of an atypical nervous system. Different combinations of neurological abnormalities were thought to be responsible for the wide variation in behaviours exhibited in these individuals. As it had already been demonstrated that children with autism were able to learn in specially constructed environments, behaviours could be addressed and developed separately. Thus, the accumulation of behavioural research could be brought together into a comprehensive intervention programme that tackled all areas of a child's functioning.

1.2 Home-Based EIBI Service Delivery

1.2.1 Instructional Sequence

I will give only a brief account of the instructional sequence associated with home-based EIBI, as numerous texts provide comprehensive descriptions (e.g. Leaf & McEachin, 1999; Lovaas, 2003; Lovaas et al., 1981; Maurice, Green, & Luce, 1996). Although the instructional sequence varies slightly depending on the abilities of individual children, home-based EIBI outcome

studies report using similar general sequences, based on the ME book (Lovaas et al., 1981). Initial stages of home-based EIBI aim to teach readiness skills that will help the child to learn more effectively during the later stages of intervention (Smith et al., 2000). Specifically, this involves identifying the component skills that make up composite skills (Weiss, 2002), such as developing a child's visual scanning and touching skills (component skills), for example, to facilitate success in receptive labelling tasks (composite skills). More generally, rapport is established with a child during the initial year of intervention by engaging in simple activities and games, thus encouraging maximal success and increasing attentiveness and motivation whilst reducing challenging behaviour. Subsequently, children are taught to follow simple instructions, imitate speech sounds and gross/fine motor movement, and basic self-help skills. The second year of intervention generally develops a child's receptive and expressive language, conversational skills, imaginary play and further self-help skills. Augmentative communication techniques such as the Picture Exchange Communication System (PECS, Bondy & Frost, 2001) can be implemented if the child displays difficulty acquiring verbal language. In the third (and typically final) year before full school integration, the focus turns to preacademic skill development in reading, writing, and arithmetic. The child is also taught to learn vicariously from peers, and an emphasis is placed on independent working (Lovaas, 1987; Smith et al., 2000; Smith & Lovaas, 1998). In essence, home-based EIBI comprises a comprehensive strategy for developing social, cognitive, and communication skills.

1.2.2 Staff Structure

Primary caregivers rarely deliver systematic intervention in isolation, with trained personnel commonly being employed within home-based EIBI. Staffing within home-based EIBI is hierarchical, following a distinct organisational structure; this is represented in Figure 1. Model examples of intervention describe teams of trained therapists delivering one-to-one intervention for a significant time period each week, often for several years. Consultants in behaviour analysis, supported by supervisory staff, regularly review child progress, modify interventions as required, and provide guidance and feedback to therapists regarding instructional performance (Smith et al.,

2000). Interventions delivered by staff external to the family have been shown to produce extensive improvement in children's intellectual and social skills, more so than interventions delivered solely by parents (Ramey & Ramey, 1998). What follows is a description of staff associated with home-based EIBI delivery, including consultants, supervisors and therapists (Anderson, Avery, Dipietro, Edwards, & Christian, 1987; Birnbrauer & Leach, 1993; Lovaas, 1996; Luiselli, O'Malley Cannon, Ellis, & Sisson, 2000; Scott, 1996; Smith et al., 2000; Smith & Lovaas, 1998).

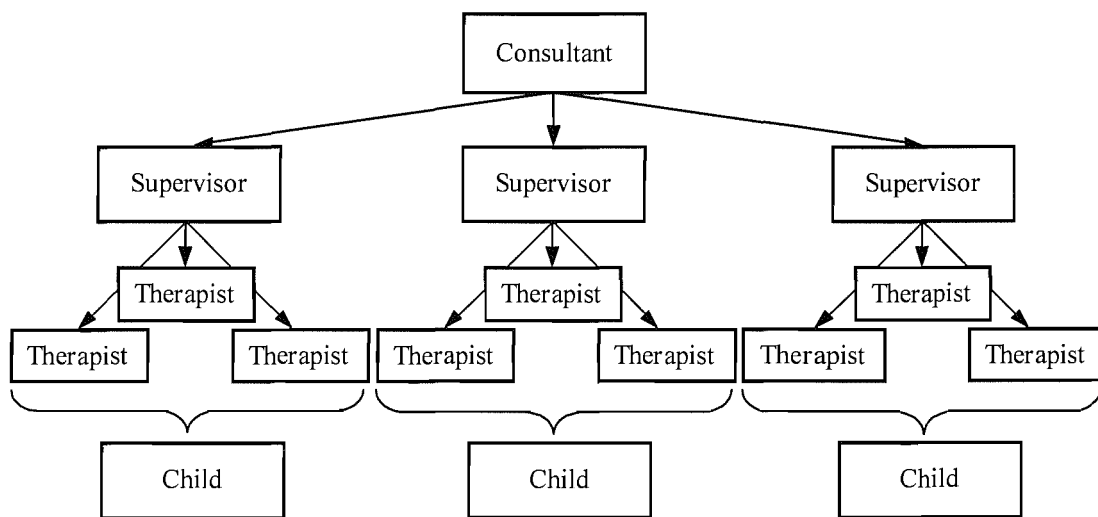


Figure 1: Typical home-based EIBI staff structure

1.2.2.1 Consultants

Consultants (or project directors within the University of California, Los Angeles [UCLA] model and affiliated Multisite Young Autism Project [MYAP]) should be licensed or chartered doctoral level psychologists, with extensive clinical and research experience related to children with autism. A consultant's primary role is to conduct diagnosis and assessment throughout the duration of intervention, and to provide expert input regarding intervention design. As well as having overall responsibility for a child's intervention, consultants integrate current research findings into intervention strategies. Consultants are also involved with wider intervention issues, such as legal or ethical issues, and helping to acquire financial support.

1.2.2.2 Supervisors

The role of a supervisor (Level II therapist in UCLA/MYAP) in home-based EIBI is twofold. First, they are responsible for the day-to-day design and maintenance of a child's curriculum. This involves examining the progress a child has made since previous adjustments were made, and modifying the intervention in the light of skill acquisition or problems encountered. Second, a supervisor has the task of overseeing therapists who work with the child every day. These therapists must be trained appropriately, and it is essential they are clear about the procedures that they are expected to implement. Supervisory staff usually possess a bachelors or master's degree in psychology or a related discipline, and have acquired several years experience within a comprehensive home-based EIBI delivery service such as that based at UCLA.

1.2.2.3 Therapists

The most numerous and varied staff involved in home-based EIBI are therapists. They are often referred to as tutors, teaching assistants/aides, Level I therapists, or paraprofessionals. For the purposes of consistency, the term therapist will be used throughout this thesis. The role of the therapist is straightforward: "to carry out a systematic instructional sequence planned by a specialist" (Scott, 1996, p. 232), in addition to recording data on children's responses to instructional stimuli. Thus, therapists implement curricula specified by supervisory and consultancy staff, but are not qualified to design or modify interventions themselves or supervise other therapists. Therapists usually have an undergraduate level education at best, and may be volunteers or members of the child's local community. Groups of therapists are usually organised into treatment teams whose members can provide intervention for many hours each week. Thus, therapists also provide an opportunity for generalisation within intervention, as the child is likely to have contact with many therapists throughout the course of intervention (Lovaas, 2003).

1.2.3 The Reality of Home-Based EIBI Service Delivery

Although the staff structure described above is common in the research literature, there are likely to be deviations in real life circumstances. Examples of variations in service delivery found outside of research settings are particularly likely in parent-directed intervention. This form of intervention is a response to the general lack of services supporting home-based EIBI for young children with autism (Smith, Buch, & Gamby, 2000). In contrast to clinic-directed intervention described above, parents who are unable to obtain formal home-based EIBI through established clinics often purchase manuals documenting instructional curricula (e.g. Maurice, Green, & Luce, 1996). By using these manuals and recruiting their own therapists, parents can provide some degree of intervention to their own child. By their very nature, parent-directed interventions suffer from a lack of regular consultation, thus limiting child progress. For parents unable to access more structured and expert services, however, directing their own intervention may offer a substantial degree of hope and the child is likely to benefit from the input received. Many parents face considerable problems, however, in obtaining recognition that home-based EIBI is the treatment of choice for young children with autism. These problems extend through to recruiting and financing teams of well-trained therapeutic staff (Maurice, Mannion, Letso, & Perry, 2001). These problems seem to occur on an international scale, with a lack of public funding and almost non-existent infrastructure to support staff recruitment, training and retention inevitably reducing the quality of home-based EIBI for young children with autism (Couper, 2004). The present chapter now turns to consider research studies investigating the efficacy of home-based EIBI for young children with autism. It is important to remember that, based on the practical difficulties associated with running this type of intervention outside of a research context, outcome studies in the research literature may be somewhat unrepresentative of the reality of home-based EIBI delivery.

1.3 Home-Based EIBI Outcome Studies

A reasonably large number of outcome studies demonstrate the efficacy of home-based EIBI for young children with autism. Although the nature of these outcome studies varies to some extent they all share common features, as noted by Green and her colleagues in the following passage:

“Treatment models varied somewhat across the published studies, but most of them have several features in common: (a) Treatment was comprehensive, addressing all skill domains, and individualized to each child’s strengths and deficits; (b) many behavior analytic procedures were used to build functional repertoires and reduce interfering behavior...; (c) one or more individuals with advanced training in ABA and experience with young children with autism directed treatment; (d) normal developmental sequences guided selection of treatment goals and short-term objectives; (e) parents served as active cotherapists for their children; (f) treatment was delivered in one-to-one fashion initially, with gradual transitions to small-group and large-group formats when warranted; (g) treatment typically began in the home and was carried over into other environments (e.g. community settings), with gradual, systematic transitions to preschool, kindergarten, and elementary school classrooms when children developed the skills required to learn in those settings; (h) programming was intensive, including 20 to 30 hours of structured sessions per week plus informal instruction and practice throughout most of the children’s other waking hours, year round; and (j) most children started treatment in the preschool years, when they were 3 to 4 years of age” (Green, Brennen, & Fein, 2002, p.70).

The focus of the review presented in this chapter is on home-based EIBI outcome studies. In addition, retrospective reports of groups of young children with autism who have received home-based EIBI will also be considered. Case studies will not be included as these are only likely to be published if they show positive result, and although available case studies provide interesting insights into the success of intervention they reveal nothing about outcome variability. Green et al. (2002) do state that case studies can demonstrate strong evidence of treatment effectiveness if aggregated over a number of studies. It is unclear,

however, as to how many case studies are needed to provide a compelling evidence-base, and as published case studies are only likely to report positive outcomes any aggregate is likely to be biased. As it is, too few case studies have documented behavioural interventions in sufficient detail to be able to make a valid judgement on the effectiveness of home-based EIBI based on this evidence (see Green et al., 2002; Groden, Dominique, Chesnick, Groden, & Baron, 1983; Perry, Cohen, & DeCarlo, 1995a,b).

The first set of outcome studies reviewed will concentrate on those based at UCLA. Next, other home-based EIBI outcome studies will be examined. Finally, retrospective studies will be considered. All outcome studies within these three groups will be presented in chronological order.

1.3.1 UCLA Young Autism Project

1.3.1.1 1973

The first attempts to use comprehensive intervention to demonstrate meaningful improvements in the behaviours of young children with autism were conducted by Lovaas and colleagues (Lovaas, Koegel, Simmons, & Long, 1973). Based on cumulative single-subject research demonstrating the benefits of systematically controlling a child's environment (e.g. Ferster & DeMyer, 1961), this study attempted to increase communication skills and alleviate challenging behaviour in large groups of children across different settings. It was anticipated that durable improvement would be observed after instructing children in a clinic setting, providing intensive intervention for 1 year, and focusing on language instruction as a pivotal skill that would encourage the further development of other skills (Lovaas, 2003).

Twenty children aged between 4-6 years with an independent diagnosis of autism received 1 year of intensive one-to-one intervention. Four groups were involved, the first and second receiving 48-56 hours of intervention per week. The second group had a slightly less demanding intervention schedule, received no aversive stimulation, and involved parents in instruction. A third and fourth group were outpatients, who received parental instruction and 2-3 hours per week of consultancy from the researchers. These two groups differed only on the time when outcome was assessed. After initial attempts at facilitating a child's

acquisition of conditioned reinforcers (e.g. praise) proved unsuccessful, attention shifted to establishing behaviours using powerful primary reinforcers (e.g. food) and using contingent aversive stimulation to eliminate undesired behaviours. The aim of intervention was to make “the child look [behave] as normal as possible” (Lovaas et al., 1973, p. 135). Instruction started by reducing challenging behaviour, whilst at the same time initiating stimulus control through teaching simple behaviours that could be easily prompted (e.g. sitting down when asked). Once this was established, the vast majority of instruction was devoted to language development, with social and self-help targets also addressed.

Two outcome measures were utilised. The multiple-response measure was implemented before and after intervention, enabling the frequency and duration of various forms of pathological (self-stimulation and echolalic speech) and normal (appropriate speech, play, and social nonverbal behaviour) behaviour to be recorded. It also allowed the extent of stimulus generalisation and, to a limited extent, response generalisation, to be ascertained. Results showed that for all children in all groups, pathological behaviour decreased and normal behaviour increased. Gains made as assessed by the multiple-response measure were lost, however, when children returned from the clinic to be institutionalised, where intervention was discontinued. Interestingly, those children who returned home to trained and enthusiastic parents after intervention maintained the skills they had learnt, and in some cases continued to make improvements.

The second outcome measure concerned intellectual and social maturity, as measured by the Stanford Binet Intelligence Scale/Merrill-Palmer and Vineland Social Maturity Scale respectively. It was found that after intervention, all children functioned in the mild to moderate range of intellectual disability, and made substantial improvement in social maturity.

Thus, the results of the 1973 study demonstrated considerable improvement in a large group of young children with autism. The intervention was responsible for the socially meaningful changes in behaviour observed (i.e. acquisition of speech and a degree of stimulus generalisation, and reduction in challenging behaviour), and was replicable across different groups of children. Upon closer inspection of the data, however, there was vast heterogeneity in outcome, as Lovaas et al. acknowledge: “Our children responded in vastly different ways to the treatment. Rick learnt in 1 hr what Jose learned in 1 yr”

(1973, p.156). Gains made were largely context specific, and attempts to establish language as a pivotal skill were unsuccessful. Lovaas et al. also acknowledged that children were not randomly assigned to groups or matched on variables such as age at intake. More control was also required over the environment that children were returned to post-intervention.

1.3.1.2 1987

The 1973 study revealed insights into how the effects of behavioural intervention could be maximised. Younger children made better progress overall. Coupled with an increase in the intensity of intervention, both in terms of the number of hours per week and the number of years overall, outcomes were considered likely to improve. The finding that children displayed limited stimulus and response generalisation prompted the relocation of intervention from clinic to home environments, where parents could assist with instruction and intervention for all the child's behaviours using the array of procedures available at the time (Lovaas, 2003).

Thirty-eight children participated in the Young Autism Project (Lovaas, 1987). All had received an independent diagnosis of autism, were younger than 40 months if nonverbal and 46 months if echolalic, and had a prorated mental age of 11 months when at 30 months of age. Children were assigned to one of two groups, but were not randomly placed in groups due to perceived ethical and parental concerns. If staff were available and the child lived with a 1-hour drive of the UCLA clinic children were assigned to the experimental group (n=19). Otherwise, children were placed in control group 1 (n=19). A variety of pre-intervention measures were taken, with groups differing only in the age of intervention commencement (control group 1 children started intervention 6 months later than experimental group children). An additional control group (control group 2) was included in comparison to the other two groups. Control group 2 (n=21) consisted of a sample of children diagnosed with autism who were not enrolled on the Young Autism Project. The experimental group received intervention delivered by trained therapists and their own parents for 40 hours per week over 2 or more years. Intervention comprised of procedures detailed in Lovaas et al. (1981, see section 1.2.1 above), including the use of contingent aversives for incorrect responding to instruction. Control group 1

received intervention for 10 hours per week in a similar fashion, but without the use of contingent aversives.

Results indicated that children in the experimental group benefited considerably from intervention, with IQ scores and educational placements being significantly higher than both control groups at follow-up. Of the experimental group children, 47% were assessed as having average or above average IQ scores and placements in normal school classrooms at first grade, therefore essentially normal with regards to intellectual and educational functioning (Lovaas, 1987). Forty-two percent of children had mild impairments in IQ scores and placements in classes for pupils with language delay, with the remaining 10% considered profoundly impaired in IQ and requiring specialist education in classes for children with autism. In contrast, only 2% of children in the control group were considered to function at a normal level, with the rest divided more or less equally between classes for children with aphasia or autism. The difference in chronological age at intake between groups was not related to intervention outcome.

Lovaas (1987) acknowledges that the impressive outcome results reported may be difficult to replicate. For example, staff require extensive supervision and training in EIBI in order to effect meaningful change in young children with autism. Also, it was found that the use of contingent aversive stimulation was an important component responsible for child progress. Given the results, it is questionable whether progress of the magnitude observed in this study is attainable without the use of aversives.

1.3.1.3 1993

Given the regression of child functioning after termination of intervention (Lovaas et al., 1973), it was of particular interest to determine if gains made in the 1987 study lasted. At an average of 5 years after intervention cessation for the experimental group, and 3 years after termination for control group 1, McEachin, Smith, and Lovaas (1993) assessed the children to determine if intervention effects were maintained. Children participated in a comprehensive battery of tests designed to ascertain social, emotional, and intellectual functioning. Overall, children in the experimental group maintained intellectual gains and had higher levels of functioning than controls. Children receiving 40

hours per week of intervention also displayed more adaptive and less maladaptive behaviours than controls. Mild deviance was observed in both groups overall personality scores, with clinically significant deviance on the psychosis scale. School placement was significantly higher for the experimental group. Thus, children who received 40 hours per week of home-based EIBI maintained the gains they had achieved during younger childhood.

In addition to examining the durability of intervention gains, McEachin et al. (1993) questioned whether the 47% of experimental group children considered as 'best-outcome' could be considered 'normal', i.e. free of the symptoms of autism. Graduate students in clinical psychology, blind to child history, administered the same battery of tests described above, as well as a clinical rating interview used to identify areas of difficulty that individuals were facing in everyday life. Results showed that the majority of the 'best-outcome' group were functioning in the normal range as regards intellectual functioning, composite adaptive behaviours, and personality. However, some children did display clinically significant maladaptive behaviours, and were experiencing more everyday life problems than a normative sample devoid of behavioural problems. These deviant scores were largely attributed to the scores of an individual child, and in general all but one of the 'best-outcome' children who received 40 hours per week of intervention were considered to be 'normal functioning'.

In part due to the remarkable findings reported by researchers based at UCLA, the studies have attracted much criticism. The vast majority of these evaluations have focused on methodological weaknesses such as the lack of random assignment of participants to intervention or control groups, or the appropriateness of assessment tools used for making judgements regarding 'normal' functioning. It has also been suggested that the children involved in intervention may have been relatively high functioning, thus having better-than-average prospects of success (Baer, 1993; Foxx, 1993; Gresham & MacMillan, 1997a,b; Herbert & Brandsma, 2002; Howlin, 1998; Jordan & Jones, 1999; Jordan, Jones, & Murray, 1998; Kazdin, 1993; Mesibov, 1993; Mundy, 1993; Schopler, Short, & Mesibov, 1989). Although some of these critiques offer useful suggestions to bolster the research (e.g. independent replication of the findings), most rely on misinterpretations of the original studies. Therefore, the

rebuttals (especially that provided in Lovaas, 2003, but also see Eikeseth, 2001; Lovaas, Smith, & McEachin, 1989; Smith & Lovaas, 1997) that have been offered largely centre on attempting to rectify misconceptions associated with the methodology and assessment procedures used, as well as the instructional techniques implemented. It was, however, necessary for replication to be carried out to demonstrate the robustness of the effects of home-based EIBI.

1.3.1.4 Subsequent UCLA and Affiliated Reports

Members and affiliates of the UCLA group have attempted to expand the research base of home-based EIBI. Smith, Eikeseth, Klevstrand and Lovaas (1997) analysed archival data from UCLA-based intervention results to identify if children with severe intellectual disability and autism benefited from home-based EIBI. It was apparent that children receiving intensive intervention made clinically significant gains in intellectual functioning and expressive speech in contrast to comparable children who received less intensive intervention. In an attempt to randomise assignment to clinic- or parent-directed home-based EIBI, Smith, Groen and Wynn (2000) found that children with pervasive developmental disorder-not otherwise specified benefit from intervention, that clinic-directed intervention is more beneficial than parent-directed intervention, and that measurement of a child's rate of skill acquisition early in intervention may be predictive of later outcome. Finally, Smith, Buch, and Gamby (2000) report that young children with pervasive developmental disorder and autism may benefit from parent-directed home-based EIBI, but that gains are likely to be short-term, due to reduced quality of therapeutic contact. Thus, research continues to contribute to our knowledge of factors relating to the effectiveness of home-based EIBI.

To address criticism of the UCLA Young Autism Project, the Multisite Young Autism Project was founded (Sallows & Graupner, 1999). Because intervention was to be spread over a number of international sites, replication efforts could be evaluated in non-university settings. Also, children would be randomly assigned to clinic- or parent-directed intervention models, and would be assessed using the same measures pre- and post-intervention. Finally, claims that the intervention would be ineffective without the use of contingent aversive stimuli could be evaluated. This project is detailed next.

1.3.1.5 The Multisite Young Autism Project

Lovaas and colleagues have not been idle to the criticism directed at their research. In an attempt to rectify methodological issues associated with previous home-based EIBI studies, a grant was obtained from the National Institute of Mental Health to carry out the Multisite Young Autism Project (MYAP), enabling stricter control and comprehensive replication of outcome studies (Smith, Donahoe, & Davis, 2000; Smith & Lovaas, 1998). The Wisconsin Young Autism Project (cf. Wisconsin Early Autism Project [WEAP], Sallows & Graupner, 1999) is an example of one of the eleven or so MYAP sites established in North America and Europe. At present, only preliminary findings are available; these will be discussed.

Twenty-four children with an independent diagnosis of autism, intake age between 24-42 months (average 33 months), IQ at or over 35 (average 49), and normal neurological functioning participated in home-based EIBI. Using a matched pairs random assignment based on age and IQ, children were equally divided between a clinic- or parent-directed intervention. Children in the clinic-directed group received 40 hours per week of intervention provided by UCLA trained therapists (parental contribution was not recorded). The curricula were based on Lovaas et al. (1981), excluding the use of contingent physical aversive stimulation. Experienced UCLA staff provided supervision for 6-10 hours per week. In comparison, parents directing their own intervention were free to choose the number of hours they provided for their child. Parent-directed intervention was recorded to have delivered 29 hours per week of intervention, given the recommendation that optimal gains have been found when 40 hours per week are provided (e.g. Lovaas, 1987). This group received 6 hours per month of supervision, with unlimited phone contact to discuss issues between-times. An additional group of young children with autism were recruited as a comparison group, consisting of 19 children receiving special education, occupational and speech therapy in local public schools.

After one year of intervention, 42% of children demonstrated an IQ within the average range. Adaptive behaviour skills also increased to some extent. Although progress was observed in language, the children still remained delayed. The most surprising finding however was the progress of the parent-directed group, who after one year of intervention appeared similar to the clinic-

directed group. It was also found that rapid acquisition of skills early in intervention was an accurate predictor of outcome after one year of home-based EIBI, with IQ at intake only moderately predicting outcome.

The results of this study demonstrate that children can benefit from home-based EIBI delivered outside of a university setting, and make progress without the use of aversive stimuli. However, several aspects of the report may cast doubt over the generalisability of the findings to other parents delivering home-based EIBI to their children. Firstly, all services were provided free of charge to parents, an unlikely situation outside of research settings. Second, highly trained supervisory staff were available to provide input into the child's curriculum. The paucity of quality staff available to parents in other parts of the world may limit the gains that children make in intervention (e.g. Mudford, Martin, Eikeseth, & Bibby, 2001). Third, most parents directing intervention were highly motivated and able provide many hours of instruction. Thus, although the outcomes are extremely encouraging, they may not be directly comparable to non-research situations.

1.3.2 Other Home-Based EIBI Sites

1.3.2.1 May Institute

Following the success of Lovaas (1987), Anderson and colleagues (Anderson, Avery, Dipietro, Edwards, & Christian, 1987) reported a more 'streamlined' version of home-based EIBI, in recognition of the immense financial and practical difficulties associated with this method of service delivery. The intention was to evaluate the effectiveness of EIBI when delivered by fewer therapists over a shorter duration, with increased involvement of parents.

Fourteen children with a diagnosis of autism (or autistic-like) received intervention for up to two years. To be accepted for intervention, children had to be less than 72 months old, live within 35 miles of the clinic, and have parents who were committed to assist in the delivery of intervention. Instruction was not detailed in the report, but reference was made to procedures detailed in manuals (e.g. Koegel, Rincover, & Egel, 1982). Aversives were not employed. Each child was designated a single therapist, who had received thirty hours of training in

ABA techniques and intervention development. Thus, therapists carried out the roles of both the supervisor and therapist, spending time each week modifying the child's curriculum, and delivering the intervention. Parents were also expected to provide a minimum of 10 hours per week of 1:1 instruction. Throughout the duration, children received between 15-25 hours per week of one-to-one intervention. A multiple-baseline design was employed, to assess whether the intervention was responsible for changes in child behaviour.

Children were assessed on 6 outcome measures. A significant change was observed between pre-intervention and after 1 year on standardised measures of intelligence, adaptive behaviour, and language skills, showing mean increases of 10, 9, and 10 months, and ranges of 2-23, 0-23, and 3-18 months respectively. Children also made significant gains on the Uniform Performance Assessment System (UPAS; enables a comparison to be made with typically developing children in terms of position on the developmental sequence), showed evidence of accelerated learning during the intervention, and achieved on average 20 behavioural objectives in 1 year, ranging from 7-29 objectives between the 14 children. However, all children required specialist educational input, with none attending educational facilities for typically developing children.

The report also includes measures of parental accuracy in delivering the intervention, and measures of parental satisfaction with intervention. Overall, all parents increased their accuracy of intervention delivery, and this was maintained over time. Parents also indicated that they were satisfied with the services that their child received.

The results of the May Institute study demonstrate that children can make gains when receiving early intervention, but to differing degrees (Anderson et al., 1987). The authors note a number of differences between their report and that of Lovaas (1987); children receiving intervention directed by the May Institute were younger at entry, less able, received fewer hours of intervention with no aversive stimulation, for a shorter duration. Therefore, perhaps it is not surprising that children did not benefit to the extent that children did in the UCLA report. The authors also recognise that the absence of a control group represents a flaw in their study, but the use of multiple-baselines suggest that children only made gains when the intervention was implemented.

A more recent retrospective study conducted by Luiselli, O'Malley Cannon, Ellis and Sisson (2000) focused on how age at enrolment and intensity of intervention influence outcome in home-based EIBI. Sixteen children diagnosed with autism or pervasive developmental disorder participated who had received EIBI from the May Institute. To ascertain the effect of age on outcome, 8 children were randomly selected from all those under 3 years of age at enrolment, and 8 children were selected from all those over 3 years of age at enrolment. All received intervention based on the procedures described by Lovaas and colleagues (see above), with a single therapist delivering intervention, much like the study described by Anderson et al. (1987). The duration of intervention was not predetermined, continuing until the child was either of an age or ability to progress to a viable alternative (e.g. a preschool class), or if funding was insufficient to maintain intervention.

The only standardised tool used across all children was a developmental rating checklist, comprising communication, cognitive, fine and gross motor, socio-emotional, and self-help skill assessment. All children, no matter their age, made significant gains in these areas from intake to conclusion of home-based EIBI, with no difference being observed between the younger and older groups of children in terms of the rate of progress. Also, development of communicative, cognitive, and socio-emotional skills was predicted by increased intervention duration. Therefore, the results of this study advocate an increased duration of home-based EIBI. However, like the previous study, no control group was included in the analysis, so other factors such as maturation cannot be discounted (Luiselli et al., 2000).

1.3.2.2 Murdoch Early Intervention Program

Based at the Murdoch University in Australia, Birnbrauer and Leach (1993) aimed to replicate the intervention model described by Lovaas (1987). However, the intervention design departed from the UCLA model in a number of potentially significant ways. Volunteers learnt teaching procedures whilst working with children, replacing the highly trained therapists used in other outcome studies. The instructional curriculum was based on that depicted by Lovaas et al. (1981), in addition to other sources of curricula introduced as and

when necessary for individual children. Contingent physical aversive stimuli were removed from the intervention protocol.

Nine children received intervention for 2 years, averaging almost 19 hours per week of instruction (range 9-25 hours). All children had a diagnosis of autism, pervasive developmental disorder, or pervasive developmental disorder-not otherwise specified, and lived within reasonable distance of Murdoch University. Five children were included in a comparison group that received no home-based EIBI. These children were generally younger and displayed more pathological behaviour than those receiving intervention.

Following intervention, blind assessment revealed that 4 of 9 children receiving home-based EIBI made substantial advances in adaptive behaviour and language skills, in addition to achieving IQ scores of at least 80. This compared favourably with the control group, where only one child made large gains in adaptive behaviour and communication. Parental stress levels in the intervention group also reduced from higher than normal levels, a change that was not reflected in the control group.

Despite the gains observed, Birnbrauer and Leach acknowledge the “large within-group variance” (1993, p.68) observed amongst the children that received intervention; some improved considerably whilst others remained delayed. It must also be acknowledged that no children warranted the classification of ‘normal functioning’. As with many other attempts to replicate the outcome study described by Lovaas (1987), many elements of intervention had been “watered-down” (Lovaas, 2003, p.17), so that children received fewer hours of intervention for a shorter duration. No physical aversives were used, and whilst not condoning the use of such stimuli, Lovaas (1987) did report that these stimuli were likely to constitute a significant element of intervention effectiveness. In this respect, however, the outcomes of this study are encouraging, in that some children did make substantial developmental progress despite the reduced intensity of intervention and alteration of protocol.

1.3.2.3 Rutgers Autism Program

The variability in outcomes of young children receiving home-based EIBI was becoming readily apparent by the time of publication of a report by Weiss (1999). Thus, research within the Rutgers Autism Program sought to identify

factors predictive of later child success. In particular, emphasis was placed on the predictive value of a child's rate of learning during early intervention.

Twenty children with an independent diagnosis of autism or pervasive developmental disorder-not otherwise specified received 40 hours per week of discrete-trial instruction for 2 years. These children were part of a larger group of 80 children receiving intervention. It is not documented as to how these 20 children were selected for inclusion in the report. Ninety-five percent of children were under the age of 5 years when starting intervention. Parents recruited teams of therapists to deliver intervention to deliver the intervention, with formal supervision being provided every 4-6 weeks.

All children were compared pre- and post-intervention on a number of outcome measures. Prior to intervention, all children were considered severe on a measure reflecting symptoms of autism (Childhood Autism Rating Scale: CARS) and were well below average (i.e. a score of 100) on measures of functional skills (Vineland Adaptive Behavior Scales: VABS). After intervention, the variation in child outcome was apparent; CARS scores were spread from children presenting no symptoms to those presenting with severe symptoms of autism, and VABS scores increased between 1 and 65 points across all children. School placement was also examined, with 50% achieving places in regular education. The remainder of children were split equally between regular education with one-to-one intervention for part of the day, and special education placements.

With respect to the predictive utility of rates of skill acquisition early in intervention, all measures were input into a multiple regression with data reflecting the children's mastery of nine specific initial skill targets. Analysis revealed that, after 2 years, i) over 70% of the variance in CARS scores were predicted by a child's rate of progress on the first five items of verbal imitation, receptive commands, and object manipulation skill targets, ii) over 70% of the variance in VABS scores was predicted by the first five items of verbal imitation, non-verbal imitation, and receptive command skill targets, and iii) 85% of children's educational placements were correctly predicted by initial skill acquisition rates.

As the author acknowledges, the Rutgers Autism Program report is very much the description of a clinical intervention as opposed to a highly controlled research project. This increases the ecological validity of the report, and coupled

with the results suggest that a child's rate of skill acquisition in specific target areas may be a useful predictor of future outcome. The lack of a control group, however, means that other factors such as maturation cannot be ruled out. Several other aspects of intervention may confound with learning rate, such as the child's responsiveness to reinforcement used during instruction, and the variability in skill levels of therapist teams. Also, the measure of rates of child skill acquisition used is problematic, as it does not reflect the number of learning opportunities that a child was afforded within a specific time period (Green, 1999a) or any issues associated with the lack of regular supervision or child illness, for example (Mulick, 1999). Thus, the report is a useful guide for suggesting important factors associated with likely successful outcomes for children receiving home-based EIBI, but is in need of controlled replication.

1.3.2.4 Behavioural Intervention Centre for Children

A recent outcome study reported in the literature concerns a pilot investigation based at the National University of Singapore (Bernard-Opitz, Ing & Kong, 2004). The authors recognised the limitations associated with discrete-trial instructional (DTI) procedures, including limited generalisation and maintenance of intervention gains, and sought to compare this instructional technique with Natural Language Paradigm procedures (NLP; Delprato, 2001). Although a pilot study, the research conducted at the Behavioural Intervention Centre for Children (BICC) represents the first published comparison of discrete-trial procedures with other forms of intervention.

Participants in the BICC study included 8 children with autism between the ages of 28 to 44 months. These children were selected from 10 children who had been referred to the Centre by paediatricians based on pre-intervention measures, although no further information is given on what measures were used or why the children were selected. All but one of the children was classified as having autism with respect to the Autism Diagnostic Interview-Revised (ADI-R), with the remaining child scoring near to this diagnosis. Children were assigned to one of two groups based on a matched pairs procedure incorporating the child's chronological age, ADI-R score, Pre-Linguistic Autism Diagnostic Observation Schedule score (PL-ADOS), Symbolic Play Test score (SPT), and the parents educational level and employment status.

Intervention was based on a crossover design, incorporating both DTI and NLP. Half of the children received DTI first and then NLP, with the other half receiving NLP and then DTI. Children received 6 hours of intervention every week for 5 weeks with one style of intervention, and then a further 6 hours of intervention every week for 5 weeks with the other style of intervention. Parents were required to provide an additional 10 hours per week of intervention; thus, each child received a maximum of 160 hours of intervention over 10 weeks, or 16 hours a week. DTI was supervised by a psychology graduate with 2 years experience of delivering behavioural techniques to young children with autism, and interventions were based on those provided in manuals (Lovaas et al., 1981; Maurice et al., 1996). Psychology undergraduates and one graduate acted as therapists. All staff received 30 hours of training and weekly feedback. In contrast, NLP was supervised by a psychology graduate with 6 months experience of teaching young children with autism. Fifteen undergraduate students acted as volunteers. Staff providing NLP received 5 hours of training involving role-play and methods to increase communication and imitation. Independent checks confirmed that the teaching methods used in the groups differed in the expected direction, but no further details are given. Additionally, Bernard-Opitz and colleagues report that levels of therapist and child enthusiasm was comparable between groups, but do not specify if participants were enthusiastic or not during intervention sessions. The report also fails to specify if parents received explicit training, but states that parents were expected to be involved in all intervention sessions that their children received.

After children received both forms of intervention, they were assessed using the PL-ADOS and SPT. Overall, 7 children had reduced scores on the PL-ADOS following intervention, with all but 1 displaying decreased abnormal communication and interactions, and all but 1 (a different child to before) showing reductions in stereotyped behaviour and restricted interests. Five children gained 8.1 months on average on the SPT, although 2 children failed to improve and 1 child regressed. With respect to differing outcomes in the two intervention conditions, parents considered their children to improve more after DTI than NLP. Parents also felt that their children continued to progress after the intervention had ceased, but these are unconfirmed reports that were not objectively validated by the researchers. Finally, the two children who had the

lowest pre-intervention scores and the least involved parents were found to benefit the least from intervention.

The findings of the BICC study represent an initial attempt to examine the differential effects of behavioural interventions on outcomes for young children with autism. Despite demonstrating improvements on a limited number of outcome measures, the results do not seem to objectively address the different outcomes of DTI and NET. In addition, the varied levels of therapists' experience, the different amounts of training and feedback that therapists received, and the fluctuations in parental involvement all represent major confounds in the research. Although the report is useful in establishing a paradigm for identifying the beneficial outcomes of different styles of intervention, the intervention period could be extended to allow for a clearer picture of child development. These criticisms must be taken in the context of the pilot-study nature of the research, and future studies should aim to build upon this investigation.

1.3.2.5 California State University

A further recent study investigating home-based EIBI for young children with autism was reported by a team based at California State University (Howard, Sparkman, Cohen, Green & Stanislaw, 2005). The authors of this study sought to compare the effects of 3 different forms of intervention on the development of young children with autism. The interventions included in the study were EIBI, autism educational programming (AP) and generic educational programming (GP). The data presented represent interim outcomes after 14 months of intervention.

Sixty-one children diagnosed with autistic disorder or pervasive developmental disorder-not otherwise specified participated in this study. All children were less than 48 months old at intervention intake, came from homes where English was spoken as the first language, had no significant additional medical conditions and had received no prior intervention lasting more than 100 hours. All of these children were involved in routine individual education or family service plans in the State of California; group placement was dependent on the judgements made in these plans, and therefore was not randomised. Children in all groups were, however, similar at intake with respect to gender,

ethnicity, diagnosis and parents' marital status. Children receiving EIBI were diagnosed and started treatment at a significantly earlier age than children in the remaining groups.

Of the 61 participants, 29 children received between 25 and 40 hours of one-to-one EIBI in the home, school and community. Younger children in this group initially received less intensive intervention. A variety of behaviour-analytic teaching techniques were used during formal and informal sessions, including discrete-trial and incidental teaching procedures. Up to 5 therapists worked with an individual child on a part-time basis for between 6 and 9 hours each week whilst they attended college. A Masters-level supervisor reviewed each child's intervention on a weekly basis, and procedures were modified as required; supervisors directed between 5 and 9 children's interventions. Parents were trained in basic behavioural strategies and helped generalise and maintain skills that children had learned. No additional services were provided to this group.

The remaining children were divided equally between receiving AP and GP, with 16 children in each. The AP group received 25 to 30 hours per week of DTI, PECS and TEACCH-based intervention strategies delivered by a special education teacher and up to 8 teaching assistants in public school classes for children with autism. Typical classroom activities such as 'circle time' were also embedded into teaching days. Graduate students in behaviour analysis were available for consultation purposes, and just under half of the children in this group received weekly speech therapy sessions. The remaining 16 children in the GP group were placed in local special education preschool classes alongside children with a variety of special educational needs. Classes were taken for 15 hours per week by a special education teacher and up to 2 teaching assistants; the adult-to-child ratio was one-to-six. Intervention comprised of language, play and sensory activities. The majority also received weekly speech therapy sessions.

Children's cognitive, non-verbal, verbal and adaptive skills were assessed using a wide range of standardised measures within 2 months of starting intervention. At this time all children involved in the study showed clear and similar signs of developmental delay across all measures. After 14 months children who had received EIBI scored in the normal range on measures of cognitive, non-verbal, verbal and adaptive skills. This is in contrast to children in

the remaining groups, who scored significantly lower on these measures. In addition, there were no differences between the scores of children in AP and GP groups, suggesting that there was no difference in the effects of these educational programmes on children's development. Examination of learning rates also showed that children who received EIBI attained normal or above-normal rates after 14 months of intervention across all measures, whereas children in the AP and GP groups were unable to learn as fast as would be expected in comparison to 'normally developing' children.

In summary, the California State University study demonstrates that EIBI can be effective in improving the outcomes of young children with autism. The study also provides evidence to suggest that focused EIBI is significantly more effective for young children with autism than less specific educational provision. It must be acknowledged, however, that children's assignment to intervention groups was not randomised but depended on individual educational or family service plans. While all groups of children were similar at the start of intervention, there is little explanation of how the judgements regarding service plans and subsequent group allocations were made. The authors note that parental preferences were a substantial factor impacting on group placement, and it is also likely that group allocation was dependent to some extent on anticipated progress in the chosen intervention. The study also focused on using standardised measures of progress. Observational measures or parental reports would have been interesting and could have provided a broader demonstration of the effects of the interventions. Finally, it was assumed that the intervention was delivered as intended by all teachers and therapists involved in the study. No objective measures were employed to qualify this assumption and, as the authors acknowledge, this would likely be difficult within the AP and GP interventions.

1.3.3 Retrospective Reports

A number of retrospective studies regarding the effectiveness of home-based EIBI have been reported in the literature. These studies essentially survey consumers of home-based EIBI services and report how children have progressed in relation to characteristics of intervention as reported by parents. These studies will be briefly described and evaluated.

1.3.3.1 University of California, San Francisco

Sheinkopf and Siegel (1998) of the University of California, San Francisco (UCSF) evaluated the effectiveness of home-based EIBI delivered in the absence of expert university support. Eleven children with autism were identified as having received home-based EIBI for on average 20 months from a sample of children involved in a separate larger study. These children were matched on chronological age, mental age and diagnosis with children from the larger sample who had not received home-based EIBI. Parental report of the characteristics of the intervention delivered indicated that children received discrete-trial instruction with limited aversive verbal stimuli, based on the model described by Lovaas et al. (1981). Parents and paraprofessional therapists delivered intervention, supervised by community based behaviour analysts.

Standardised cognitive testing revealed an average gain of 25 IQ points in the children receiving intervention, compared with no difference in groups prior to intervention. Thus, children receiving intervention averaged an IQ of 90 after 20 months home-based EIBI. However, children still displayed symptoms associated with autism. In addition, there was no relationship between the number of hours per week of intervention a child received and subsequent outcome. Sheinkopf and Seigel speculated that home-based EIBI need not be as intensive as suggested, for example, by Lovaas (1987). The authors also acknowledge the limitations associated with relying on parental reports of intervention settings. There is also an issue related to the fact that parents chose home-based EIBI of their own accord. This choice may introduce a number of confounding variables into the interpretation of this research. For example, parents may have perceived themselves to have more social support or financial resources, thus increasing the likely effectiveness of intervention. Thus, children from less supportive or affluent families may not have benefited to the same extent.

1.3.3.2 Golden Gate Regional Center, San Francisco

In a similar study to that reported at UCSF, Boyd and Corley (2001) surveyed the outcomes of 22 children (mean age of 41 months at intake) who had received home-based EIBI for 30-40 hours per week, to determine if intervention was successful in community settings. Of these children, half received 2 or more

years of intervention, whereas the other half were withdrawn before 2 years were completed due to lack of progress. All children had a diagnosis of autism or pervasive developmental disorder-not otherwise specified, and 6 also had a diagnosis of mental retardation. Trained therapists who received weekly supervision delivered intervention, with funding being provided by a non-profit making agency based in California. Observation and examination of reports confirmed that intervention was delivered in a comparable manner to that offered at UCLA.

To compare results with those reported by Lovaas (1987), similar outcome measures were used. Thus, educational placement and judgements of similarity to normally developing peers were attained. As IQ scores were not available for all children, a further outcome measure included judgement of the presence of mental retardation, based on educational psychometrics and observation.

The results of the survey indicated that no child attained both a normal educational placement and a normal level of intelligence. Sixty-eight percent of children required one-to-one assistance in the classroom; likewise, 68% were deemed to have mental retardation. The authors state that all children benefited from home-based EIBI, however, despite not achieving the levels of functioning of best outcome children (Lovaas, 1987). The findings must be viewed with some caution though, because of the lack of a suitable comparison group and relatively small sample size. In addition, children received varying degrees of home-based EIBI, with some participating for more than 2 years whereas one child's intervention was terminated after 9 months. Unlike the study conducted by UCSF, however, intervention was funded by a non-profit making agency, helping to eliminate some of the potential confounds to interpretation.

1.3.3.3 Autism and Developmental Disorders Education Research

There has been a worldwide growth in demand for comprehensive home-based EIBI services; accompanying this is an increase in the number of parent-directed interventions, particularly in the UK. A study funded by Autism and Developmental Disorders Education Research (ADDER) sought to establish if parent-directed home-based EIBI in the UK approximating the UCLA model (Lovaas, 1996) were successful, and to establish factors predictive of beneficial

child outcome (Bibby, Eikeseth, Martin, Mudford, & Reeves, 2002). Sixty-six children that had already started receiving a mean of 30.3 hours of parent-directed intervention per week participated. To aid comparison with other ongoing research projects, the same instruments as used by the MYAP were implemented for the assessment of cognitive, language, adaptive behaviour and symptoms of autism. Prior to the study, individuals independent to ADDER conducted assessments; initial assessments associated with the study were conducted at T₁, with subsequent assessments being taken 12 months later at T₂.

A group of children assessed prior to the study commenced did not achieve significant increases in IQ but made gains in adaptive behaviour skills (except they were still considered to be functioning at a low level) over a period of approximately 30 months of intervention. Children that reached T₂ assessment were found to have a significantly lower IQ than comparable children receiving UCLA intervention (Lovaas, 1987), and none were placed in mainstream school without adult support. With regard to predictive factors, IQ at T₂ was highly correlated with initial assessments, and progress in IQ scores from initial assessment to T₁ was found to be predicted by the age at which children started intervention, with younger children gaining more IQ points than older children.

Bibby et al. (2002) suggest that the results that they obtained may be due to the lack of UCLA qualified supervisors designing interventions in the UK. They also comment on the lack of data regarding measures of intervention quality during sessions. Problems with the research include, as with the other retrospective studies described above, a lack of an appropriate comparison group of children receiving typical state-provided services within the UK. In conclusion, the authors suggest that children are unlikely to benefit from parent-directed intervention in the UK at the present time.

Summary

There is a relatively large body of research on the efficacy of home-based EIBI for young children with autism. These studies show that, under certain conditions, children can make substantial developmental gains that can increase their access to educational and social opportunities as they get older (cf. Smith,

Donahoe, & Davis, 2000). Even so, considerable controversy surrounds this approach, which can only be eased by future research. In the meantime though, “the substantial body of research upon which [Lovaas’] work rests and the other published studies of early intensive behavioral treatment makes this a convincing case for the efficacy of that treatment” (Eikeseth, 2001, p.262).

1.4 Variability in Child Outcomes

The majority of research reviewed above suggests that home-based EIBI can be an effective option for young children with autism. This judgement, however, is based on studies comparing groups of children receiving different intensities of intervention. Group studies tend to summarise data in a useful way so that average group performance on a range of outcome measures can be assessed. The very nature of this research design, however, has the potential to mask interesting characteristics of individual group members’ responses to intervention. It may appear, for example, that a group of participants receiving an intervention benefited much more on average than a group of participants not receiving the intervention. Closer inspection of the data, however, may reveal that some participants in the intervention group fared less well than some of those participants who did not receive the intervention. Thus, examining group data for overlaps between groups on outcome measures may reveal interesting aspects of intervention outcome that would not be considered if readers took outcomes on comparisons between group averages alone (Graziano & Raulin, 2004).

Many home-based EIBI outcome studies and associated commentaries recognise the variation in individual child outcomes (e.g. Bristol et al., 1996; Robbins, Dunlap, & Plienis, 1991; Romanczyk & Arnstein, 2001; Schreibman, 2000; Smith, Donahoe & Davis, 2000). More specifically, in the May Institute outcome study, it was noted that “individual differences in the magnitude of the treatment effects were evident, including two children who demonstrated little or no change...as measured by standardized instruments” (Anderson et al., 1987, p.363). Outcome study data is, however, often presented as a comparison between groups of children receiving some variation of home-based EIBI. In examining the data further by considering how children in groups do as

individuals, the picture becomes less clear. Thus, whilst some children seem to benefit to a large extent from home-based EIBI, some do worse than other children receiving the same specific intervention. Additionally, some children actually benefit less after intervention than their counterparts in other groups receiving less intense or different styles of intervention. To demonstrate this, data from three home-based EIBI outcome study reports that include raw data are displayed in Figures 2, 3 and 4 (Lovaas, 1987; Sallows & Graupner, 1999; Weiss, 1999).

The first set of data (presented in Figure 2) is drawn from the most successful home-based EIBI outcome study to be reported in the literature to date (Lovaas, 1987). In summary, 19 children with autism were assigned to an experimental group and received home-based EIBI for 40 hours per week over 2 years. Control group 1 consisted of 19 children who received home-based EIBI for 10 hours per week for the same duration, whereas control group 2 contained 21 children who were not enrolled on the UCLA home-based EIBI programme.

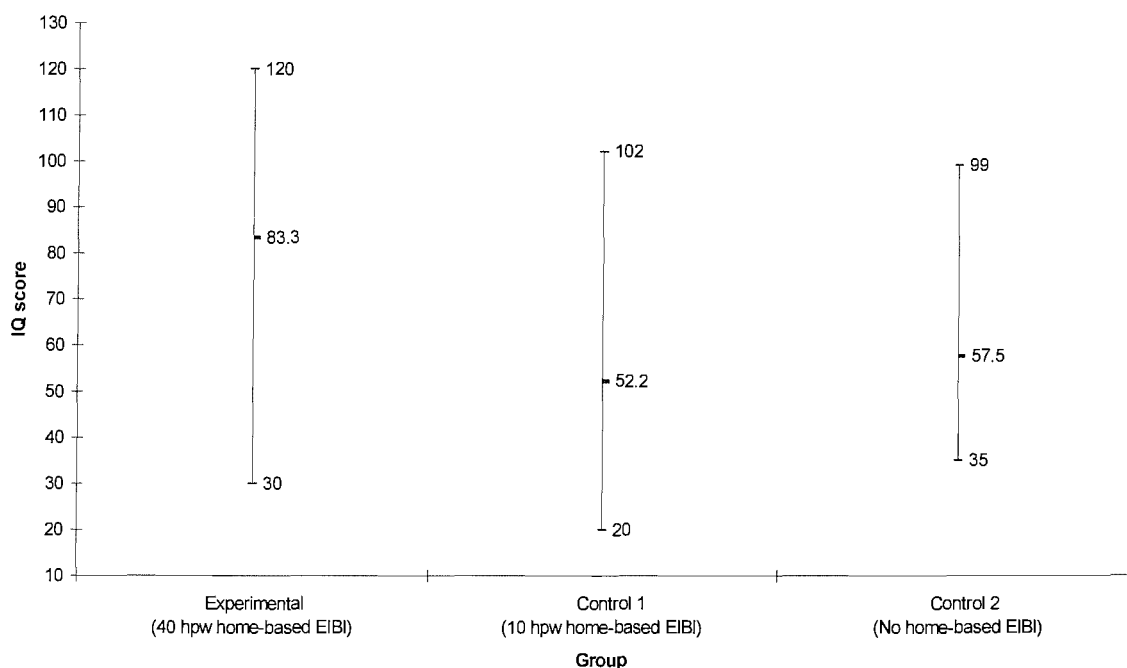


Figure 2: Data from the UCLA YAP, showing highest, mean, and lowest IQ scores for children receiving home-based EIBI at differing intensities (adapted from Lovaas, 1987).

Lovaas reported that children in the experimental group benefited considerably from the intervention in terms of IQ and educational placement at first grade, in contrast to children in the both control group. Based on a comparison between groups, this data seems to suggest that significant progress should not be expected unless children receive 40 hours per week of home-based EIBI. Closer inspection of the data, however, reveals interesting findings. Figure 2 displays the mean and range of IQ scores for children in all groups of Lovaas' (1987) study. As can be seen, the mean IQ scores for children in the experimental group are markedly higher after 2 years of intervention than the mean IQ scores of children in both control groups. The range of IQ scores of children in all groups, however, tell a different story. First, the variation in outcomes of children receiving 40 hours per week of home-based EIBI for 2 years is immense. Second, although children in the experimental group perform better on average than children in the control groups, some children in the experimental group score lower on tests of IQ than children who received less intense or no home-based EIBI. Additionally, children in both control group's score within the normal range on tests of IQ, just as children in the experimental group do. Therefore, despite the study demonstrating the general effectiveness of home-based EIBI for young children with autism, it appears that some children fare much better than others.

A second example of variation in child outcomes can be seen in the report of the Wisconsin YAP (Sallows & Graupner, 1999). Figure 3 shows the IQ scores of 3 children before and after 1 year of parent-directed home-based EIBI. As can be seen, divergence and convergence of scores between children is apparent. Thus, the 3 children presented had IQ scores representing moderate levels of intellectual disability prior to intervention. After one year of intervention, however, Child A was functioning within normal limits in terms of IQ, whereas Child B and Child C scored at the low end of mild intellectual disability. Thus, children receiving the same style of intervention benefited to strikingly different degrees following just 1 year of home-based EIBI.

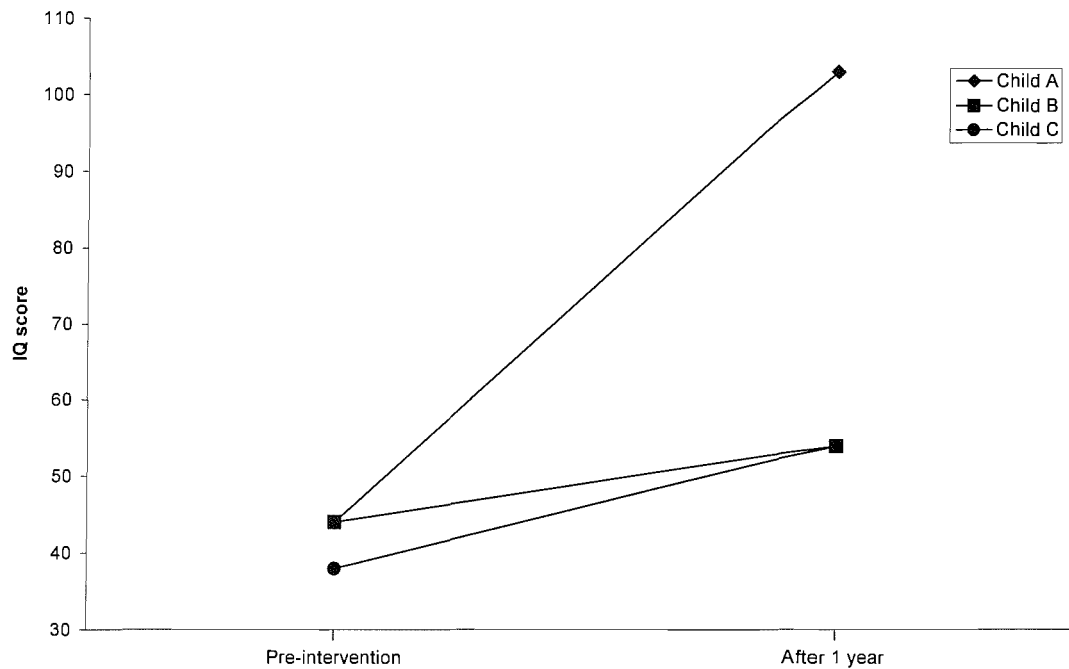


Figure 3: Data from the Wisconsin YAP, showing 3 children's pre-intervention IQ, and results after one year of intervention (adapted from Sallows & Graupner, 1999).

The final data presented in Figure 4 show the Childhood Autism Rating Scale (CARS) scores of 2 children before and after 1 year of clinic-directed home-based EIBI (Weiss, 1999). Both children clearly started intervention with ratings of severe symptoms of autism on the CARS. Outcomes for the pair were much different after intervention, however, with Child E assessed to be within the non-autistic range, whereas Child D remained at the severe end of the scale. Further data reported by Weiss (1999) also demonstrate similar variability in adaptive behavioural skills, as measured using the Vineland Adaptive Behavior Scales.

More detailed consideration of the data suggests that children receiving what is reported to be the same intervention do not all progress to the same degree. As stated above, this is a recognised finding among outcome studies. The challenge facing researchers is to identify the reasons for the discrepancy between child outcomes, and identify how practice can be modified to encourage the development of those children who remain delayed after home-based EIBI.

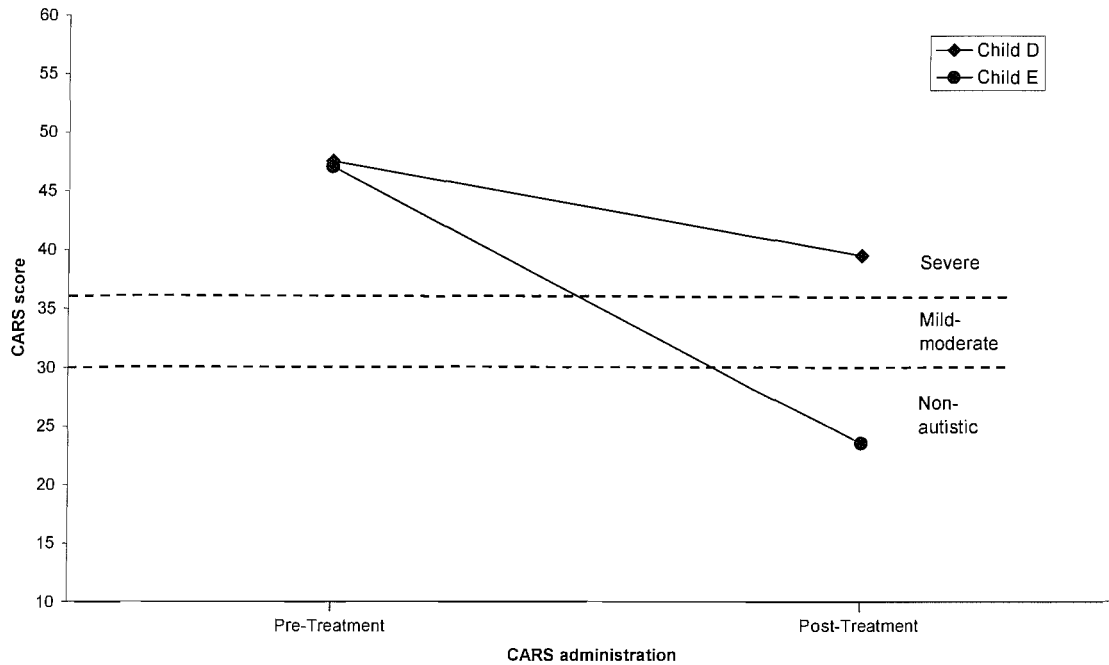


Figure 4: Data from the Rutgers Autism Program, showing 2 children’s pre-and post-intervention Childhood Autism Rating Scale (CARS) scores (adapted from Weiss, 1999).

1.5 Conclusions

Most researchers and clinicians agree that the most beneficial option for young children with autism is home-based early intensive behavioural intervention. Although group-based outcome studies focusing on home-based delivery demonstrate successful outcomes, children participating in such models tend to vary widely in their response to intervention as measured by a range of assessment instruments. The next chapter explores factors that are critical to the success of behavioural interventions, and considers where home-based EIBI stands with regards to research and practice. By identifying the elements of successful interventions, important future research directions may be discovered which can be targeted to improve the development of more young children with autism.

CHAPTER TWO

Exploring Outcome Variability in Home-Based Early Intensive Behavioural Intervention

Chapter Summary

Thus far, most of the published research reviewed suggests that home-based EIBI is effective for some but not all young children with autism. It is necessary to identify possible causes of this variability. The present chapter presents an examination of factors essential to the successful outcomes of behavioural intervention, with specific reference to home-based EIBI practice and research.

Clinically significant outcomes in behavioural intervention are considered to be the product of three factors: powerful techniques, intervention integrity, and procedural fidelity. Interventions must be based on instructional procedures that have been shown to have a demonstrable effect on observable behaviour in highly controlled and internally valid research settings. Competent supervisory staff must specify interventions that meet the needs of individual children, using the array of powerful techniques available. Finally, therapists must instruct the child consistently and accurately on a daily basis using the curriculum detailed by supervisors. This chapter ends by focusing on one therapist characteristic that is likely to influence the delivery of home-based EIBI: perceived therapeutic self-efficacy.

Exploring Outcome Variability in Home-Based Early Intensive Behavioural Intervention

The previous chapter discussed reports of home-based EIBI that have appeared in the literature to date and highlighted the variability in child outcomes. Whilst home-based EIBI is the most effective intervention at present for young children with autism (Eikeseth, 2001), there remains a disparity between the developmental achievements of different children. Some children seem to benefit considerably whereas others seem to make little or no progress. Understanding why this variability exists and the factors differentiating those children that have relatively successful outcomes compared with those that do not fare so well is in issue of utmost importance in behavioural research (Bristol et al., 1996; Connor, 1998; Jordan & Jones, 1999; Kazdin, 1993; Schreibman, 2000). The aim of the present chapter is to explore why some children with autism may benefit more than others from home-based EIBI, and to suggest areas that may benefit from future research.

2.1 Factors Influencing the Impact of Interventions

There are many possible reasons why an intervention may succeed or fail to deliver best outcomes across a range of different recipients. In home-based EIBI for young children with autism, various child- and intervention-related factors have been examined. Given that the disparity between typical and atypical development is likely to increase as children grow older, the chronological age at which intervention delivery starts may be an important factor governing outcomes. Whilst little is known about the precise effects of child age at commencement of intervention on outcome (Schreibman, 2000), there is some evidence to suggest that children starting intervention at an earlier age make more progress on measures of IQ than children starting intervention when older (Bibby, Eikeseth, Martin, Mudford, & Reeves, 2002). Another study comparing groups of children above and below the age of 3 years when they started receiving intervention found no differences between the developmental progress of children in either group (Luiselli, O'Malley Cannon, Ellis, & Sisson,

2000). This finding is likely to be confounded to some degree, however, by the fact that younger children received home-based EIBI over a longer duration and for more hours in total than older children. Despite this, the best outcome studies suggest that the most benefit can be gained by starting interventions as early as possible (Lovaas, 1987). In support of this, a recent single-case study has demonstrated that a child aged 14 months who was considered to be at high risk of developing autism benefited from home-based EIBI to the extent that, after 4 years of intervention, she was able to attend a class for normally-developing children and showed no behavioural or developmental delays (Green, Brennan, & Fein, 2002). Whilst this is an important finding, it is a single-case study and it must be remembered that further research is necessary to demonstrate the effects of home-based EIBI on children of such a young age. Future outcome studies should make explicit attempts to evaluate the effects of age of intervention initiation on subsequent outcomes.

In addition to a child's age, there are many other characteristics of young children with autism that are likely to have a bearing on the outcomes of home-based EIBI. A recent study has investigated how individual behavioural profiles of children with autism predict response to behavioural intervention (Sherer & Schreibman, 2005). First, archival videotape data on 11 children who had received a behavioural intervention known as pivotal response training were examined to determine the behavioural profiles of responders and non-responders to intervention. It was found that those children who had responded best to the intervention in the past were, at intake, more interested in toys, more able to tolerate close proximity to other people, more likely to engage in verbal self-stimulatory behaviour and less likely to engage in non-verbal self-stimulatory behaviour than non-responders. Next, the validity of these characteristics were examined by exposing 6 children to pivotal response training. Three of these children had behavioural profiles that matched those of previous responders, and the remainder had behavioural profiles that matched those of non-responders; children in both groups were matched for age, language ability and IQ. After 5 weeks of intervention it was found that those children who were similar to past responders had improved on behavioural measures of language, play and social skills, whereas non-responder type children did not benefit from the intervention and it was discontinued. This study highlights the

potential impact that child characteristics can have on the efficacy of short-term behavioural intervention programmes, but the findings are only applicable to pivotal response training at present. The authors of the study also acknowledge that future research could incorporate component analysis to determine the importance of various aspects of children's behavioural profiles that have a bearing on intervention efficacy.

Intervention-related factors are also likely to influence the progress of young children with autism. Intensity, defined as the number of hours per week that a child is exposed to home-based EIBI, has been found to be a major predictor of child outcomes in the best outcome studies (Lovaas, 1987). More recent investigations have failed to support this finding, demonstrating that the number of formal intervention hours children receive is unrelated to subsequent outcomes (Luiselli, et al., 2000; Sheinkopf & Siegel, 1998). It has been suggested that other measures of intervention intensity such as the rate at which therapists deliver discrete-trials or the number of learning opportunities that the child is exposed to (cf. Greer, McCorkle, & Williams, 1989) may be more useful in trying to ascertain the impact of this factor on child outcomes (Green, 1996). It is likely, however, that inadequate levels of service provision will preclude the majority of young children with autism receiving home-based EIBI attaining 'normal' levels of functioning (Romanczyk, Weiner, Lockshin, & Ekdahl, 1999). Few would argue against increasing service provision and resources to improve outcomes, but a number of other factors are also likely to be important. Rather than examining individual elements of intervention, a broad and systematic examination of factors contributing to intervention success and failure is likely to yield a more comprehensive list of areas to target for future research and practical consideration (cf. Sulzer-Azaroff, 2000).

The degree to which children benefit from an intervention, also called the impact, has been conceptualised as an interaction between two distinct factors (McConnell, McEvoy, & Odom, 1992). Thus, the impact of an intervention depends on the effectiveness of the techniques used and the likelihood of implementation of the intervention. Effective techniques, according to McConnell and colleagues, are those that have demonstrated reliable effects in changing behaviour in internally valid settings. The likelihood of implementation equates to the level of implementation of the specified intervention in typical

delivery settings. Following this analysis, interventions that use effective techniques and are implemented as specified are expected to have a high impact on the target. On the other hand, if less effective techniques are implemented or the intervention fails to be delivered as intended, the intervention could be expected to have a reduced impact.

This analysis seems plausible and provides a framework with which to examine the elements of home-based EIBI for young children with autism. It does, however, make the assumption that appropriate effective techniques are selected and accurately specified in the form of an intervention protocol. There is no reason to assume that this would be the case. Allen and Warzak (2000), in their consideration of outcome failure in parent-delivered behavioural interventions, identify three essential features they regard as critical to successful intervention outcome in ABA. According to their analysis, inconsistent outcome may stem from an insufficiently effective behavioural technology, poor intervention integrity, or poor procedural fidelity. Technology may be considered effective if, in internally valid experimental settings, reliable effects upon behaviour have been demonstrated. Integrity may be contrasted with fidelity. With respect to home-based EIBI, the former focuses on the role of consultancy and supervisory staff in specifying an intervention program (using effective technology) that meets a child's needs. The latter concerns the therapists' capacity to reproduce that intervention during daily sessions.

Consider the following hypothetical situation relating to the medical profession. Researchers may produce a pharmacological agent in the form of an ointment for eczema. In randomised control trials with human participants this ointment may have been shown to be effective in reducing the skin irritation associated with this condition. This demonstration of effectiveness, however, is not sufficient to warrant the use of this particular ointment with all occurrences of skin irritation. A general practitioner must correctly diagnose the patients' skin irritation as eczema and not, for instance, psoriasis. In addition, checks should be made to ensure that the patient is not allergic to the active ingredients present in the ointment. As it is highly likely that patients will be required to apply the ointment themselves once they have left the consulting room, the general practitioner must also specify exactly how and when the ointment is to be used. This specification is also insufficient to guarantee that patients' skin irritations

will be alleviated. In order to maximise the likelihood of symptom relief, the patient must follow the general practitioners' prescription as closely as possible for the duration of the treatment. Thus, the impact of the intervention for eczema is dependent on the effectiveness of the ointment, the integrity of the intervention design as planned by the general practitioner, and the fidelity with which it is implemented by the patient over the duration of the intervention. The same general factors may be expected to govern the impact of home-based EIBI for young children with autism. The remainder of this chapter evaluates the status of this style of intervention in relation to effective techniques, intervention integrity, and procedural fidelity.

2.2 Effective Techniques

Although the continuity model described in Section 1.1.3 was not explicitly presented until the late 1980's, researchers have demonstrated the benefits of focusing on specific behaviours during intervention since the 1960's (e.g. Risley & Wolf, 1967; Wolf, Risley & Mees, 1964). The advances gained through this research are largely the result of discrete-trial instruction and discrimination learning (Lovaas, 1993). These techniques form the basis of the most effective home-based EIBI programmes to date (Lovaas, 1987), and as such are widely used and considered to be appropriate for teaching almost any skill that the child is found to be lacking (Maurice, 1996). Discrete-trial instruction (DTI) usually takes place with both the therapist and child seated at a table in an environment with minimal distraction (Anderson, Taras, & O'Malley Cannon, 1996; Lovaas, 2003). The basic steps in the discrete trial are i) the therapists' instruction, ii) the child's response, iii) the consequence the therapist delivers dependent on the child's response, and iv) a brief inter-trial interval. The therapists' instruction, labelled the discriminative stimulus (S^D), can be verbal or nonverbal and is intended to make the child aware that a reinforcer will be available dependent on the child's correct response to instruction. In order to be most effective, delivery of an S^D should be short, clear, and consistent, for example saying "Touch red" whilst presenting a red card and a blue card on the table. The child's response to instruction will either be correct, incorrect (including non responsiveness), or prompted. In response to the example S^D of

“Touch red” the child may react correctly by touching the red card, incorrectly by touching the blue card, or be prompted by touching the red card whilst the therapist points to it. The consequence delivered by the therapist varies in accordance with the child’s response to the S^D ; thus, the therapist may reward a child who touches the red card with small amounts of a preferred item such as food (often paired with praise, hugs etc.). This action would serve to reinforce the child’s behaviour. If the child’s response was incorrect, however, the therapist may remove all signs of reinforcing stimuli, in effect placing the child under ‘time-out’ conditions. This is likely to be accompanied by an informational “No”. A brief inter-trial interval helps the child distinguish between discriminative stimuli, and allows time for the therapist to clear the instructional area ready for the next trial. The structure inherent in DTI can aid both the therapist and the child as teaching procedures can be explicitly described, the child is able to attend to a clear S^D , and the therapist is aware of the desired response topography. The use of DTI can enhance consistency both within and between therapists, and permits straightforward assessment of child progress.

Up to now, DTI has formed the basis of the most successful home-based EIBI outcome studies. Despite these demonstrations some authors have voiced concerns regarding the suitability of DTI for addressing all of the challenges associated with autism, such as socio-emotional development (e.g. Prizant & Rubin, 1999). In addition, the outcomes of such techniques are often impressive in controlled settings but yield disappointing results in the real world (Goldstein, 2002). Lovaas (1993) has observed that some children seem to benefit more from visual than auditory instruction. Specific interventions such as the UCLA Reading and Writing Program (Lovaas & Eikeseth, 2003) and the Picture Exchange Communication System (Bondy & Frost, 2001, 2003) have been developed for those children who fail to develop vocal language. Those children who develop vocal language skills often remain dependent on specific cues and lack spontaneity during interaction. It is also common to observe children that have received DTI giving rote responses that fail to generalise across settings (Schreibman, 2000). One approach that has been implemented with the intention of reducing these problems has been to include parents as therapists for their own children, thus increasing the likelihood that children would receive continuous intervention with a wide range of individuals (Lovaas, 1978; Smith, Eikeseth,

Klevstrand, & Lovaas, 1997). Another approach has been to develop techniques that address the problems associated with using immediate primary reinforcers and limited response generalisation, both of which delay child progress outside of specific instructional environments (Prizant & Wetherby, 1998; Sundberg & Partington, 1999). Natural environment training (NET; Sundberg & Partington, 1998), an alternative approach to language instruction derived from a functional analysis of verbal behaviour (Skinner, 1957), allows a child to learn from their immediate environment by focusing on stimuli that are functional to the child. Specific generalisation procedures are not required as instruction takes place in the child's natural environment. Small-scale studies have shown that in comparison to DTI, NET is more effective in developing functional speech and reducing challenging behaviour (e.g. Koegel, Camarata, Koegel, Ben-Tall, & Smith, 1998; Koegel, Koegel, & Surrat, 1992). However, NET is not as widely reported as DTI in home-based EIBI outcome studies, and at present there are no objective published outcome studies reporting the exclusive use of NET techniques in long-term intervention (Lovaas, 2003). A recent case study describes the use of NET during the initial stages of a home-based EIBI programme. The young child with autism involved was described as "...moving aimlessly around the [teaching] area, engaging only briefly, if at all, with any of the materials that were available and very rarely interacting with the teacher in any way" (Green, Brennen, & Fein, 2002, p.80). When DTI was instigated, however, the child interacted more frequently with the therapist and began to develop skills. When NET was reintroduced later in intervention, it did prove to be an effective instructional method. Thus, both instructional procedures demonstrated efficacy in this context, but may have targeted different aspects of verbal behaviour during the course of the child's language development (cf. Sundberg & Partington, 1998). For NET to be considered a powerful technique, however, an increase in the number of published reports of children succeeding in long-term NET-based intervention is needed. DTI is, arguably, the only intervention technique at present to have demonstrated sufficient power in home-based EIBI.

Despite the success in developing instructional techniques, there is a considerable lag-time between the reporting of techniques in the literature and their practical implementation (Green, 1999b), exemplified by Lovaas' statement

that there is "...at least a 25-year delay between what is now known about how to teach developmentally disabled children and what has been adopted" (1993, p.627). The cumulative nature of behavioural research means that instructional techniques are continually being identified or improved, but the 'active ingredients' of intervention are a matter of ongoing debate (Kasari, 2002). Although there are many potential avenues to explore, the future of research in behavioural interventions most likely lies in developing techniques that lead to widespread and generalised effects on children's learning (Pelios & Lund, 2001). Stimulus and response generalisation are particularly important directions that should be considered from the start of an intervention, rather than being addressed as and when skills are developed. In addition to this technology, it is also important to consider the issues involved in implementing intervention strategies in the real world (Kunkel, 1987). This review will now consider other aspects of home-based EIBI that could contribute to successful outcomes for young children with autism.

2.3 Intervention Integrity

Effective intervention techniques are the necessary starting-point of successful outcomes for young children with autism receiving home-based EIBI. For children to benefit from intervention, however, appropriate procedures that suit the child's developmental level must be selected from the multitude of effective ABA techniques available. Intervention integrity refers to the appropriate selection and accurate description of the parameters of an intervention (Peterson, Homer, & Wonderlich, 1982). As the demand for home-based EIBI increases, less time is available for highly qualified individuals proficient in behaviour analysis (i.e. supervisory and consultancy staff) to work directly with children for extended periods of time. It is therefore essential that appropriate techniques are fashioned into a formal intervention structure detailing a procedure that can be followed by others involved in the child's intervention strategy. The importance of a comprehensive intervention plan cannot be underestimated, given that the therapists that are often recruited to deliver these interventions are likely to be relatively inexperienced and may lack specific knowledge regarding effective procedures.

Research and practice in home-based EIBI has addressed the issue of intervention integrity in a number of ways. Manual-based intervention, certification of behaviour analysts, and specific assessment of supervisory staff in the context of EIBI can increase the likelihood that curricula will be appropriately designed and will bring about clinically significant change in young children with autism. These will be considered next.

2.3.1 Manualised Intervention

The use of manual-based interventions has increased the quality of psychotherapy research and practice over the past 20 years (Kazdin, 1998). Over a similar period of time, specific home-based EIBI manuals have been available that include empirically validated techniques based on cumulative research in ABA. These manuals typically describe curriculum progression, specific skill targets, ABA technology, and practical issues associated with delivering home-based EIBI (e.g. Leaf & McEachin, 1999; Lovaas, 2003; Lovaas et al., 1981; Maurice, Green, & Luce, 1996; Sundberg & Partington, 1998). As these manuals are available to parents and special educators, a larger number of children with autism are more likely to be exposed to home-based EIBI than would be the case if provision was dependent on the individual input of supervisory or consultancy staff. Manuals that operationalise the independent variable and detail intervention procedures can help improve the standardisation and replication of home-based EIBI (cf. Wilson, 1996). Ownership of documented instructional steps, however, is often not sufficient to ensure that aspects of home-based EIBI will be selected appropriately and delivered precisely. Although manuals are a useful resource that may help extend parents' and therapists' understanding of intervention techniques, it is impossible to describe all of the possible child reactions to instruction. Individual experience is likely to play a significant role in determining relevant intervention practice and delivery. Highly trained supervisory or consultancy staff should ideally direct manual-based intervention, as they will be more likely to develop an intervention appropriately when a child fails to progress sufficiently (Heimberg, 1998).

2.3.2 Behaviour Analyst Certification

Increased recognition of the effectiveness of home-based EIBI for young children with autism has been accompanied by an increase in the demand for services of this kind (Shook, Ali-I'Rosalis, & Glenn, 2002). The number of individuals qualified to design effective behavioural curricula do not however meet these growing requirements. Parents attempting to obtain high quality interventions for their own children have often been exploited by incompetent individuals professing to be able to design suitable and effective home-based EIBI curricula (Green, 1999b). This is a scenario that has been recognised by the professional behaviour analytic community (e.g. Smith & Lovaas, 1998), and the certification process is a response designed to provide a means by which the quality of a service can be monitored.

The certification of behaviour analysts is a relatively recent endeavour designed to benefit both the public and the profession (Moore & Shook, 2001; Shook & Favell, 1996). The Behavior Analyst Certification Board (BACB; www.bacb.com) is a non-profit making organisation that attempts to regulate the services of behaviour analysts in general on an international scale. BACB offers two voluntary levels of certification (Board Certified Behavior Analyst - BCBA; Board Certified Associate Behavior Analyst - BCABA) that require applicants to meet specific eligibility criteria, pass a written exam on behaviour analysis, and provide evidence of continuing professional development. The potential benefits to the public are substantial; parents can identify quality professionals who have attained a minimum standard in behaviour analysis, and can be confident that interventions designed by these professionals will be of the highest quality. In addition, it is also likely that behaviour analysts themselves will identify with this new professional role and raise standards generally within behavioural analysis (Johnston & Shook, 2001). Certification is, however, an expensive enterprise that has the potential to divide those who have been certified from those who have not (Moore & Shook, 2001; Rosenwasser & Cautilli, 2001). Some parents have also registered concerns that the certification process will drastically limit the number of professionals that are able to provide home-based EIBI (Jacobson, 2000). It is also possible that without a compulsory certification system, some inadequate behaviour analysts may 'slip through the net', further reducing the integrity of home-based EIBI for some children. It is likely that

certification will need to be widely promoted and recognised by consumers in order for it to be an effective way of ensuring the highest quality standards within the field, and as the BCBA certification process is a “necessary but not sufficient indicator of competence” (Shook et al., 2002, p.32), consumers must still exercise caution when employing behaviour analysts. BCBA certification provides information regarding the knowledge and experience of behaviour analysts, for example, but does not include an assessment of the quality of services provided post certification (Davis, Smith, & Donahoe, 2002). Given that the certification process described above is not specifically tailored to home-based EIBI for young children with autism, the field would likely benefit from a more focused and complementary certification process.

2.3.3 UCLA/MYAP Level II Certification

The UCLA home-based EIBI model has attempted to detail as many elements of intervention as possible, including supervisory quality control procedures (Lovaas, 2003). The Level II certification process is a means of assessing the quality of the service that supervisors provide to children, parents, and therapists. To qualify for Level II certification, a potential supervisor must pass an examination on topics including the nature of autism, ABA, and outcomes of intervention. In addition, candidates must receive satisfactory ratings from therapists they have trained, supervisors they have worked with, and parents they have supported. Candidates are also evaluated on their ability to introduce and deliver instructional programs to children (Smith, Donahoe, & Davis, 2000).

The Level II certification has recently been validated in a study demonstrating that the procedure discriminates between supervisory level staff and therapists (Davis, Smith, & Donahoe, 2002). Twenty-six supervisors who had worked within the UCLA model for over 9 months were compared to 22 therapists. Supervisors had over 6 thousand hours of intervention experience on average, compared to an average 72 hours experience for therapists. Results clearly showed that supervisors had a greater knowledge of home-based EIBI and designed more appropriate interventions than those devised by therapists, which is not surprising given the difference in the amount of experience between the staff groups. Whilst the authors suggest that Level II certification seems to

reflect the more sophisticated nature of the supervisory role, they also recognise that the Level II certificate is limited to the UCLA model, and advise that prospective supervisors also sit for the more general BCBA or BCABA qualifications (see above). Davis et al. also speculate that those supervisors achieving higher scores during Level II assessment are more likely to design better interventions and children are more likely to attain better outcomes. The logical implications of this are that those children whose intervention is directed by supervisors who are not Level II certified might not benefit as much from home-based EIBI. This argument must be substantiated with empirical data, however, and remains restricted to interventions based on the UCLA model. The challenge may be to devise a more generic assessment tool of supervisor quality that transcends different service providers, but still retains a focus on home-based EIBI for young children with autism.

Summary

The accurate selection and appropriate description of intervention techniques is likely to be an important factor governing the success of home-based EIBI for young children with autism. It is expected that intervention integrity is maintained to some degree by the availability and ease of use of manuals documenting home-based EIBI procedures. A lack of suitably trained, experienced, and qualified supervisory and consultancy staff in the UK however is likely to be a major barrier to the success of children receiving this style of intervention. By the year 2000 approximately 650 children received home-based EIBI in the UK, with the number likely to be rising annually (Bibby, Eikeseth, Martin, Mudford, & Reeves, 2002). As of August 2005, however, only 13 people in the UK were certified at BCBA level and 23 at the less proficient BCABA level, with the vast majority based in southeast England or north Wales (www.bacb.com). In addition, a recent survey of 75 home-based EIBI programmes for young children with autism in the UK reported that only 21% received consultancy from individuals who had passed the UCLA Level II certification process used in best outcome programmes (Mudford, Martin, Eikeseth, & Bibby, 2001). If certification at any level were to be considered a

hallmark of the quality of supervisors or consultants, it is likely that a large number of children and therapists in the UK are not receiving supervision of an adequate standard. The implications for children with autism are obvious, and increasing the number of certified professionals should be a target for the future.

2.4 Procedural Fidelity

It is essential to use effective techniques that have been carefully selected as appropriate for addressing the challenges at hand to maximise the impact of any intervention. These are however necessary but not sufficient elements of a successful intervention strategy. In addition to these aspects a high level of procedural fidelity is also required. In recognition of the fact that interventions are rarely delivered by the people who designed them, procedural fidelity refers to the degree to which interventions are implemented as intended (Peterson et al., 1982; Mowbray, Holter, Teague, & Bybee, 2003). Procedural fidelity in home-based EIBI refers to therapists' adherence to, and accurate delivery of, a specified intervention protocol. This is a particularly pertinent issue in home-based EIBI, given the overwhelming demand for competent behaviour analysts to design interventions for young children with autism. Therapists who are typically less experienced and knowledgeable about behavioural interventions are required to provide the vast majority of direct instruction, reproducing a specified intervention protocol during daily sessions. The intervention protocol provides information on how therapists should behave around children during intervention sessions (cf. Albin, Lucyshyn, Horner, & Flannery, 1996). Simply put, effective intervention techniques that have been appropriately selected by a competent supervisor or consultant are less likely to be effective if delivered inaccurately and inconsistently on a regular basis.

Establishing and maintaining high levels of procedural fidelity is important in both research and practice, establishing the functional relevance of aspects of intervention delivery (e.g. intensity of service delivery) and ensuring children receive the best quality intervention and therefore the best chance of clinically significant outcome. In particular, the accurate delivery of the intervention protocol can enhance the validity of an intervention (Moncher & Prinz, 1991). Consider the outcomes of children receiving home-based EIBI

where no data on procedural fidelity are recorded. If a significant change in the behaviour of a young child with autism occurs during home-based EIBI, it is difficult to conclude with any certainty that the intervention caused the observed changes. Child progress can only be attributed to an intervention if there are data concerning the nature and implementation of the intervention (cf. Johnston & Pennypacker, 1980). Thus, the development of skills may be attributed either to the intervention, to other aspects of the therapist-child interaction, or to maturation. Similarly, if no change in the behaviour of a child is observed it is difficult to conclude either way that an intervention is ineffective or that a potentially effective intervention was implemented incorrectly. Replication of intervention outcomes is also difficult to achieve if the extent to which the protocol was implemented as intended is unknown.

It is a point of interest to reflect on the reporting of procedural fidelity in the general ABA literature prior to considering similar reports in home-based EIBI outcome studies. Over the past 20 years there have been at least three explicit investigations of this aspect of intervention delivery presented in the literature. All of these accounts examined the reported manipulation of the independent variable in experimental studies appearing in the *Journal of Applied Behavior Analysis (JABA)*, arguably the premier journal of the field. Peterson et al. (1982) found that only 20% of experiments reported in *JABA* between 1968 and 1980 gave details on procedural fidelity. Sixteen percent of experiments involving children in *JABA* detailed procedural fidelity between 1980 and 1990 (Gresham, Gansle, & Noell, 1993). The most recent investigation by Progar and colleagues found that 25% of experiments published in *JABA* between 1996 and 2000 considered procedural fidelity (Progar, Perrin, DiNovi, & Bruce, 2001). It is likely that the apparent increase in reports of procedural fidelity appearing in *JABA* at the end of the last decade is due in part to a slightly different review methodology whereby any mention of the implementation of the independent variable was considered for inclusion, regardless of whether objective data were reported. From these three studies it appears that despite the importance of procedural fidelity it is largely neglected in experimental reports in the ABA literature. In addition to the ABA literature, fewer than 20% of intervention articles in three major journals focusing on learning disabilities were found to provide objective data on procedural fidelity (*Journal of Learning Disabilities,*

Learning Disability Quarterly, and *Learning Disabilities Research & Practice*). Around half of the remaining studies mentioned the accuracy and consistency of intervention delivery, but provided no data (Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000). This is not to suggest, however, that the vast majority of researchers overlook the assessment of the implementation of independent variable manipulations. Indeed, it may be that space restrictions in academic journals preclude the inclusion of such data in published experimental reports. Considering the importance of procedural fidelity, however, researchers and practitioners should be encouraged to include such important information in their reports.

2.4.1 Previous Reports of Procedural Fidelity in Home-Based EIBI

Given that procedural fidelity is seldom reported in published experimental studies in a high-quality behaviour analytic journal, would one expect the method sections of home-based EIBI outcome studies to give space to the issue? The most common forms of procedural fidelity appraisal include observational ratings by experts and self-report measures of intervention implementation (Gresham et al., 2000; Mowbray et al., 2003). Of all the home-based EIBI studies reviewed in the previous chapter, only one provides objective observational data on the quality of therapists' delivery of intervention techniques. It is interesting to note that the only study to provide this had specifically targeted procedural fidelity as a distinct aim of the research (Smith, Buch, & Gamby, 2000). All other research reports failed to contain objective or self-report data of therapists' behaviour during sessions, leaving the reader uncertain as to the quality of intervention delivery that children received on a day-to-day basis. One study presents data on the quality of parents' delivery of intervention techniques, but neglects to provide the same information regarding the therapists who participated (Anderson, Avery, Dipietro, Edwards, & Christian, 1987). Six studies consider the importance and measurement of procedural fidelity but do not provide objective data (Bernard-Opitz, Ing, & Kong, 2004; Birnbrauer & Leach, 1993; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; Sallows & Graupner, 1999; Smith, Groen, & Wynn, 2000; Weiss, 1999). Two additional studies also mention procedural fidelity but, due to the archival nature of the research, data were not available on the quality of

intervention delivery (Sheinkopf & Siegel, 1998; Smith, Eikeseth, Klevstrand, & Lovaas, 1997). Finally, five studies failed to mention procedural fidelity (Bibby, Eikeseth, Martin, Mudford, & Reeves, 2002; Boyd & Corley, 2001; Lovaas, 1987; Lovaas, Koegel, Simmons, & Long, 1973; Smith, Klevstrand, & Lovaas, 1995).

To be most effective, the procedural fidelity of home-based EIBI should be ascertained using systematic observational techniques that incorporate an explicit coding frame (Jordan, 1999; Wolery & Garfinkle, 2002). When acknowledged, reports of procedural fidelity focus on the accuracy of therapists' delivery of DTI instructional techniques (Koegel, Russo, & Rincover, 1977; Sarokoff & Sturmey, 2004). The DTI assessment procedure forms an integral part of therapist evaluation in the Level I certification process used within the UCLA model of intervention delivery (Smith, Donahoe, & Davis, 2000). Therapists are instructed to deliver appropriate DTI to a child whilst a trained observer records data on five aspects of DTI relating to the therapists' behaviour when i) presenting discriminative stimuli (S^D s) to the child, ii) using prompts to guide the child's responses, iii) shaping the child's behaviour by reinforcing successive approximations, iv) delivering consequences after the child's response to an S^D , and v) ensuring the trial has a distinct onset and offset. The accuracy of therapists' intervention delivery is calculated as a percentage of correct instances of each element of DTI. Thus, particular strengths or weaknesses in the delivery of individual components can be identified. Outcome studies incorporating this method of assessment have reported therapists working in UCLA clinic-directed EIBI to be over 90% accurate (e.g. Smith, Buch, & Gamby, 2000), and parents in a partial-replication to be over 80% accurate (e.g. Anderson et al., 1987). Despite not being included in the original report, retrospective analysis of DTI recorded at UCLA between 1970 and 1984 (cf. Lovaas, 1987) has shown therapists to be 92-100% accurate (Lovaas, 2003).

2.4.2 Problems with Reports of Procedural Fidelity in Home-Based EIBI

Despite the few reports of highly accurate delivery of DTI techniques in home-based EIBI settings, there are a number of problems associated with the measures of procedural fidelity developed by Koegel et al. (1977). First, the predictive validity of the measure is questionable to some degree. The authors

acknowledge that in one case "...there was no improvement in child performance with a high level of correct teacher performance" (Koegel et al., 1977, p.204). It is not necessarily the case therefore that therapists who achieve favourable ratings on this measure are helping to develop children's skills. It is possible that the child in question did not improve because the therapist had been asked to deliver ineffective or inappropriate techniques, but the finding still highlights the limited predictive value of the measure. Second, the measure is restricted to therapists' delivery of DTI. Given that a number of other ABA techniques are permeating into the 'mainstream' practice of home-based EIBI, this restricts the styles of intervention that can be assessed (e.g. Sundberg & Partington, 1998; Weiss, 2002). The quality of therapists' delivery of other ABA techniques therefore remains unknown, as no comparable published assessment tool is available at present. Future research should aim to develop measures for assessing the quality of therapists' delivery of other techniques such as NET. Alternatively, a more generic measure of therapist performance that transcends intervention techniques may be useful.

A third problem is that the measure is quite complex. An observer using the Koegel et al. (1977) measure has to rate a total of 13 separate elements of DTI during continuous 20-30 second observational periods. Although comprehensive, this also represents quite a challenge for observers to complete within the allotted time periods. More complex observational measures (i.e. those with a large number of response options or a wide variety of behaviours to be observed) are less likely to be reliable (Kazdin, 1977). In a recent study of the quality of therapists' delivery of DTI, researchers excluded elements of the measure associated with therapists' prompting and shaping techniques due to low inter-rater reliability (Smith, Buch, & Gamby, 2000). A simple remedy to this problem may be to video-record therapists' while they work with children rather than assessing therapists 'live'. Trained observers could watch the video recording several times and rate each element of therapists' DTI delivery separately. There is a chance, however, that after repeated viewing observers would become familiar with the therapists' actions. This would be likely to influence the observers' ratings of the quality of intervention delivery. It is also important for observers to remain independent of the team providing intervention to the child with autism. Employing raters who are blind to the nature of the

intervention and the recipients might help to minimise systematic bias within the monitoring of intervention delivery, but this is likely to be difficult to achieve given the technical nature DTI (Wellcome Trust, 2003).

Finally, therapists' performance may be reactive to the assessment process (Gresham et al., 2000). Reactive effects occur when the observational procedure influences the behaviour of the observational target, and are considered threats to the validity assessment tools (Haynes & Horn, 1982). Reactive effects include an increase or decrease in the rate of responding within and between observational targets, and orientation towards the observer rather than the child or other aspects of the environment. In particular, adults are more likely to engage in teaching activities, give commands, praise, and reward children in the presence of observers (Baum, Forehand, & Zegiob, 1979). A number of methodological aspects of the assessment process can cause reactive behaviour change to occur, including the novelty of the observational process, characteristics of the observational target or observer, and the length of the assessment process (Haynes, 1978). Analysis of the observational context associated with DTI assessment indicates that observed therapist behaviour might be reactive and therefore unrepresentative of actual DTI. An observer or video camera operator and equipment are present during one-to-one intervention that usually takes place in an environment that is quiet and free from distraction (cf. Anderson, Taras, & Cannon, 1996). This situation is markedly different to that experienced during normal intervention sessions. Consultancy or supervisory staff are also likely to view the videotapes and assess DTI accuracy, placing pressure on therapists to perform well during assessment. Indeed, Mash and Hedley (1975) suggest that changes in behaviour due to reactivity may be a function of the observational targets' anticipation of positive or negative consequences that occur during or as a result of the observational procedure. In addition to these threats, the length of observation typically ranges from 5-15 minutes (e.g. Sarokoff & Sturme, 2004; Smith, Buch, & Gamby, 2000; Smith, Donahoe, & Davis, 2000). As Haynes (1978) remarks, several sessions may be necessary to minimise the effects of reactivity. Thus, observed DTI may be unrepresentative of instructional behaviour in the absence of the assessment context. This potentially limits the value of outcome studies claiming that staff behaviour when observed is of a high standard. Although accurate but potentially

reactive therapist behaviour demonstrates that procedural fidelity is high during at least one condition (cf. Ivancic & Helsel, 1998), it would be more useful to observe therapists working with different children over repeated sessions that are interspersed throughout the intervention (Jordan, 1999; Moncher & Prinz, 1991). This could help therapists and children to get used to the assessment process and minimise reactive effects as much as possible. The difficulty, however, is achieving the right balance; frequent assessment of procedural fidelity is likely to be costly in terms of financial expenditure, time and resources, whereas occasional assessment of procedural fidelity may allow therapeutic drift to occur (Mowbray et al., 2003).

2.4.3 Quality of Procedural Fidelity in Home-Based EIBI

It has been established thus far that procedural fidelity is often neglected from reports of home-based EIBI for young children with autism. In addition, there are also likely to be problems associated with current methods of assessing the accuracy of therapists' delivery of instructional techniques. It has already been noted that the lack of explicit data regarding procedural fidelity does not necessarily indicate that researchers and clinicians are not recording such information. Without these data, however, it is also difficult to defend claims that procedural fidelity is high across and within outcome studies. Consequently, it is quite possible that the observed variation in outcomes of young children with autism may be due in part to inconsistent implementation of the intervention across daily sessions and therapists.

Researchers in general psychotherapy settings have acknowledged the 'therapist-as-fixed-effect fallacy' for many years, recognising that heterogeneous therapist skills can have a profound impact on intervention outcomes (Crits-Christoph & Mintz, 1991; Martindale, 1978). More recently, variability in therapist performance in home-based EIBI for young children with autism has also been noted. In their critique of the UCLA Young Autism Project, Gresham and MacMillan (1997a,b) state that it is common to observe substantial variation in the delivery of home-based EIBI. These authors suggest that, even in the best outcome studies, it is not known for certain that intervention success is due to the correct implementation of the intervention and that intervention failure is due to therapists delivering the intervention to a poor standard. Programme managers

and parents of children with autism have also remarked that therapist performance might not be consistent. Weiss, for example, recognised that despite competence in discrete-trial instruction, some therapists are ‘...more enthusiastic, more acutely aware of the nuances of instruction, or more thorough in their communication’ (1999, p.19). The problems experienced in recruiting and training therapists have also been highlighted in a recent study of parents’ perceptions of facilitating factors and barriers to the implementation of home-based EIBI in the UK (Johnson & Hastings, 2002). In addition, interventions that rely on students being employed as therapists will inevitably suffer from variations in staff quality and availability throughout year (Birnbrauer & Leach, 1993). Thus, future research in home-based EIBI should consider procedural fidelity as an important factor governing the outcomes of young children with autism. It is plausible that poor child outcomes are due to the inaccurate and inconsistent implementation of interventions (Gresham et al., 2000), and some have even gone as far as to suggest that inconsistent procedural fidelity may become a “prime suspect” in terms of explaining the variability in child outcomes (Wolery & Garfinkle, 2002, p.471). The remainder of this chapter will explore factors that may influence therapists’ delivery of home-based EIBI for young children with autism.

2.5 Factors Influencing Therapists’ Delivery of Home-Based EIBI

There are very few published data at present focusing on therapist behaviour in the context of home-based EIBI. As described above, reports of procedural fidelity in clinic-directed home-based intervention demonstrate therapists’ accuracy of discrete-trial instruction to be in excess of 90% (e.g. Lovaas, 2003; Smith, Buch, & Gamby, 2000). It is unlikely, however, that therapists in clinic- or parent-directed interventions maintain such high levels of fidelity throughout the course of typical intervention sessions, and little is known about the exact nature of interaction between therapists and children on a day-to-day basis (Green, 1996). If more were known about the nature of procedural fidelity, it might be possible to explain the differential effects of intervention on young children and their families (LeLaurin & Wolery, 1992). Although there is no specific theory of therapist behaviour within home-based EIBI, it is likely that

a number of factors contribute to therapists' accurate delivery of an intervention protocol. These factors are likely to include the training and supervision therapists receive, the nature of the intervention and service environment, the children therapists work with, and characteristics of the therapists themselves (cf. Graziano & Katz, 1982). Each of these will be considered in turn.

2.5.1 Training

At least three separate factors associated with home-based early intensive behavioural interventions per se are likely to contribute to therapist performance levels. These factors include training, supervision, and an environment that supports effective intervention delivery (cf. Cullen, 1988). A relatively straightforward approach to increasing the accuracy of delivery of intervention techniques is to provide therapists with appropriate training. The main aim of training is to improve knowledge and teach skills (Mullins, 1999); therefore training is an important method that can be used to increase the likelihood that therapists will deliver predetermined interventions in the manner in which they were intended (Salend, 1984a,b; Yeaton & Sechrest, 1981). Various methods including lectures and manuals, role-play, and modelling have been used either individually or in combination to train therapists (Jahr, 1998). Research has demonstrated that modelling (i.e. enabling therapists and parents to observe more experienced members of staff delivering interventions to children before attempting the techniques themselves) in particular is effective in developing appropriate therapeutic skills for working with young children with autism, and as such is the most extensively used training method (Koegel, Glahn, & Nieminen, 1978; Koegel, Russo, & Rincover, 1977; Lovaas, 1978). A recent study has also shown that accurate DTI skills can be taught when modelling is coupled with instructions, feedback and rehearsal (Sarokoff & Sturmey, 2004). Care must be taken, however, to ensure that the models themselves are effective at delivering intervention techniques (cf. Robertson, 1990). There is also evidence to suggest that training is an effective means of teaching therapists DTI skills, but that other areas of intervention delivery such as fading prompts or reinforcing successive approximations are not addressed sufficiently (Mørch & Eikeseth, 1992). This is an area that would benefit from further research, given

the importance of reducing prompt-dependency in young children with autism (Jahr, 1998).

2.5.2 Supervision

There are at least two facets to the role of the supervisor in home-based EIBI. The first of these pertains to designing an appropriate and effective intervention for young children with autism; this has already been discussed above. The second role of the supervisor is to maintain the performance of therapists working with young children with autism. Whilst training can help therapists to learn the skills necessary to teach children, research has shown that it is also necessary to devote structured supervision time with therapists to maintain accurate intervention implementation (cf. Noell et al., 2000). Thus, supervisors must help to ensure high levels of procedural fidelity through the duration of intervention. A recent study of community programmes for people with developmental disabilities found that supervisory staff considered supervisee motivation to be a very important aspect of the supervisory role (Parsons, Reid, & Crow, 2003). Common strategies employed by supervisors to maintain therapists' usage of behavioural techniques include prompting and providing feedback or tangible rewards (Harchik, Sherman, Hopkins, Strouse, & Sheldon, 1989). When questioned, however, supervisory staff in community programmes considered only half of other supervisors to be adequately using these techniques (Parsons et al., 2003). It is a distinct possibility therefore that supervisors may be providing insufficient support to therapeutic staff, despite the importance of their role in maintaining procedural fidelity. One reason for this may reside with the widely held belief that supervisory staff who are proficient in delivering intervention techniques themselves are able to manage therapists who implement intervention techniques on a day-to-day basis (Jensen, Parsons, & Reid, 1998). In fact, it has been shown that supervisors proficient in instructional skills are not always able to maintain the performance of the direct-care staff that they supervise (McGimsey, Greene, & Lutzker, 1995; Parsons & Reid, 1995). It is important that supervisory staff receive specific management guidance as part of their own training and are supported in using feedback and other supervisory techniques, as this can have beneficial effects on the maintenance of therapist

skills and subsequent procedural fidelity (cf. Jensen et al., 1998; Shore, Iwata, Vollmer, Lerman, & Zarcone, 1995).

2.5.3 Intervention-Related Factors

It is possible that certain characteristics of home-based EIBI could contribute to therapists' accurate delivery of intervention techniques. These characteristics can be divided into at least two distinct factors. First, features of the intervention setting are likely to have a bearing on therapist behaviour during sessions. Ideally, the intervention should be delivered in an environment that is quiet and free from distraction (Anderson et al., 1996). This usually necessitates a dedicated room for intervention delivery; a lack of space in the child's home is therefore likely to be a barrier to procedural fidelity. In addition, a lack of funding for equipment or parental resources for organising elements of the programme would be expected to be barriers to the implementation of home-based EIBI (Johnson & Hastings, 2002). Thus, procedural fidelity may suffer if therapists were required to deliver interventions without access to suitable resources or had to devote valuable intervention time to a large amount of administration. In addition to physical resources, therapists are also likely to be expected to work in the vicinity of the child's parents. Parental stress in particular may be a barrier to intervention implementation (Tharp & Wetzel, 1969). Although parents of children with autism receiving home-based EIBI are not more stressed than parents of children with autism not receiving this style of intervention, they are still likely to be more stressed than parents of children without autism (Hastings & Johnson, 2001). It would be useful to establish how this parental discord influences therapists' delivery of intervention programmes.

Second, techniques specified in the intervention protocol have the potential to influence therapist behaviour. When designing interventions, time should be taken to consider how the intervention is likely to influence the behaviour of therapists. 'Intervention-effects' such as increased therapeutic stress and reduced interaction time are more likely to be observed when therapists are asked to deliver interventions that they find aversive (McConnachie & Carr, 1997). Shorter or more concise interventions, for instance, are also more likely to be implemented as intended than more lengthy and complex interventions (Gresham et al., 2000; Salend, 1984a,b). In addition, interventions that demand

direct, intensive interaction are less likely to be implemented by special educators than more indirect styles of intervention (McConnell et al., 1992). Thus, the lengthy and direct interactions demanded by home-based EIBI may prove difficult for therapists to deliver as was intended over the course of intervention.

2.5.4 Child-Effects

Child-effects have long been recognised to have an influence over adults' behaviour, cognitions, and emotions (Bell, 1968; Emery, Binkoff, Houts & Carr, 1983). It is likely that child-effects shape the responses of therapists delivering home-based EIBI. Thus, the characteristics and behaviours of young children with autism may have a bearing on the accuracy of intervention delivery. Therapist behaviour may be influenced to some degree, for example, by the child's diagnosis of autism. In a simulation study of a teaching situation, Eikeseth and Lovaas (1992) found that student-therapists used more rewards and less verbal corrections with children labelled as having autism than with children described as 'normal'. The authors concluded that the child's diagnostic label had the potential to influence the behaviour of therapists in real intervention settings. Procedural fidelity is also likely to be associated with improvements in child skills and development (Berberich, 1971; Gresham et al., 2000); therapists' accurate delivery of suitable interventions may be reinforced by noticeable child progress during teaching sessions. Conversely, children who are not thought of positively or who progress slowly may receive a lower standard of intervention delivery (Hastings & Remington, 1993). It is also likely that there is some degree of reciprocity between the accuracy of intervention delivery and child progress, such that slow child progress may be due to poor procedural fidelity, or poor procedural fidelity may be due to slow child progress. Future research may help to clarify this issue.

In addition to the characteristics of young children with autism, the quality of instruction that therapists' deliver is likely to be influenced by any challenging behaviour that children display. Thus, therapists who experience challenging behaviour as aversive may submit to the functional demands of the behaviour in an attempt to avoid or escape it (Hall & Oliver, 1992; Oliver, 1995). A therapist may, for example, reduce the intensity of instruction with a child who

is aggressive during periods of unwanted task demand. Although the therapists' and child's behaviour are both negatively reinforced by the cessation of the challenging behaviour and the activity respectively, it is also likely to maintain this cycle of responding in the future. Thus, any unwanted task demand is immediately met with child aggression and the therapist avoids following specific elements of an intervention protocol that are associated with increased child aggression. An early study by Sherman and Cormier (1974) demonstrated the power that children's disruptive behaviour can have over the teaching behaviour of adults. The experimental design involved modifying the children's unruly behaviour without the teachers' knowledge. Teachers were observed providing more attention and giving less negative verbal statements when the children's behaviour improved. In addition, teachers rated students as less disruptive and less irritating after the intervention had been applied. A series of studies by Carr and colleagues are particularly relevant, given that they focus on the teaching behaviour of adults implementing discrete-trial instructional procedures (Taylor & Carr, 1993). Adults have been found to instruct less challenging children more frequently and in a wider range of tasks than when teaching more challenging children (Carr, Taylor, & Robinson, 1991). In addition, challenging behaviours with different functions have been shown to influence the behaviour of adults in different ways. Thus, adults teaching socially avoidant children tend to reduce the level of attention and interaction required during teaching sessions, whereas adults teaching children with challenging behaviour that functioned to attract attention engaged in more interaction-based tasks (Taylor & Carr, 1992). Finally, it has also been demonstrated that child challenging behaviour influences adults' delivery of a specified intervention protocol. In a study by McConnachie and Carr (1997), functional communication training and escape extinction interventions were taught to proficiency with adults who were working with children with challenging behaviour of children. Children demonstrated more frequent challenging behaviour whilst engaged in nonpreferred tasks during conditions of escape extinction than during periods when functional communication was promoted. Adults were instructed to use one of the interventions for at least half of the time available during different phases of the experiment. It was found that adults implemented the escape extinction procedure less than was required, whereas functional communication

interventions were implemented at the necessary level. The authors concluded that procedural fidelity was directly related to the level of challenging behaviour displayed by children during different interventions. Thus, interventions that promote disruptive or challenging behaviour in children, at least in the short-term, are less likely to be delivered as intended than interventions that do not have such effects on children.

2.5.5 Therapist Characteristics

In the general psychotherapy literature there has been considerable interest in identifying those therapist characteristics that influence client outcomes (e.g. Beutler, Machado, & Neufeldt, 1994; Blatt, Sanislow, Zuroff, & Pilkonis, 1996; Huppert et al., 2001; Lafferty, Beutler, & Crago, 1989; Zlotnick, Elkin, & Shea, 1998). This interest has also extended into the behavioural intervention literature (Albin, Lucyshyn, Horner, & Flannery, 1996; Allen, 1999). There are at least two reasons why exploring therapist characteristics may be profitable in home-based EIBI for young children with autism. First, an understanding of therapist characteristics that influence therapists' delivery of intervention techniques could help improve personnel selection and training. Substantial differences have been found in therapists' responses to training in discrete-trial techniques, and it has been suggested that this is likely to be accounted for, at least in part, by therapist characteristics (Buch, 1995). If the therapist characteristics responsible for these differences were known then potential therapists could be selected on the basis of these attributes, or training could focus on developing these characteristics (cf. Milne, 1985). There is a possibility, however, that an intervention approach such as home-based EIBI that is already short of qualified and experienced therapists could be compromised through any screening procedures that may reduce staff numbers further.

Second, therapist characteristics may be a useful entry point in achieving positive change in young children with autism. Consider the example of a challenging child who is likely to influence the behaviour of a therapist working with them (see section 2.5.4). Ultimately, the aim of home-based EIBI is to produce clinically significant and durable change in the behaviour of young children with autism. In order to promote change in the child, behavioural interventions specify how therapists should behave (Albin et al., 1996). Given

the discussion above it is possible that the behaviour of the therapist is governed not by the intervention protocol, but by the behaviour of the child that they are working with. Thus, a circular pattern of events can be envisaged where the behaviour of the child influences the behaviour of the therapist, which in turn influences the behaviour of the child. An understanding of therapist characteristics may help to resolve this vicious cycle, such that therapist behaviour is driven by these characteristics and not by a child's challenging behaviour. In addition, these characteristics may help the therapist to follow the prescribed intervention protocol and promote subsequent child development.

Although demographic factors such as therapists' level of education are likely to influence therapists' accurate delivery of behavioural interventions (cf. Adkins, Singh, McKeegan, Lanier, & Oswald, 2002), staff attitudes, beliefs, stress and emotional reactions have received particular attention in the learning disability literature (Allen, 1999, Bromley & Emerson, 1995). The present discussion will now consider some possibilities regarding how these psychological factors may influence therapists' delivery of home-based EIBI for young children with autism.

2.5.5.1 Stress and Emotional Reactions

Staff emotions such as depression, anger, fear, anxiety, sympathy and disgust have been investigated in the learning disability literature (e.g. Dagnan, Trower, & Smith, 1998; Mitchell & Hastings, 1998). Research has also focused on the impact of stress, including general mental health and burnout, on staff interaction with clients (Hastings, 2002). Within the organisational and work psychology literature, various relationships between stress and task performance have been investigated (Muse, Harris, & Field, 2003). First, researchers have explored a negative linear relationship, such that increased stress inhibits work performance. Second, a positive linear association has been proposed, with increased stress providing a challenge that improves work performance. Last, an inverted-U relationship between stress and work performance has been advocated. This approach suggests that increased stress facilitates work performance up to a certain level, with subsequent increased stress impeding task performance.

There is a distinct lack of research examining the effects of stress on staff performance in services for people with learning and developmental disabilities (Hastings, 2002). Three research strategies incorporating observational and self-report measures have been reported in the literature. Using an experimental design, staff-client interaction has been observed in group homes for people with learning disabilities (Rose, Jones, & Fletcher, 1998). Staff working in less stressful homes were found to be less anxious and interacted more frequently and positively with clients than those working in more stressful homes. A correlational study examining the association between self-reported measures of stress and observed staff-client contact found that staff members who reported higher levels of job-related burnout were more likely to interact negatively with, and avoid, client contact (Lawson & O'Brien, 1994). Finally, a survey study of direct-care staff working in homes for people with learning disabilities has demonstrated that perceived work stress, uncertainty regarding work-related activities, and limited chances for personal development were all considered to have a negative impact on perceived work performance (Hatton, Brown, Caine, & Emerson, 1995). Although this investigation was based on correlational data, the study may have particular relevance for therapists working within home-based EIBI, given the lack of career structure and explicit career development opportunities.

The limited research described above appears to support a negative linear relationship between staff stress and interaction with clients. In the present context this may mean that therapists who are more stressed will interact less often with children and the quality of intervention delivery is likely to be impaired to some extent. There are, however, likely to be large individual differences governing therapists' reactions to stress and stressful situations (cf. Greenberg & Baron, 1997). Staff scoring high on measures of neuroticism, for example, have been found to experience more stress in high job demand situations than less neurotic staff (Rose, David, & Jones, 2003). Further research should aim to clarify how staff stress and emotions contribute to work performance, and examine the applicability of these findings to therapists working with young children with autism in home-based EIBI programmes.

2.5.5.2 Attitudes and Beliefs Regarding the Intervention

The effects of social validity or acceptability of behavioural interventions on staff behaviour has been recognised for some time (e.g. Tharp & Wetzel, 1969), and has received increasing clinical and research interest since the publication of a seminal paper on the subject in the late 1970s (Wolf, 1978). Service-users, paraprofessionals, and family members can make judgements of acceptability with respect to the fairness, intrusiveness, and appropriateness of an intervention. Research demonstrates that ‘positive’ or reinforcement-based interventions are deemed more acceptable than alternative approaches (Elliott, Witt, Galvin, & Peterson, 1984). As such, it might be expected that modern home-based EIBI, based on reinforcement and positive principles, is likely to be acceptable to therapists, and that these interventions will be adhered to in both the short and longer terms (cf. Corrigan et al., 1998; Hastings, 1997; Kazdin, 1980, 1981). There is, however, a dearth of research exploring the association between the acceptability of an intervention and actual compliance with intervention regimens (Hastings, Boulton, Monzani, & Tombs, 2004). The relationship between parents’ self-report ratings of intervention acceptability and compliance has been investigated at a paediatric behaviour management outpatient clinic (Reimers, Wacker, Cooper, & DeRaad, 1992). It was found that those parents who had more positive perceptions of the reasonableness and effectiveness of the prescribed intervention, and were more willing to deliver the intervention, reported increased levels of compliance with recommendations. Perceptions of increased familial disruption were negatively associated with compliance. There are, however, obvious problems in relying on self-report measures of compliance. As Reimers and colleagues acknowledge, future research should seek to obtain more objective measures of compliance with intervention protocols. It may be that there is very little correspondence between the interventions that people say they find acceptable, and the intervention that they are actually willing to use (J. Witt, personal communication, November 12, 2002).

2.5.5.3 Attitudes and Beliefs Regarding Young Children with Autism

Perhaps it is to be expected that therapists' attitudes toward the children they work with are likely to influence the manner in which they interact and deliver interventions. Research shows that staff teaching in early special education classes deliver more intensive intervention to those children rated as more independent (McConnell et al., 1992). Staff have also been found to be more attentive to, and interact more positively with, children with learning disabilities perceived as more likeable, attractive, and intellectually competent (Daily, Allen, Chinsky & Veit, 1974). Investigations have also demonstrated that parents who consider their own children with autism to have a more amenable temperament tend to interact with them more than parents who find their own children to be more difficult (Kasari & Sigman, 1997). The converse of these findings, however, suggests that therapists may be less likely to interact with children that they perceive to be more difficult or challenging. It has recently been suggested that staff are less likely to be motivated to intervene during episodes of client challenging behaviour if the staff perceive there is nothing that can be done to help (Allen, 1999). Under these circumstances staff may experience 'learned helplessness', and be less motivated to deliver specified interventions or intervene during episodes of challenging behaviour (cf. Seligman, 1975). It is quite possible that therapists may experience similar feelings if they perceive the young children that they are working with as incapable of making progress. This situation may be especially likely to arise when working with young children with autism, who are characterised by severe and chronic impairments in communicating and socialising with others. Subsequent intervention may be less intensive or of reduced quality. As research has not yet addressed this issue the reverse is equally plausible, such that a lack of therapist effort negatively impacts upon child development. An important avenue for future investigation would be to examine therapists' perceptions of the developmental potential of the young children that they work with, and to collect data concerning the relationship between therapists' perceptions and delivery of home-based EIBI.

In addition to considering children's abilities, therapists' attributions regarding child behaviour during sessions may have an influence on the delivery of interventions. Researchers have investigated the role that attributions of

internality, stability and controllability of another's behaviour may have on subsequent emotional responses and helping behaviour (Weiner, 1980, 1985, 1993). Following this model, it may be that therapists' evaluate the behaviour and abilities of young children with autism, which in turn lead to emotional reactions and subsequent helping behaviour. If a therapist were to consider that a child was being maliciously disruptive or inattentive during sessions, for example, that therapist may feel angry and be less likely to help. If, however, the therapist attributed the disruption or lack of attention to the child's developmental disorder rather than being intentional, the therapist might feel sympathetic and deliver the intervention with more effort. There are no studies in the home-based EIBI literature supporting this argument concerning therapists' helping behaviour using Weiner's model. There is, however, a growing body of research exploring the applicability of Weiner's model to the reactions of staff working with people with intellectual disabilities and challenging behaviour. Researchers have explored the applicability of Weiner's model to staff reactions to challenging behaviour displayed by people with intellectual disabilities, with the aim of using cognitive-behavioural interventions to address faulty attributions or emotional reactions. A number of self-report studies incorporating vignettes have found support for Weiner's original model (Dagnan & Cairns, 2005; Hill & Dagnan, 2002; McGuinness & Dagnan, 2001), and a modified model incorporating optimism (Dagnan, Trower, & Smith, 1998; Stanley & Standon, 2000). The use of hypothetical vignettes has been criticised by some (e.g. Allen, 1999), however, and a recent study using staff members actual experiences of aggressive challenging behaviour has been incorporated into a test of Weiner's model (Dagnan & Weston, in press).

Despite the support offered for a model of staff helping behaviour, some researchers have cast doubt on the utility of Weiner's account to the context of services for individuals with challenging behaviour (e.g. Jones & Hastings, 2003). Conceptually, Weiner's emotional reactions consist of anger and sympathy, but these do not correspond to work with staff in challenging behaviour services where fear/anxiety and depression/anger have been found to be key emotions (Mitchell & Hastings, 1998). Also, measures of helping are based on self-report of participants' likelihood of offering help, as opposed to direct observational measures of the quality of helping behaviour; a more

detailed analysis may incorporate the latter (Sharrock, Day, Qazi, & Brewin, 1990). In addition, staff 'helping' behaviour may not actually be 'helpful' in relation to the function of challenging behaviour. In the home-based EIBI context, however, Weiner's model may be more useful as therapists' helping could be defined as implementing a protocol as advised by a supervisor or consultant. It has also been noted that some of the support for the model incorporates optimism, which is not a part of Weiner's original model of helping behaviour. Thus, it may be that the attribution-emotion-behaviour model is too simplistic for understanding staff behaviour in services for individuals with challenging behaviour (Wanless & Jahoda, 2002). The utility of this model has yet to be tested within the home-based EIBI context, however, and future research could usefully establish its predictive power in the context of therapist's delivery of intervention to young children within the home.

2.5.5.4 Attitudes and Beliefs Regarding Therapists' Own Abilities

Given the isolated nature of the therapists' working environment in home-based EIBI, their beliefs about their own performance and delivery of interventions may be especially important. One particular belief that has received relatively little attention in the staff research literature, but is likely to have a substantial impact on staff behaviour, is perceived therapeutic self-efficacy. This belief may have benefits at the behavioural level. There are strong contingencies acting to punish therapist adherence to behavioural technologies (Allen & Warzak, 2000). One example is that the time between a therapists' accurate delivery of an intervention technique and positive changes in a child's behaviour may be quite considerable. This has the effect that accurate intervention delivery may not be reinforced immediately; if child progress was considered a reinforcer for therapists' behaviour then a delay in reinforcement may have a detrimental impact on intervention delivery, particularly in those therapists who are learning ABA techniques (cf. Kazdin, 2001). Social disapproval from members of the therapists' verbal community may constitute another example. If, for instance, a therapist is asked to ignore a child's tantrums while instructing the child in a public setting, others who view the therapists' actions as inappropriate or neglecting may punish this openly by showing their disapproval. Thus, accurate therapist behaviour (in this case, ignoring child tantrums) may be punished by

the aversive comments of members of the public, and as a consequence intervention fidelity is likely to suffer. It is possible that therapists' beliefs in their efficacy in the therapeutic role will help to mitigate against these contingencies and improve the chances that they will adhere to the programme long enough for their behaviour to come under the control of child improvement contingencies. Developing and sustaining a working environment that supports staff and engenders feelings of personal effectiveness in the therapeutic role is likely to be an important setting condition that warrants further examination (Clements & Zarkowska, 1994). The remainder of the present chapter will focus on perceived therapeutic self-efficacy and explore the role of this therapist belief in relation to the delivery of home-based EIBI.

2.6 Perceived Therapeutic Self-Efficacy

Self-efficacy theory resides within a wider social-cognitive theory of human functioning (Bandura, 1986). Social-cognitive theory proposes that human functioning is the product of environmental, personal (i.e. cognitive, emotional, biological), and behavioural factors. These factors influence one another in a dynamic system described as reciprocal determinism. Perceived self-efficacy is considered to be a salient cognitive factor in this system that acts as a proximal determinant of an individual's behaviour (Bandura, 1977; 1978; 1986; 1989; 1997).

“Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p.3). These beliefs are thought to be a crucial factor governing the outcomes of an individuals' intended actions. According to self-efficacy theory, behaviour is not only the product of knowing what to do and being sufficiently motivated to do it; self-efficacy beliefs are key. Thus, effective functioning is a product of adequate skills, sufficient motivation, and a personal belief in being able to do what is necessary to perform a task well. People who possess similar skills relating to a specific task are likely to perform differently as a function of their perceptions of their own abilities to perform that task. Staff members' lack of confidence in applying behavioural techniques is considered to be an important setting event influencing the use of behaviour techniques in

psychiatric hospitals (Burdett & Milne, 1985). In the present context different therapists in a team may deliver home-based EIBI with varying degrees of success despite having similar levels of technical skill. Therapists who believe they are capable of organising the actions required to deliver the intervention to the child may be more likely to perform at a higher level.

2.6.1 Mechanism of Perceived Self-Efficacy

Perceived self-efficacy acts as a complex mediating factor that is constructed through multiple sources, and influences actual behaviour in a variety of ways (Bandura, 1977, 1989, 1997). Figure 5 illustrates the proposed mechanism of perceived self-efficacy on behaviour, with the following sections expanding on this model.

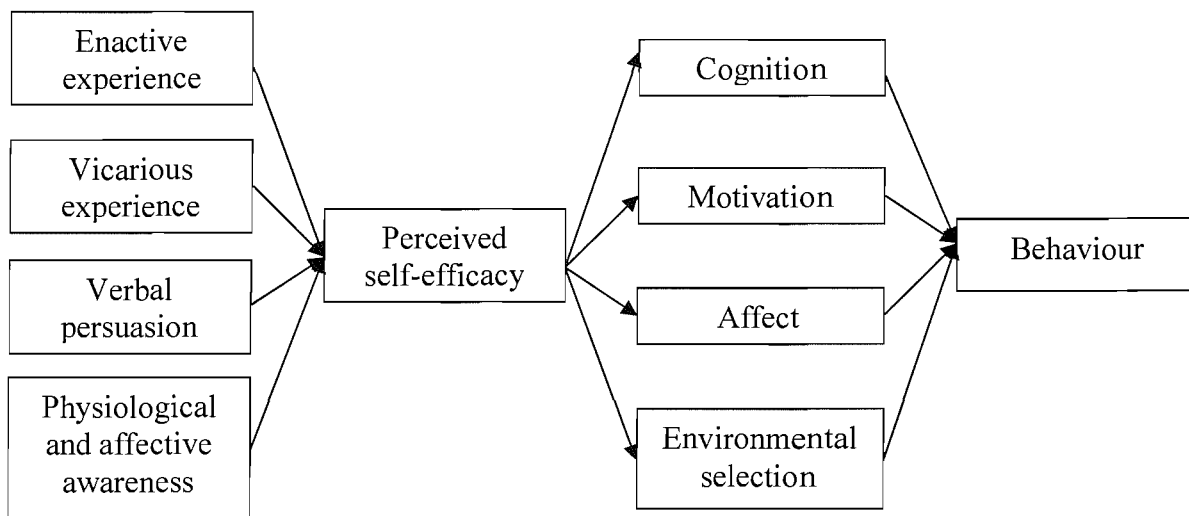


Figure 5: Mechanism of perceived self-efficacy

2.6.1.1 Sources of Perceived Self-Efficacy

Judgements of perceived self-efficacy are created from four distinct sources (Bandura, 1977, 1997). These sources can act either separately or in combination to generate self-efficacy beliefs. The first, and most influential, source of efficacy beliefs is derived from peoples' perceptions of their own enactive (i.e. personal) experiences. The importance of this source of information is highlighted in the assumption that personal experience provides the most genuine evidence of a person's ability to succeed or fail at a task. Thus, success

on a particular task is likely to increase perceived self-efficacy for completing the task again in the future, whereas failure is likely to lower such beliefs.

Completing more difficult tasks is also likely to raise self-efficacy beliefs. Some tasks, however, require less effort to complete successfully than other tasks.

Therefore, perceived self-efficacy is likely to increase further if a required level of performance is attained through perseverant effort rather than if the task is found to be simple and undemanding. It may be expected that therapists delivering home-based EIBI to young children with autism will have an increased sense of therapeutic self-efficacy if they are successful in delivering intervention programmes. These beliefs are likely to be more robust if therapists' have expended a significant amount of effort whilst coping with difficult tasks such as managing a child's challenging behaviour, for example, or whilst learning to deliver more complex instructional activities.

A second source of self-efficacy beliefs is derived from vicarious experience. There is no accepted defining measure of successful performance for many human pursuits. Therefore, an important method of appraising personal capabilities may be to compare others performance with one's own functioning (Bandura, 1997). Perceived self-efficacy is likely to be improved if a model is competent at a given activity and is similar to the observer in other aspects, such as age or gender. The perceived therapeutic self-efficacy of therapists in the present context is likely to be strengthened by having the opportunity to observe other therapists of similar backgrounds and abilities delivering home-based EIBI to young children with autism. This would allow therapists to make meaningful evaluative judgements about their own capabilities during similar teaching activities in comparison to others that they consider to be more competent. The opportunities for this, however, may be dependent on the frequency of team or supervision meetings, as the one-to-one nature of this style of intervention is obviously not conducive to observing other therapists during sessions.

A further source of information upon which an individual's judgement of perceived self-efficacy can be based is verbal persuasion. Positive judgements are more likely to be made if significant others openly convey their own beliefs regarding the individual's ability to succeed (Bandura, 1997). The views of significant others are expected to have a greater influence on perceived self-efficacy if they are congruent with those of the target individual and come from

sources considered to be credible and knowledgeable. Thus, we may expect the perceived therapeutic self-efficacy of therapists in the present context to increase if supervisory or consultancy staff offer supportive and realistic comments about the therapists' abilities. The effectiveness of these remarks is likely to rest on the therapists' perceptions of the competency and credibility of those supervisors or consultants, and the disparity between these comments and the therapists' own beliefs about their ability to deliver home-based EIBI.

The final source of beliefs postulated by self-efficacy theory is gleaned from an individual's awareness of their physiological and affective condition during a specific task. This information can be used to make judgements of perceived self-efficacy (Bandura, 1997). Increased physiological or psychological arousal can have a negative impact on self-efficacy beliefs, such that individuals who are aware of feeling physically exhausted or psychologically stressed during a task will feel less capable of being able to perform well on that activity in the future. Perceptions of increased vulnerability to physical or emotional strain are also likely to contribute to feelings of reduced self-efficacy. Thus, therapeutic perceived self-efficacy in the present context is expected to diminish when therapists experience undue physical or psychological pressure, or believe that they are likely to experience such pressure in a particular situation.

2.6.1.2 Mediating Processes

Perceived self-efficacy beliefs are considered to influence peoples' behaviour through a variety of mechanisms (Bandura, 1989, 1997). For instance, self-efficacy beliefs act through cognitive processes. Thus, those with more robust feelings of self-efficacy in a particular domain are more likely to set higher goals for themselves, remain more task orientated, and visualise themselves performing well prior to and during a task. Motivation is also affected by perceived self-efficacy, such that individuals are likely to exert more effort if they hold realistic beliefs that they are able to complete the task successfully. Those with higher perceived self-efficacy beliefs are also less likely to experience depression or anxiety in challenging situations, due to increased feelings of being able to cope with these situations. Last, people will select tasks or environments that are conducive to personal success. Perceived self-efficacy beliefs are therefore considered to influence choice behaviour.

In the light of Bandura's theoretical writings, a therapist with high perceived self-efficacy for delivering home-based EIBI to young children with autism may set more definite goals about what is to be achieved during an intervention session, and will likely persevere with more challenging children or demanding activities. In addition, it would be expected that those therapists with more robust beliefs in their own capabilities will cope more effectively with stressful and anxiety-provoking situations, and may actively select more advanced (but appropriate) instructional tasks during sessions. In contrast, therapists with a lower sense of perceived self-efficacy for delivering home-based EIBI may set less demanding goals for themselves and children during sessions, and will be more likely to give up in the face of adversity. These therapists might also be more prone to developing stress- and anxiety-related reactions whilst working with young children with autism. This argument is speculative at present in relation to therapeutic performance, but is a potential cause for concern given the literature describing the effects of perceived self-efficacy on task performance in other fields, and the observed differential effects of home-based EIBI on young children with autism.

2.6.2 Research Regarding the Role of Perceived Self-Efficacy

A theoretical argument for the role of perceived self-efficacy in determining behaviour has thus far been presented. The present section considers the research evidence supporting the role of perceived self-efficacy. Research specific to the home-based EIBI setting is sparse, but can be supported by literature from related fields such as the educational and teaching literature (e.g. Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

As noted above, there is a distinct lack of research specifically exploring therapists' perceived self-efficacy for delivering home-based EIBI. Although there has been no direct investigation of the effects of perceived therapeutic self-efficacy on the quality of intervention delivery, one recent piece of research has examined sources of parents' perceived therapeutic self-efficacy for delivering home-based EIBI to their own children (Hastings & Symes, 2002). Specifically, it was hypothesised that parents would have lower levels of perceived therapeutic self-efficacy if they worked with children with more severe symptoms of autism and if they felt less supported by the intervention team. Survey responses from

85 mothers who delivered home-based EIBI to their own children supported these hypotheses. In addition, child-related stress was found to mediate the effects of child symptom severity and perceived team support on perceived therapeutic self-efficacy. It appears that children with more severe symptoms of autism increase maternal stress, which in turn reduces maternal perceived therapeutic self-efficacy. The same effect can be found if mothers feel that they are not receiving support from their intervention team. Considering theoretical underpinnings, it may be that mothers' perceived therapeutic self-efficacy is influenced by child symptom severity through enactive experience and by team support through vicarious experience and verbal persuasion. Rather than acting as a contributory factor, physiological and emotional arousal may mediate the effects of mothers' enactive and vicarious experiences and verbal persuasion to influence perceived therapeutic self-efficacy. Despite these findings, there is a need for empirical studies in this area to address the causal role of perceived therapeutic self-efficacy. Moreover, it is not known if these results generalise to non-familial therapists delivering home-based EIBI. It may be, for example, that non-familial therapists find more severe child symptoms less stressful than parents because they are not continually exposed to the child in the same way that parents are.

Given the distinct lack of research on perceived self-efficacy in the present context, it is necessary to draw from other related bodies of literature. Teachers' self-efficacy in general education settings has been a particularly active area of research, and has been found to be positively associated with teachers' attitudes and classroom behaviour, as well as student outcomes (Tschannen-Moran, et al., 1998). Results from large-scale surveys indicate that teachers with a greater sense of teaching self-efficacy were more committed to remaining in education in the long-term (Coladarci, 1992; Evans & Tribble, 1986). Attitudes toward teaching commitment were based on self-report, however, and a more useful measure may be obtained using longitudinal research designs examining teacher retention in the profession in relation to perceived teaching self-efficacy. Teachers' attitudes toward children's educational placements have also been investigated. Two-hundred-and-forty teachers were given a case study to read regarding a child experiencing academic difficulties and were asked to comment on the appropriateness of the child's placement and

the likelihood that the teacher themselves would refer the child to special education (Podell & Soodak, 1993). It was found that teachers with a lower sense of teaching self-efficacy were more likely to refer the child on to special education, whereas those teachers with higher teaching self-efficacy were more likely to keep the children in their own class. Teachers with a higher sense of personal teaching self-efficacy have also been found to be more open to new ideas, more willing to implement new teaching practices, more organised and show higher levels of enthusiasm (Allinder, 1994; Guskey, 1988). In a further study examining qualified and unqualified staff working in schools for children with intellectual and/or developmental disabilities, it was found that staff members' depression/anger and fear/anxiety emotional reactions to challenging behaviour were predicted by staffs' perceived self-efficacy for dealing with such behaviour (Hastings & Brown, 2002b).

In addition to the questionnaire-based studies reported above, researchers have observed the instructional behaviour of teachers with high and low levels of teaching self-efficacy. A small-scale study reported by Gibson & Dembo (1984) focused on 4 teachers scoring high and 4 teachers scoring low on a measure of teaching self-efficacy. Those teachers who had greater feelings of teaching self-efficacy were found to spend more time teaching whole classes as opposed to small groups, and spend more time preparing lessons and doing paperwork. In addition, teachers with a higher sense of teaching self-efficacy were found to be more persistent in helping children who had difficulties. Although needing replication with a larger sample of teachers, the results from this study point to the important implications of having a strong personal sense of teaching self-efficacy. Given the correlational nature of this study and the others described above, however, it is necessary to extend research to encompass experimental designs. Although research suggests that perceived self-efficacy is important in educational settings, it is equally plausible for example that teachers who persist with students who are struggling feel greater self-efficacy, as opposed to increased self-efficacy being responsible for greater persistence.

2.6.3 Practical Implications of a Focus on Perceived Self-Efficacy

The research detailed above suggests that perceived self-efficacy might be an important factor that should be considered in relation to therapists' delivery of home-based EIBI. We might expect that perceived therapeutic self-efficacy is a significant predictor of the quality and quantity of delivery of home-based EIBI, and that modifying the sources of this important construct will lead to meaningful improvements in perceived therapeutic self-efficacy and subsequent therapist behaviour. In turn, we might observe improvements in the outcomes of young children with autism receiving such intervention. Cognitive-behavioural interventions have been designed to address maladaptive emotional and cognitive reactions of staff members working with people with learning disabilities and challenging behaviour (Kushlick, Trower, & Dagnan, 1997). Such interventions are also likely to be useful in increasing perceived therapeutic self-efficacy.

Self-efficacy theory not only provides a means of understanding therapists' actions, but also specifies a framework for developing effective interventions. Thus, if we were to try to increase therapists' accurate and consistent delivery of a specified intervention protocol, it is likely that we must enhance their beliefs that they are able to deal with the variety of challenges that they are likely to face. Self-efficacy theory also suggests that if we are to increase therapists' beliefs of competence, we must provide them with experiences where they personally succeed in teaching young children with autism in challenging situations. It is also important that we aid therapists' interpretations of these experiences, such that they believe that they have surmounted difficult teaching situations, and they are able to do so alone in the future (cf. Cervone & Scott, 1995).

Appropriate training will likely provide therapists with the practical knowledge and direct experiences necessary to increase the prospect that intervention techniques will be delivered accurately. It is unlikely, however, to guarantee these outcomes. As such, it will also be necessary to pay attention to other sources of perceived self-efficacy beliefs, such as the views of significant others. If perceived therapeutic self-efficacy were to be explored as a proximal determinant of therapists' behaviour, it would be likely to alter the role of the supervisor or consultant. In addition to focusing on the development and maintenance of a child's instructional curricula, supervisors and consultants

would need to spend more time developing and supporting the skills and competency beliefs of therapists who work with the child on a daily basis. Various techniques that have been developed to increase perceived self-efficacy could be utilised. For instance, supervisory staff can educate therapists on the importance of perceived therapeutic self-efficacy, and attempt to minimise the cognitive errors that therapists make about their own performance (Cervone & Scott, 1995). Guided mastery is a strategy that, despite being limited to the treatment of clinical anxiety disorders at present, is likely to be of use in increasing perceived self-efficacy across a wide range of domains (Scott & Cervone, 2003). First, supervisory staff might model the teaching procedures to be delivered, and demonstrate how to deal with challenging situations that may arise during intervention delivery. Supervisors could demonstrate the required actions, offer verbal guidance, show appropriate video footage, or engage the therapist in participant modelling. Next, those situations that a therapist feels less efficacious in managing should be broken down into appropriate steps and attempted with the aid of the supervisor. Facilitating strategies such as written cues or hand-over-hand prompting by the supervisor can be used at this stage. When the therapist gets to the stage where they feel efficacious enough to manage the challenging task, the supervisor can withdraw any aids that may have been used. Thus, the therapist may be able to work independently in specific challenging situations. A supervisor can increase the likelihood of these feelings of competence generalising to other difficult situations by encouraging a therapist to be constructive and to contribute directly to the formulation of new teaching activities.

Given the theoretical and practical leads that are evident in self-efficacy theory, it may be that supervisory staff can further improve the day-to-day delivery of home-based EIBI. An important aspect of any intervention designed to enhance perceived therapeutic self-efficacy concerns reliable measurement of therapists' beliefs of personal competence. This is an important and necessary hurdle to overcome given the practical and theoretical implications of increased attention in this area. As noted above, researchers have already begun to investigate the potential impact of perceived therapeutic self-efficacy on procedural fidelity in home-based EIBI (Hastings & Symes, 2002). A 5-item measure of perceived therapeutic self-efficacy was adapted for this study from

research investigating staff and parent self-efficacy for dealing with challenging behaviour exhibited by children with developmental disabilities living at home or attending school (Hastings & Brown, 2002a,b). Future research would benefit from the development of a more specific measure that takes into account the unique situations and challenges that therapists' delivering home-based EIBI are likely to encounter. Indeed, this would be desirable, since perceived self-efficacy is likely to vary for different behaviours in different contexts (Bandura, 1997). The development of such a measure is an important precursor to determining the functional relevance of perceived therapeutic self-efficacy to actual intervention delivery.

2.7 Conclusions and Research Directions

The impact of any intervention is likely to be dependent on the effectiveness of intervention techniques, the integrity of intervention design, and the quality of procedural fidelity. Whilst research and continued interest have helped develop the effectiveness and integrity of home-based EIBI, the quality of intervention delivery by therapists' during daily sessions has been neglected to some extent. There are many factors that could influence therapists' delivery of home-based EIBI, including therapists' own beliefs regarding their competency in implementing instructional techniques. Little is known about therapists' beliefs in this area; the remainder of this thesis explores perceived therapeutic self-efficacy as a concept and how it may be constructed in more detail. As stated above, an important first step is to devise a measure of perceived therapeutic self-efficacy specific to the present context. To achieve this, it is necessary to identify barriers that therapists consider significantly impeding their ability to deliver home-based EIBI. These barriers could then be converted into items in a measure of perceived therapeutic self-efficacy. A large number of therapists might then be asked to rate how capable they considered themselves in attempting to surmount these barriers to intervention delivery. Relevant dimensions of perceived therapeutic self-efficacy could then be isolated and explored to enhance our understanding of therapists' beliefs in their own abilities (cf. Bandura, 2001).

Once a measure of perceived therapeutic self-efficacy has been constructed, it will be possible to explore how different aspects of the therapeutic

experience contribute to this belief. Thus, demographic and intervention-related characteristics such as the duration of therapeutic experience and frequency of supervision can be examined alongside more theoretical sources of self-efficacy such as personal and vicarious experiences. This analysis will help to expand our knowledge of perceived therapeutic self-efficacy, and may suggest useful practical or research directions. This thesis will end with suggestions for future research into perceived therapeutic self-efficacy, including examining the predictive validity of this belief in relation to therapists' delivery of intervention techniques.

CHAPTER THREE¹

Research Stage 1: Therapists' Perspectives on Achieving Procedural Fidelity

Chapter Summary

The variability in outcomes observed in home-based early intensive behavioural intervention for young children with autism is likely in part to be the result of the quality of therapist performance. Therapist behaviour in this context, however, is poorly understood. To achieve such an understanding, it will be necessary to investigate how factors such as therapist, child, and intervention program characteristics, as well as supervision and training provision, influence therapists' interactions with children.

As a precursor to developing a measure of perceived therapeutic self-efficacy, this study identified facilitating factors and barriers that therapists considered to influence their capacity to deliver home-based EIBI to young children with autism. Nineteen therapists associated with various service providers in the south of England were interviewed. In general, responses represented opposite poles of the same construct. For example, child factors such as compliance and competence were considered to facilitate instruction, whereas challenging behaviour and lack of progress were perceived to hinder it. These issues are considered in the light of previous research on staff behaviour in related contexts. In addition to providing the basis for a measure of perceived therapeutic self-efficacy, the factors identified suggest specific avenues for questionnaire and experimental research to validate these findings, have implications for routine service provision, and may help improve the outcomes of children receiving home-based EIBI.

¹ Parts of this chapter appear in: Symes, M.D., Remington, B., Brown, T., & Hastings, R.P. (2006). Early intensive behavioral intervention for children with autism: therapists' perspectives on achieving procedural fidelity. *Research in Developmental Disabilities, 27*, 30-42.

Research Stage 1: Therapists' Perspectives on Achieving Procedural Fidelity

3.1 Introduction

Consideration of factors influencing therapists' delivery of home-based EIBI suggests that perceived therapeutic self-efficacy might be a salient factor. There is, however, no explicit measure of perceived therapeutic self-efficacy available in the literature. This has the potential to be a major barrier to theoretical and practical development in this area, given that perceived self-efficacy is behaviourally and contextually specific. The present chapter reports the initial stages of the development of such a measure.

The first stage in developing a measure of perceived therapeutic self-efficacy is to identify relevant barriers that impede therapists' delivery of home-based EIBI (cf. Bandura, 1997, 2001). This is most readily achieved by asking therapists' open-ended questions regarding barriers to successful intervention delivery. A number of techniques are available to the researcher that could help to gather this information. Questionnaires could be sent to therapists asking them to identify barriers to their delivery of home-based EIBI with young children with autism. A small number of studies have been conducted that have successfully used this approach with direct-care staff implementing behavioural techniques in institutions for people with learning disabilities or psychiatric disorders, and with parents implementing home-based EIBI programmes for their own children (Emerson & Emerson, 1987; Johnson & Hastings, 2002). Questionnaires would certainly be a useful way of collecting the views of a large number of therapists. At this phase of enquiry, however, it might be necessary to clarify therapists' responses or explore issues further than the space allocated in a questionnaire would allow.

A more useful approach at this stage of the research would probably be to ask therapists' in a face-to-face context about barriers that they have experienced whilst delivering home-based EIBI for young children with autism. In this way therapists' responses could be clarified if necessary and a better picture of therapists' experiences could be obtained. Two particular methods appear to be

of use. Focus groups could be set-up where a number of therapists meet to discuss barriers with the researcher and each other. Focus groups may be particularly useful in helping therapists to consider barriers or experiences that they have had in relation to other therapists' experiences, and can help to clarify issues in detail (cf. Coolican, 1994). In practice, however, potential problems may arise in setting up focus groups with a suitable number of therapists. Therapists delivering home-based EIBI often work alone with a number of children with autism at different locations, and as such have no fixed place of employment. The only time that small groups of therapists are likely to get together is during team meetings. The primary aims of these meetings, however, are to discuss child progress, update instructional programmes and demonstrate teaching activities. There is likely to be little time during these sessions to devote solely to discussing barriers to intervention delivery. Another problem with approaching therapists during team meetings is that therapists might not feel comfortable discussing barriers in the company of other team members. Whilst an interesting debate may be elicited through focus groups, social pressures are also likely to restrict the topics raised in such discussions (Willig, 2001).

Semi-structured interviews were chosen as the research method to identify barriers therapists' considered to impede their delivery of home-based EIBI. This style of interview could help encourage therapists' to talk about issues that they found to be important, while at the same time allowing the researcher to focus the dialogue on general factors that could be considered salient (Willig, 2001). Interviews with individual therapists would also be more practical to organise and execute, given that therapists could be interviewed in their own homes. This would also allow therapists to discuss their work outside of the workplace, perhaps reducing the impact of social pressures that therapists might experience. Interviews have been useful in exploring issues related to delivering behavioural interventions in psychiatric rehabilitation settings (e.g. Burdett & Milne, 1985), and although the generality of findings may be subject to question if small sample sizes are used, the validity of the findings is likely to be high.

The study reported in the present chapter represents an attempt to elicit barriers perceived by therapists to impede the delivery of home-based EIBI. A number of therapists were interviewed about their experiences of delivering home-based EIBI, the training and supervision they received, the children they

worked with, and personal characteristics that they considered to obstruct their work (cf. Graziano & Katz, 1982). In addition, therapists were asked about facilitating factors to maintain a balance during the interview and also to highlight factors that, whilst not being immediately useful in the development of a measure of perceived therapeutic self-efficacy, might be helpful in promoting high levels of procedural fidelity.

Although therapists in this context use a variety of ABA instructional techniques, the present research focuses on discrete-trial delivery. This technique has been shown to be particularly effective in establishing foundational skills during the early stages of EIBI for children with autism (e.g. Green et al., 2002), and as such is widely used. One would expect the vast majority of therapists to have had some experience using this instructional technique, and to have some understanding of factors that helped and hindered this style of behavioural intervention.

3.2 Method

3.2.1 Participants

Nineteen therapists, aged between 19 to 51 years (mean = 30.7 years, SD = 10.6 years) implementing discrete-trial techniques with young children with autism on home-based EIBI programmes participated in the present study. All but two were female. At the time of data collection, therapists provided on average 20.2 hr of home-based EIBI each week (SD = 11.7 hr) and had 14.5 months of home-based EIBI experience (SD = 16.8 months). Therapists typically worked with a mode of 1 child (range 1-4 children) at the time of data collection, and had delivered intervention to a mode of 1 child (range 1-12 children) in total. Further demographic and intervention-related details are shown in Table 1.

Participants were recruited in three ways. Firstly, an advertisement was posted on various UK-based Internet sites whose primary concern is early, intensive behavioural intervention for young children with autism (UKABA, ABA-UK; accessed at <http://groups.yahoo.com>). Next, supervisors working for the Southampton Childhood Autism Programme (SCAmP) invited all therapists

Table 1.

Further Demographic and Intervention Related Characteristics of the Sample

Characteristic	N (% of sample)
Marital status	
Single	15 (79%)
Married/Cohabiting	4 (21%)
Have at least one dependent	6 (32%)
Highest level of education	
Psychology Bachelors degree / Postgraduate diploma	5 (26%)
Other Bachelors degree / Postgraduate diploma	4 (21%)
Masters degree	2 (11%)
A-Levels or below	8 (42%)
Additional occupational commitments	
None	8 (42%)
University / College studies	4 (21%)
Assistant Psychologist	2 (11%)
Other	5 (26%)
Supervision provider ^a	
Southampton Childhood Autism Programme (SCAmP)	11 (58%)
Independent supervisor	6 (32%)
London Early Autism Project (LEAP)	3 (16%)
No formal supervision	3 (16%)
Unknown	2 (11%)
Centre for Autism and Related Disorders (CARD)	1 (5%)
Parents for the Early intervention of Autism in Children (PEACH)	1 (5%)
UK Young Autism Project (UKYAP)	1 (5%)

^a Some therapists received supervision from more than one home-based EIBI provider

to participate. Finally, a poster advertising the study to part-time therapists (i.e. students) in the School of Psychology at the University of Southampton offered research credits for participation.

Owing to the absence of a national UK database containing information on therapist characteristics, the representativeness of this sample cannot be established. According to experienced ABA consultants working extensively in the UK and the US, however, it is typical in respect of the male to female ratio, length of experience, number of children worked with, and intervention hours provided per week (E. Jahr, personal communication, December 19, 2002; T. Smith, personal communication, February 7, 2003). The mean age may be slightly higher than expected.

3.2.2 Interview Schedule

The interview followed a semi-structured format, and the schedule is presented in Appendix One. Background information was collected initially on the length of time therapists had worked in home-based EIBI, for example, and the number of children with whom they had worked. The main interview sought therapists' accounts of factors that facilitated and/or hindered their capacity to deliver discrete-trial instruction to young children with autism in a home-based context. Questions were grouped into sections focusing on: i) aspects of intervention sessions and specific instructional skill targets (e.g. 'Is there anything that makes instructional targets easier/harder for you to do?'), ii) components of initial training (e.g. 'What parts of the training you received do you think were particularly helpful/unhelpful to you?'), iii) elements of continuous supervision (e.g. 'How do you think that supervision has influenced your performance?'), iv) characteristics of children with whom they worked (e.g. 'What things about a child make it more difficult for you to teach them?'), and v) specific therapist attributes (e.g. 'Is there anything about you that you think makes it easier/harder for you to tutor young children with autism?') that were judged to be potentially relevant to effective intervention delivery. At the end of the interview, therapists were given an open-ended opportunity to comment further before demographic data were collected.

3.2.3 Procedure

Following initial contact with the researcher, participants received letters confirming time and location of interview and consent forms for the attention of parents of children with whom they worked. These explained the purpose of the study and indicated that interview recordings would be destroyed after data analysis.

Interviews were conducted in the therapists' own homes, lasting for a mean length of 58 min (range = 40 - 83 min). The interviewer introduced himself as a researcher working with therapists on home-based early intensive behavioural interventions for young children with autism, and who had previously worked as a therapist for 2 years. The confidentiality and anonymity of responses was asserted before and after interview, and written consent was obtained. All interviews were audio taped. Participants were verbally debriefed, offered a written information sheet about the study, and asked not to discuss the interview with other therapists.

3.2.4 Data Reduction

A quantitative approach to data reduction was taken in the present study, with the aim being to identify facilitating factors and barriers that therapists' considered to impact on their delivery of home-based EIBI. Interview tapes were transcribed and subjected to content analysis, using sentences as the basic unit of analysis (cf. Dey, 1993). Next, on the basis of common content in respondents' sentences, categories were identified relating to the five topic areas of the interview described above, based on the work of Graziano and Katz (1982). These categories formed the basis of a codebook, incorporating facilitating factors and barriers relating to each of the five topic areas of the interview. As further transcripts were examined, some categories were combined or split if data were best described in this way, and definitions of categories were developed. Finally, sentence units in all interview transcripts were re-coded into the content categories represented in the codebook. The final sets of category codes, along with sample quotes, are displayed in Tables 2 and 3. The codebook is presented in Appendix Two.

3.2.5 Reliability

To establish inter-rater reliability, a masters level health psychologist with significant interviewing experience coded four (21%) randomly selected interview transcripts using the codebook. Agreement between coders' ratings was scored when both raters signified that a statement corresponded to a category or when both did not indicate the presence of a statement corresponding to a category. Inter-rater agreement was calculated in two ways. Using Kappa (Cohen, 1960), overall agreement between raters was .77 ($p < .001$). A simple percentage agreement index formula ($[\text{agreements}/[\text{agreements} + \text{disagreements}]] \times 100\%$) showed agreement ranged between 89% and 94% (mean = 92%) for the codes summarized in Tables 2 and 3. Both measures thus indicate acceptably high agreement between raters.

3.3 Results

Participants identified a variety of factors that they considered to influence effective discrete-trial instruction. Categories endorsed by at least 4 therapists are presented in Tables 2 and 3 respectively. These tables additionally provide an example of the category taken from interview transcripts, and indicate the number (and percentage) of therapists that endorsed it.

In general, categories identified in the coded transcripts represented opposite poles of the same construct. Thus, 9 therapists (47%) regarded their patience as a quality that facilitated effective intervention delivery, especially whilst shaping child responses to instructional stimuli and remaining calm during child tantrums. Four therapists (21%), however, stated their emotional reactions to child behaviour hindered intervention delivery. For example, therapists who regarded a child's challenging behaviour as a personal attack said that this impacted upon their own behaviour during sessions, reducing the consistency and effectiveness with which they delivered the intervention, thus slowing child progress. As one therapist remarked, "sometimes you don't have to be so emotional...you have to think of it as more like work...he is not learning from the way I am."

Table 2.

*Aspects of Home-Based EIBI Therapists Considered Facilitating Effective
Discrete-Trial Instruction*

Category	N (%)	Example
Training in instructional techniques	10 (53%)	“The things about discrete-trials and prompting, it was good to get a background.”
Therapist has patience	9 (47%)	“I have seen really slow starts, where you think that you are not getting anywhere...so patience.”
Child is likeable	8 (42%)	“...[Child] is really fun, and he is really sweet.”
Child is intellectually competent	8 (42%)	“...[Child] is very responsive and learns very quickly.”
Training involved observing an experienced therapist / supervisor	7 (37%)	“It is all very well being given a sheet and [being told] to read about [how to deliver the intervention], but actually seeing someone do it was really helpful.”
Child is motivated	7 (37%)	“He wants to work, and that is important, he likes learning and wants to work.”
Child is compliant	5 (26%)	“If the child is compliant then it is much easier to get them to the table and keep their attention...then you can progress to whatever it is you want to do.”
Training involves ABA theory	5 (26%)	“With one of the families I worked with we had the whole theory of applied behaviour analysis in general, which I did know a lot about, but not applied to this sort of therapy I suppose.”
Basic skill targets	4 (21%)	“[Targets] that require a minimal amount of materials, something like [nonverbal imitation]...you clap your hands and expect the child to clap their hands.”
Training in behaviour management techniques	4 (21%)	“Something I was taught from the training before was managing challenging behaviours, and that was definitely invaluable.”

Table 3.

*Aspects of Home-Based EIBI Therapists Considered Hindering Effective
Discrete-Trial Instruction*

Category	N (%)	Example
Childs' challenging behaviour	13 (68%)	"Ones that hit out ... dealing with the self-injury I sometimes find quite difficult"
Reinforcer issues	8 (42%)	"If you can't find anything to reinforce [the child], so they don't have fun and they just want to look over there, or stim, or if I can't break through to them."
Child makes little or no progress	7 (37%)	"Ones where we have been working on them for ages and ages and ages and he cannot get them ... when we don't seem to be making any progress."
Being observed during sessions	6 (32%)	"...if someone's watching me, you know from outside, I find that I am not my usual self and not as reinforcing for the child and things tend to go wrong."
Advanced skill targets	5 (26%)	"Some things are a bit more complicated, like matching, require more materials."
Therapist unsure of the aim of specific skill targets	4 (21%)	"I do find drills harder if I don't see the point of them."
Therapists' emotional reactions to child behaviour	4 (21%)	"I am soft, you see them crying and I think, okay, you want to give in but you can't ... it is hard to watch."

Many therapists considered that child characteristics could both aid and hinder intervention delivery. Affectionate children or those with a likeable disposition were identified by 8 therapists (42%) as encouraging interaction. The same number noted that intellectually competent children, i.e. those who were considered to be clever, 'bright', or to learn quickly, aided intervention delivery.

Similarly, 7 therapists (37%) regarded children that were motivated or who seemed to enjoy the therapists' company as facilitating of their efforts. Five therapists (26%) also remarked that intervention delivery was more effective with children that were compliant, as they were considered easier to instruct and to attend more readily to instruction. Thirteen therapists (68%), however, considered that children who displayed challenging behaviour such as self-injury or aggression directed toward the therapist disrupted intervention delivery. Children who made slow progress during skill targets, and for whom effective reinforcers were not easily identified were also thought to hamper instructional efforts by 7 therapists (37%).

Some therapists remarked that the nature of instructional skill targets influenced the effectiveness of their instructional efforts. Four therapists (21%) felt that basic skill targets, including those that require fewer teaching resources, facilitated interaction. Also, more 'natural' play activities increased effective intervention delivery, as one therapist described, "...it is so much easier to be positive and reinforcing with those things because they naturally are." Conversely, 5 therapists (26%) remarked that skill targets requiring more teaching resources, or those embedded in more complex procedures reduced the effectiveness of instructional efforts. Four therapists (21%) also referred to not understanding the aim of specific skill targets. Some therapists perceived instructional activities selected by supervisors to be of no use for children, and in some cases skill targets were thought of as negative, for example as "...tricks...things that weren't stretching [the children] enough".

Therapists considered various aspects of the training they received to promote interaction and effective instruction. Training in instructional techniques, including how to introduce/fade prompts and deliver reinforcers were considered beneficial by 10 therapists (53%). Seven therapists (37%) commented on the advantages of observing experienced therapists implementing instructional techniques in aiding their own intervention delivery, clarifying the procedures used and seeing how children react to instruction. Five therapists (26%) noted that training in ABA theory enabled them to appreciate the conceptual basis underlying intervention techniques, and was deemed to aid effective instruction. Finally, 4 therapists (21%) expressed that behaviour management techniques

helped them tackle particularly difficult child behaviour, and also aided their understanding of the functional nature of challenging behaviour.

In contrast to the perceived beneficial consequences of training, therapists considered a single element of supervision to influence their instructional efforts. Six therapists (32%) stated they disliked being observed when instructing children, reporting it made them feel intimidated, nervous and "...not as reinforcing for the child". Most of these responses were characterized by recognition of "...how different my tutoring is when I'm being watched."

3.4 Discussion

It is likely that the accuracy and consistency of intervention delivery contributes, at least in part, to the progress observed in young children with autism receiving home-based EIBI. Results of this study suggest a variety of factors that therapists consider to influence their delivery of discrete-trials, including therapist and child characteristics, initial training, ongoing supervision, and the intervention techniques used. Although the nature of the data collected means that causal relationships cannot be demonstrated between the factors identified and therapist behaviour during intervention sessions, it remains useful to place these findings in the context of previous research on staff behaviour.

Therapists considered competent, likeable, motivated and compliant children to enhance the effectiveness of intervention delivery. This may mean that children who are receptive to home-based EIBI and make significant progress may receive instruction that has higher fidelity. It has been found that children in early special education classes who are rated as more independent by teaching staff receive more intensive intervention (McConnell, McEvoy, & Odom, 1992). Similarly, staff have also been found to be more attentive to, and interact more positively with, children with mental retardation perceived as likeable, attractive, and intellectually competent (Dailey, Allen, Chinsky, & Veit, 1974). In contrast, therapists considered that children who made slow progress with skill targets or showed challenging behaviour were considered to hinder effective instruction. Likewise, in the mental retardation literature, fidelity of intervention delivery has been found to decrease with increased levels of challenging behaviour (Carr, Taylor, & Robinson, 1991; McConnachie & Carr,

1997). The fact that staff can experience distress in response to challenging behaviour (Hastings, 2002) may result in their preferring to interact with children perceived as more rewarding; thus children in the most need of intensive intervention may be the least likely to receive it. Given that both social learning theory and behaviour analysis concur that individuals are more likely to interact with those they like or find more rewarding (Repp, Felce, & de Kock, 1987), the potential for child characteristics to influence therapist behaviour should encourage supervisory staff to support those working with more challenging children, and to ensure that intervention techniques are not promoting challenging behaviour that may punish therapists' attempts at maintaining intervention fidelity (Carr et al., 1991).

Therapists in the present study reported that training in instructional and behaviour management techniques, as well as ABA theory, increased effective intervention delivery. This underlines the importance of promoting both theoretical and practical aspects of training prior to, and during, intervention. Barriers to effective instruction identified by therapists included being unsure of skill targets and reacting emotionally to distressing child behaviour. After receiving training that establishes a conceptual basis for intervention, therapists are more likely to understand problems that they encounter (Scott, 1996). This may help to counter the barriers identified above by enabling therapists to appreciate the goals of the intervention and place skill targets in a wider context. Also, informing therapists during training about children's behavioural reactions to instruction may prepare them for the challenges that they may face when delivering the intervention. Allowing therapists to observe sessions conducted by experienced therapists may further facilitate this process.

Therapists considered that the nature of skill targets set influenced their capacity to deliver intervention. Complex procedures and targets requiring more teaching resources were considered harder to implement than more "natural" targets using fewer teaching resources. Similarly, it has been shown in special education classes that interventions that demand direct, intensive interaction are less likely to be implemented than more indirect styles of intervention (McConnell et al., 1992). This may have implications for home-based EIBI, where intensive teaching is considered essential. Smith, Buch, and Gamby (2000) found that most children on parent-directed home-based EIBI

programmes rapidly acquire skills, but may fail to maintain progress in the longer term. They suggest that this could be because parent-directed therapists are more competent at teaching basic skill targets such as imitation than more advanced skill targets such as conversation and peer play. Therapists' responses in the present study would certainly support this interpretation, suggesting that continued training for therapists throughout the duration of intervention is essential to facilitate the delivery of more complex instruction.

The potential lack of correspondence between therapists' verbal reports and observable behaviour in the present study is an important issue to consider. This is highlighted especially in therapists' statements that being observed during sessions reduced their perceived effectiveness of intervention delivery. These claims contrast with reports of highly accurate discrete-trial delivery in the presence of an observer (Koegel, Russo, & Rincover, 1977; Lovaas, 2003; Smith, Buch, & Gamby, 2000), and research demonstrating that in adult-child interaction, aspects of adult behaviour relevant to discrete-trials (e.g. attending, instructing, praising) can increase in the presence of an observer (Baum, Forehand, & Zegiob, 1979). Thus, the accuracy of therapists' self-reports may be questionable, and future research might usefully establish whether therapists' reports of their own teaching activities are reliable.

The interviews conducted in the present study were a useful method of investigating factors that could influence the fidelity of home-based EIBI. The data reveal a number of important concerns which future research may help to clarify. Despite the widespread use of interviews in gathering systematic data relating to behavioural issues in clinical settings (e.g. O'Neill et al., 1997), findings are only correlational in nature, and can prove to be inaccurate (Carr, Langdon, & Yarborough, 1999). For example, therapists in the present study identified those children who make slow progress with skill targets or show challenging behaviour as hindering effective instruction. However, it may be that inaccurate delivery of discrete-trials increases the display of challenging behaviour by a child, or hinders child progress. Alternatively, a broader, unidentified integrity factor such as supervision quality or intervention suitability may influence both therapist and child behaviour. So, for instance, if the overall quality and frequency of supervision were improved, an intervention would more likely be suitable for a child's specific needs and less likely to elicit challenging

behaviour. Other, more experienced observers (e.g. consultants) may benefit from a wider perspective on issues surrounding intervention delivery. Thus, “frontline” therapists may perceive a child’s challenging behaviour to be a considerable barrier to intervention delivery, and this may hinder their efforts. The remediation of this issue, however, may be more successfully addressed by increasing the integrity of intervention design.

In future, controlled experimental research would be useful to verify the influence of factors identified on the accuracy of discrete-trial instruction. Numerous examples of the experimental validation of factors responsible for challenging behaviour in children with learning disabilities and/or developmental disorders following hypotheses generated by indirect assessment suggest that a similar approach should be employed to confirm the relevance of factors identified in the present research (e.g., Dunlap, Kern-Dunlap, Clarke, & Robbins, 1991; Galiatsatos & Graff, 2003). For example, single-case designs incorporating a reversal phase could be used to ascertain the effects of direct peer-observation on the quality and duration of therapist-child interaction (Kazdin, 2001). There are, however, considerable practical and ethical issues involved in manipulating some of the factors identified in the present study, such as the presence of child challenging behaviour (but see e.g. Taylor & Carr, 1992). Alternative methods might incorporate naturalistic observation to detect changes in the quality or quantity of therapists’ intervention delivery in the presence of child challenging behaviour.

A further issue of concern is the external validity of the data, because therapists in this sample may differ from therapists trained elsewhere or parents acting as therapists for their own or other children. For example, therapists in the present study reported that rapid child progress facilitated intervention, a finding mirrored by parents conducting home-based EIBI with their own children (Johnson & Hastings, 2002). There was, however, a discrepancy between these samples, with therapists perceiving child disruption to be a barrier to effective intervention whereas parents rarely mentioned that their own children’s characteristics hindered intervention efforts. Constructive replication of the present study with samples of therapists in different geographical areas could usefully establish the generality of these findings. For example, questionnaire methods could be used to get more quantitative data, and ask therapists directly

about the importance of the factors identified, in order to tackle the underlying assumption in the present research that all therapists mentioned all of the issues that were important to them.

Like other recent investigations examining staff reports, the present study highlights factors that, if verified and addressed, have the potential to influence routine service provision and improve outcomes for young children with autism (e.g. McGill, Teer, Rye, & Hughes, 2003). In particular, therapists delivering home-based EIBI seem to attribute reductions in the fidelity of their discrete-trial instruction to child effects. This is in contrast to the widely held behaviour analytic stance that responsibility for lack of progress does not lie with the particular characteristics of children but with the quality and implementation of instructional programs. Thus, an initial step may be to ensure that training directly addresses this attributional issue, improving both therapists' understanding and the fidelity of instruction, potentially enhancing the quality of early intensive behavioural intervention.

This final point emphasizes the fact that data such as those presented here may have two slightly different implications for the practice of home-based EIBI. First, they may identify factors worthy of exploration in future experimental research. Second, therapists' perceptions of themselves may be an important barrier determining the fidelity of home-based EIBI procedures. In particular, where therapists' perceptions differ from those of their supervisors they may be less inclined to maintain fidelity (cf. Hastings, 1997). This might suggest that supervisors and consultants should attend to therapists' beliefs and be prepared to challenge them if they appear to be of a counter-habilitative nature. Of course, some therapist beliefs, such as in the effectiveness of the intervention program or in their perceived therapeutic self-efficacy, may serve to improve procedural fidelity (Hastings & Johnson, 2001; Hastings & Symes, 2002). The data presented may be usefully translated into a reliable measure of therapists' confidence in their own skills, furthering our understanding of potential factors influencing therapist behaviour during sessions (cf. Bandura, 2001); this forms the basis of the following chapter.

CHAPTER FOUR

Research Stage 2: Developing a Measure of Perceived Therapeutic Self-Efficacy

Chapter Summary

Before attempting to establish the relevance of perceived therapeutic self-efficacy in relation to procedural fidelity, it is necessary to develop a valid and reliable measure of this belief. The interview study presented in the previous chapter identified barriers that therapists considered to impede their delivery of home-based EIBI for young children with autism. The present chapter extends this research direction by developing a measure of perceived therapeutic self-efficacy based on these findings.

The barriers therapists have identified can be converted into items to be included in a scale of perceived therapeutic self-efficacy. Seventy-seven therapists delivering home-based EIBI for young children with autism in the UK responded to a questionnaire containing items relating to those barriers identified in the previous study. Results of a factor analysis indicated that there were two distinct dimensions of perceived therapeutic self-efficacy; these related to teaching a child that is difficult to engage with and teaching a child whilst being observed. The derived factor solution accounted for 65% of the variance in therapists' responses, and both subscales were found to have very high levels of internal consistency. Subsequent exploratory analysis of therapists' scores on the subscales of perceived therapeutic self-efficacy revealed that the only demographic or intervention-related characteristic related to this belief was supervision frequency, such that those therapists who received more frequent supervision had a lower sense of perceived therapeutic self-efficacy for teaching children who were difficult to engage with. The general lack of association between demographic or intervention-related characteristics is in keeping with the theoretical model of perceived self-efficacy.

Research Stage 2: Developing a Measure of Perceived Therapeutic Self-Efficacy

4.1 Introduction

The preceding chapter described a study exploring therapists' perceptions of facilitating factors and barriers to delivering home-based EIBI to young children with autism. In particular, therapists reported that training in instructional and behaviour management techniques, ABA theory, and having opportunities to observe experienced peers were useful in developing the skills necessary to deliver home-based EIBI. In addition, therapists found it easier to work with children that they considered to be more likeable, competent, or motivated. Therapists considered, however, that children who made slow progress or displayed challenging behaviours such as aggression or self-injury hampered intervention delivery. Furthermore, therapists expressed difficulties in working with children whilst being observed by peers or supervisory staff, or if the child had upset them during an intervention session.

The findings of the previous study are interesting, in that they point to specific avenues for developing and maintaining the quality of therapists' delivery of home-based EIBI. Increasing therapists' opportunities for observing more experienced colleagues could, for instance, be a useful means of improving the quality of therapists' delivery of this style of intervention. Therapists' views are also likely to be useful in understanding psychological mechanisms that may influence intervention skills. In particular, domain-specific perceived self-efficacy beliefs are considered to be important determinants of behaviour (Bandura, 1997). In the present context, perceived therapeutic self-efficacy is likely to be derived, at least in part, from therapists' beliefs regarding their ability to surmount different challenges associated with delivering home-based EIBI to young children with autism (cf. Bandura, 2001). While research has begun to address the role of psychological factors such as perceived therapeutic self-efficacy in this context (Hastings & Symes, 2002), there has been no attempt to devise a valid and reliable measure of this potentially important belief based on therapists' perceptions of challenging situations. The barriers identified in the

previous study could be usefully translated into items constituting a measure of perceived therapeutic self-efficacy that could be employed for assessment and staff-development purposes. The aim of the present study is to devise such a measure.

The present chapter describes a large-scale questionnaire study of UK-based therapists' perceived therapeutic self-efficacy beliefs. Barriers to intervention delivery identified in the previous chapter were presented to therapists in the form of a rating scale. Therapists were asked to rate their confidence in being able to teach a child in each of these challenging situations. Ratings were subsequently analysed to detect the presence of distinct factors of perceived therapeutic self-efficacy. Thus, the results of the present study should identify dimensions of self-efficacy relevant to therapists teaching young children with autism engaged in home-based early intensive behavioural intervention.

4.2 Method

4.2.1 Participants

Seventy-seven therapists delivering home-based EIBI to young children with autism in the UK participated in the study. All but three of the therapists were female. The therapists' median age was 25 years, ranging from 19 to 60 years. At the time of data collection, therapists provided a mean 18.0 hr of home-based EIBI each week ($SD = 11.5$ hr) and had a mean 36.8 months of home-based EIBI experience ($SD = 24.8$ months). The modal number of children that therapists worked at the time of data collection was one (range 1 - 7 children), and the modal number of children that therapists had delivered home-based EIBI to in total was one (range 1 - 30 children). Further demographic and intervention-related details of respondents are presented in Table 4.

Apart from those presented in the previous interview study (see section 3.2.1), there are no demographic data available on therapists working in the UK. The data presented above and in Table 4 indicate that the responding sample were predominantly well-educated, single young women with no children of their own. Most therapists delivered home-based EIBI on a part-time basis, and had been doing so for approximately three years. All therapists had received a

Table 4.

Further Demographic and Intervention Related Characteristics of the Sample

Characteristic	Percentage of sample
Therapists' marital status	
Married, and living with spouse	33
Living with partner	22
Divorced / Separated / Single and not living with partner	45
Therapist has at least one dependent	20
Therapist has bachelors, masters, or doctoral degree	58
EIBI specific training received ^a	
Initial workshop	81
Shadowed an experienced therapist / supervisor / consultant	88
Attended courses / seminars in early intensive behavioural intervention	66
Supervision provider ^b	
Parents for the Early intervention of Autism in Children (PEACH)	31
Independent supervisor	27
Centre for Autism and Related Disorders (CARD)	12
London Early Autism Project (LEAP)	10
Other organisations ^c	42
Child's parents	3
No formal supervision	4
Unknown	10
Supervision frequency ^d	
Once or more every two weeks	45
Between once every two weeks and once a month	38
Less than once a month	17

^a All therapists received at least one form of training

^b Some therapists received supervision from more than one source

^c Represents a composite of 8 other UK home-based EIBI providers that individually account for less than 10% of the total sample

^d Percentages represent the most frequent supervision that therapists' received

minimum of one style of training, and the vast majority received formal supervision at least once a month.

In general, the present sample is similar to that reported in the previous interview study, with the exception that the therapists in the interview study were younger on average and had approximately 2 years more experience. With reference to the views of experienced ABA consultants presented in the previous interview study, the sample is likely to be representative of typical therapists delivering home-based EIBI. Owing to the nature of recruitment, non-respondent characteristics are unknown.

4.2.2 Questionnaire

The first part of the questionnaire asked about a number of demographic and intervention-related details (see data presented in 4.2.1). The remainder of the questionnaire asked therapists to rate their perceived therapeutic self-efficacy in a number of different situations. Additional measures were also included in the questionnaire; these will be described in the following chapter (see section 5.2.2). A copy of the questionnaire is included in Appendix Three.

4.2.2.1 Perceived Therapeutic Self-Efficacy

Therapists were asked to rate their own perceived therapeutic self-efficacy for delivering home-based EIBI in 16 different situations. Items were designed to represent the range of challenging situations that therapists could face whilst delivering home-based EIBI to young children with autism (cf. Bandura, 2001); thus, item content was identified from the transcripts of interviews relating to perceived barriers to intervention delivery presented in the preceding interview study chapter. Seven barriers were identified that represented the views of at least four of the therapists that had been interviewed. Of these barriers, five were translated into items as identified from content analysis of the interview transcripts. The remaining items were expanded to capture finer details of therapists' experiences. An item relating to child challenging behaviour was expanded to three items addressing i) child aggression directed towards the therapist, ii) child aggression directed towards others, and iii) self-injurious behaviour. An item relating to being observed whilst delivering intervention was also expanded to three items, addressing being observed by i)

other therapists, ii) more senior staff (i.e. supervisors or consultants), and iii) the child's parents. In addition to these 11 items, five items representing interview responses from less than four therapists were included, resulting in a 16-item measure (see Figure 6). Because items that were closely related to therapists' own experiences of delivering intervention in the present context were included, it was likely that the final scale had an acceptable level of content validity (cf. Bandura, 2001). A small number of therapists were consulted to check the clarity and readability of items prior to their inclusion in the questionnaire. Therapists were asked to make their ratings in relation to working with the most difficult child that they delivered home-based EIBI to at the time of completing the questionnaire. Each item was rated on a scale from zero (*cannot do at all*) to 10 (*certain can do*), with the midpoint being 5 (*moderately can do*). To enable therapists to familiarise themselves with the scale, a number of practice items

How confident are you that you can teach the child...

1. ...when the child is aggressive toward you.
2. ...when the child is aggressive toward others.
3. ...when the child deliberately injures himself or herself.
4. ...when reinforcers lose effectiveness
5. ...when the child seems to be making little progress.
6. ...when other therapists' are watching you teach.
7. ...when more senior staff are watching you teach.
8. ...when the child's parents are watching you teach.
9. ...when the teaching activity requires lots of resources.
10. ...when you are unsure of the aim of the teaching activity.
11. ...when the child has upset you in some way.
12. ...when the child has additional medical complaints.
13. ...when a member of the child's family disrupts the teaching activity.
14. ...when the child's attention wanders during the teaching activity.
15. ...when the child is disruptive during the teaching activity.
16. ...when you dislike a particular teaching activity.

Figure 6: Items included in the perceived therapeutic self-efficacy scale.

were included. These asked therapists to rate their perceived ability to lift a number of different objects of increasing weight. Responses to the practice items were not included in the analysis.

Social desirability or demand characteristics are important sources of bias to consider when designing self-report scales. A number of safeguards were built into the current design to minimise these threats in the present study. First, a covering letter included with the questionnaire emphasised the confidential nature of the research. Second, returned questionnaires were identified by code-number only. Third, a nondescript title was used for the scale; thus, the section of the questionnaire focusing on perceived therapeutic self-efficacy was labelled “teaching a young child with autism”. Finally, therapists were asked to be as open and honest as possible, and it was emphasised that their contributions would help to develop understanding of the role of therapists delivering home-based EIBI to young children with autism (cf. Bandura, 2001).

4.2.3 Procedure

Two-hundred-and-seventy-two questionnaires were mailed out to therapists delivering home-based EIBI in the United Kingdom. These questionnaires were sent to (i) members of a therapist database held by a UK-based parent support group (Parents for the Early intervention of Autism in Children; PEACH), (ii) parents replying to a separate survey who were willing to distribute questionnaires to therapists who worked for them, and (iii) a small number of therapists responding to an advertisement posted on several UK-based Internet groups (UKABA, ABA-UK; accessed at <http://groups.yahoo.com>). Seventy-seven therapists returned the questionnaire anonymously in prepaid envelopes, constituting a response rate of 28%. Although the response rate may be considered low for a postal survey of this type, there are several reasons why this may have occurred. First, the nature of home-based EIBI means that therapists are difficult to locate. This is in contrast to the vast majority of staff surveys reported in the intellectual or developmental disability literature, where response rates are typically higher than that reported here. The sample populations in these studies, however, are usually based in a fixed and known location such as a school or residential setting. Second, only therapists delivering home-based EIBI were asked to participate. Because of the confidential nature of

the PEACH therapist members' database, however, it was impossible to exclude those members who may have been parents working as therapists for their own children, for example, or those therapists delivering an intervention other than home-based EIBI. Lack of resources meant that it was impractical to mail out reminder letters or additional copies of the questionnaire to all members of the PEACH therapist members' database.

4.3 Results

4.3.1 Factor Analysis

An exploratory principal components factor analysis was used to investigate therapists' ratings of perceived therapeutic self-efficacy in the variety of challenging situations presented. This procedure was used to determine the independence of items, and to identify any specific dimensions of perceived therapeutic self-efficacy for delivering home-based EIBI to young children with autism (cf. Bandura, 2001). The therapists-to-items ratio (5:1) was sufficient to warrant this type of analysis (Floyd & Widaman, 1995). The few missing values apparent in the data set were replaced with the mean value for the relevant item prior to running the analysis.

To justify the application of factor analysis to a data set there must be a substantial number of correlations between items (Hair, Anderson, Tatham, & Black, 1995). If this is not the case, then items may be regarded as independent and no dimensions of perceived therapeutic self-efficacy may be extracted. Before the main analysis, items were examined to ascertain their suitability for inclusion in the factor analytic procedure. If the correlation matrix of item scores resembles an identity matrix, such that item scores only correlate with themselves and all other correlations between items are close to zero, factor analytic techniques would likely extract as many factors as there were items. Thus, the data set would be non-factorable. Bivariate correlations for the perceived therapeutic self-efficacy scale items are presented in Table 5. A visual inspection of the correlation matrix revealed that the vast majority of correlations between items were above .30, with all but 2 of the correlations being significant. To determine the statistical probability that the correlation matrix had significant correlations between at least some of the items, Bartlett's Test of Sphericity

Table 5.

Bivariate Correlations for the 16-item Pool of Perceived Therapeutic Self-Efficacy Scale

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2	.79															
3	.69	.69														
4	.49	.46	.35													
5	.37	.31	.44	.57												
6	.35	.47	.50	.24	.42											
7	.31	.46	.52	.22	.39	.92										
8	.33	.40	.42	.24	.41	.86	.84									
9	.37	.52	.53	<u>.18</u>	.45	.68	.70	.60								
10	.34	.32	.38	.35	.20	.35	.39	.34	.50							
11	.51	.65	.59	.42	.56	.51	.53	.51	.46	.23						
12	.39	.43	.40	<u>.17</u>	.29	.42	.44	.39	.47	.26	.41					
13	.45	.54	.46	.53	.38	.38	.40	.32	.45	.40	.46	.46				
14	.54	.52	.42	.57	.49	.45	.44	.37	.44	.32	.48	.65	.63			
15	.61	.63	.56	.53	.46	.46	.43	.41	.53	.38	.52	.64	.64	.84		
16	.51	.55	.55	.35	.45	.55	.51	.51	.62	.38	.51	.59	.43	.63	.74	

Note. Item numbers refer to items described in Figure 6.
Underlined values represent $p > 0.05$

was also examined. Results of this test were highly significant ($\chi^2 = 936.04$, $p < .001$), supporting the judgement that the correlation matrix contained a substantial number of significant correlations between items. Finally, sampling adequacy, being a measure of the degree to which items can be predicted without error by other items, was investigated. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy ranges from .0 to 1.0; the higher the value, the more likely that items in the data set are measuring a factor common to all items. It was found that all but 2 items had a KMO sampling adequacy above .80, with the remainder being above .75. The overall KMO sampling adequacy for all items was also very high at .86. The use of factor analysis was warranted given the substantial number of correlations between items in the perceived therapeutic self-efficacy questionnaire and the high likelihood that all items measured at least one common factor.

A variety of techniques can be used to determine the number of factors to be extracted from a principal components factor analysis (Hair et al., 1995). As

there is no research indicating the number of factors to be expected to emerge from the analysis in question, an a priori criterion seems inappropriate. An alternative method involves examining the latent roots, or eigenvalues, of factors. An eigenvalue represents the amount of variance accounted for by a single factor. The reasoning behind this method of factor extraction is to expect any factor retained for interpretation to account for the variance of at least a single item. Thus, factors with an eigenvalue above 1.0 are retained; all others are rejected. The latent root criterion method is often combined with a scree test to help the analyst identify the point where factors represent items more than specific common dimensions of the subject matter. The scree test plots eigenvalues against extracted factors; a change in the steepness of the curve (also called the “elbow”) indicates where extracted factors represent unique rather than common variance.

For the current data set, 3 factors were found to have eigenvalues at or above 1.0. Inspection of a scree plot constructed from these eigenvalues indicated that the change in the steepness of the curve (or “elbow”) could be placed at either 2 or 3 factors. The scree plot is displayed in Figure 7. Thus, principal components factor analyses were conducted specifying 2 or 3 factors to be extracted. Factors were then rotated to simplify the factor pattern. The orthogonal Varimax procedure was used so as to maintain the independence of the factors derived from the analysis.

The 2-factor solution appeared to be the most logical of the extracted solutions, given the distribution of items in the factors. Both 2- and 3-factor solutions included a factor common to both solutions. The remaining items were incorporated into a single factor in the 2-factor solution, but were distributed between two factors in the 3-factor solution. The factors in the latter solution did not contain items that appeared to be distinct from each other, and further exploration revealed that although the factors were measuring different concepts to some extent, there was a high degree of overlap between factors ($r(77) = .724$, $p < .001$). Thus, it was decided that the 2-factor solution was the most appropriate. This solution appeared to be a reasonably good model for the data, as evidenced by all residuals in the reproduced correlation matrix being low, with 49% having a residual value less than .05. The predicted pattern of relationships

that would be derived from the 2-factor solution, if it were assumed to be correct, would therefore be similar to those observed in the original data set.

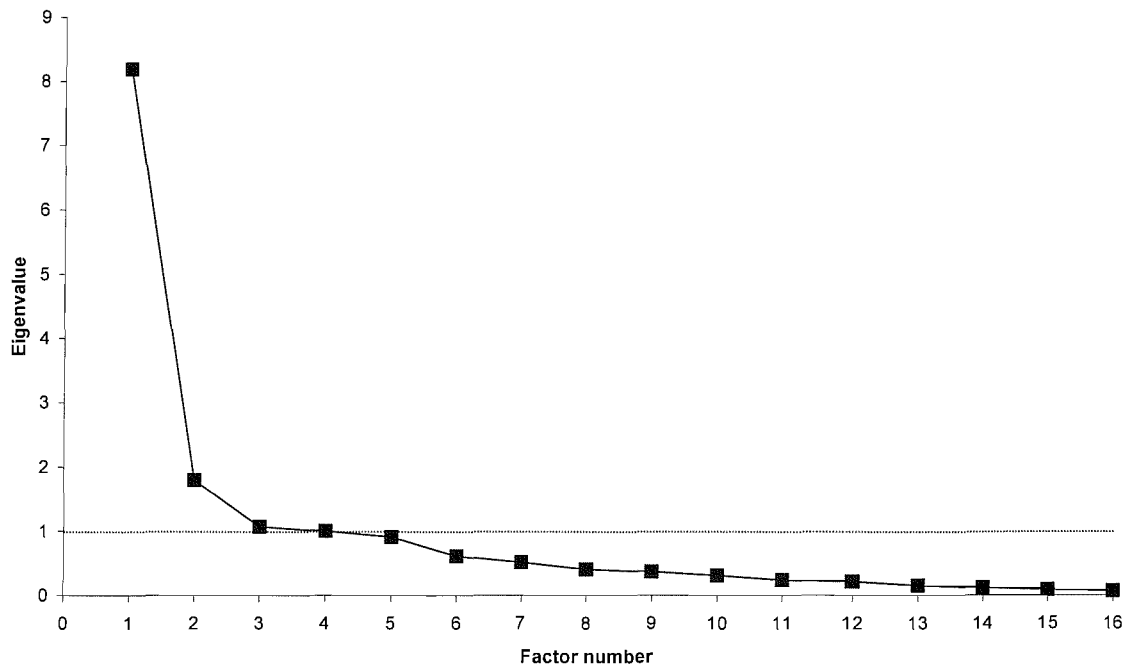


Figure 7: Scree plot of eigenvalues for extracted perceived therapeutic self-efficacy factors. The dashed line represents acceptable eigenvalue criterion.

Items loading (i.e. correlating) at or above .50 on the factors were considered significant, in the practical sense, for inclusion in a measure of perceived therapeutic self-efficacy for delivering home-based EIBI to young children with autism (Hair et al., 1995; cf. Rose, 1999). If an item loaded above .50 on both factors, it was assigned to the factor on which it had the highest loading. If the difference between the factor loadings of an item were equal to or less than .1, however, the item was excluded entirely; this helped maintain the independence of factors. Using these procedures two items were removed from the scale; item 10 was omitted because it did not load substantially (i.e. at or above .50) on either factor and item 16 was omitted because it loaded substantially and simultaneously on both factors. A further factor analysis confirmed the presence of a 2-factor solution despite the removal of these items. Thus, a 14-item scale comprising two subscales was derived from the data. This solution with factor loadings is presented in Table 6.

Table 6.

Factor Analysis of Therapists' Ratings of Perceived Therapeutic Self-Efficacy

Item	Factor loading	
	Factor 1 <i>Teaching a child who is difficult to engage with</i>	Factor 2 <i>Teaching a child whilst being observed</i>
When the child is disruptive during the teaching activity	<u>.823</u>	.289
When the child's attention wanders during the teaching activity	<u>.791</u>	.255
When the child is aggressive toward you	<u>.780</u>	.175
When reinforcers lose effectiveness	<u>.755</u>	.009
When the child is aggressive toward others	<u>.739</u>	.334
When a member of the child's family disrupts the teaching activity	<u>.717</u>	.227
When the child deliberately injures himself or herself	<u>.624</u>	.428
When the child has upset you in some way	<u>.590</u>	.467
When the child seems to be making little progress	<u>.544</u>	.336
When the child has additional medical complaints	<u>.519</u>	.389
When more senior staff are watching you teach	.213	<u>.928</u>
When other therapists are watching you teach	.231	<u>.918</u>
When the child's parents are watching you teach	.184	<u>.883</u>
When the teaching activity requires lots of resources	.344	<u>.737</u>
Eigen value	7.347	1.783
Variance	52.48	12.73

Note: Significant factor loadings are underlined

Factors labels were chosen to represent each of the items derived from the analysis as closely as possible. Factor 1 (teaching a child who is difficult to engage with) was made up of items that generally referred to delivering home-based EIBI whilst the child is displaying challenging behaviour, or being distracted in some way. This factor accounted for 52.48% of the variance in therapists' responses. Factor 2 (teaching a child whilst being observed) was made up almost exclusively of items that referred to delivering home-based EIBI whilst the child's parents or other members of the intervention team were watching. This factor accounted for 12.73% of the variance in therapists' responses. In all, the derived factor solution accounted for 65.21% of the variance in therapists' responses. Given that a satisfactory factor analysis solution in social sciences research accounts for 60% of the total variance, the present solution accounts for an acceptable amount of variance (Hair et al., 1995).

4.3.2 Item Analysis

Raw scores for each item in each factor were correlated with an adjusted total score for that factor to establish if individual items are measuring the same construct as the factor to which they belong. Adjusted scores were calculated by summing the total raw scores of the items in the factor, excluding the raw score of the item concerned. All items were required to correlate with the relevant adjusted factor score at or above .30. One-sample Kolmogorov-Smirnov tests were used to compare the individual items, or adjusted factor scores, to a normal distribution. Appropriate parametric or nonparametric correlational statistics indicated that all items were to be retained in the derived solution as they measured the same construct as the factors to which they belonged. Scores for items included in the final scales and item-total correlations are presented in Table 7; responses to all items except item 13 were not normally distributed.

4.3.3 Internal Consistency

It is also appropriate to establish the internal consistency of both factor subscales, by calculating the extent to which items correlate with other items in each subscale. Both factor subscales have very high levels of internal consistency, as determined by Cronbach's alpha (Factor 1 = .91; Factor 2 = .93).

Finally, the correlation between subscale scores indicates that both subscales were measuring different aspects of the experience of delivering therapy, but it must be acknowledged that there is a moderate degree of relationship between the measures ($r(77) = .60, p < .001$).

Table 7.

Item Scores and Corrected Item-Total Correlations for the Perceived Therapeutic Self-Efficacy Subscales

Factor	Item	Median	Range		Corrected item-total correlation	
			Min	Max		
1	1	8	1	10	.64	
	2	9	0	10	.69	
	3	8	1	10	.61	
	4	8	0	10	.62	
	5	8	1	10	.58	
	11	8	1	10	.66	
	12	8	1	10	.50	
	13	8	1	10	.67	
	14	9	2	10	.80	
	15	9	3	10	.79	
	2	6	9	1	10	.90
		7	8	1	10	.89
		8	9	1	10	.84
		9	9	4	10	.65

Note. Item numbers refer to items described in Figure 6.

4.3.4 Exploratory Analysis

Factor scores for each subscale of perceived therapeutic self-efficacy were obtained by summing therapists' responses to items that loaded on each factor. Mean scores for the present sample are displayed in Table 8. Although no comparative data are available, therapists in the present sample appeared to have reasonably high levels of perceived therapeutic self-efficacy across both domains in relation to the total possible scores. Mean scores are also subdivided by level of education, amount of training, and frequency of supervision received.

Table 8.

Mean Scores of Perceived Therapeutic Self-Efficacy for the Present Sample

Sample	n	Factor 1 <i>Teaching a child who is difficult to engage</i> ^a		Factor 2 <i>Teaching a child whilst being observed</i> ^b	
		Mean	(SD)	Mean	(SD)
All therapists	77	78.02	15.93	32.13	7.63
Education					
Bachelors degree or higher	45	79.01	15.63	33.11	6.71
Lower than bachelors degree	32	76.63	16.49	30.75	8.70
Training					
3 types	39	78.09	15.54	32.62	6.84
2 types	26	77.84	14.89	32.32	7.15
1 type	12	77.50	20.72	29.83	11.04
Supervision					
Once or more every 2 weeks	35	77.28	14.36	31.03	7.85
Between once every 2 weeks and once a month	29	74.90	17.99	31.97	8.30
Less than once a month	13	87.00	12.49	35.46	4.24

^a Minimum scale score = 0, maximum score = 100

^b Minimum scale score = 0, maximum score = 40

Perceived therapeutic self-efficacy ratings for both subscales were explored to see if they were related to therapists' demographic and intervention-related characteristics. One-sample Kolmogorov-Smirnov tests were used to ascertain the nature of the distribution of scores in relation to these characteristics, and associations were explored using appropriate parametric or nonparametric tests. Associations between continuous variables and perceived therapeutic self-efficacy subscale scores are presented in Table 9. Associations between categorical variables and perceived therapeutic self-efficacy subscale scores are presented in Table 10. Therapists' sex was not included in this analysis as too few males responded to allow meaningful comparison.

Table 9.

Associations Between Continuous Variables and Perceived Therapeutic Self-Efficacy Subscales for the Present Sample

Variable	Factor 1 <i>Teaching a child who is difficult to engage</i>		Factor 2 <i>Teaching a child whilst being observed</i>	
	r	r _s	r	r _s
Age		-.096		-.093
Number of dependents		.052		.167
Number of hours therapist delivers home- based EIBI each week	.210		.220	
Number of months therapist has delivered home-based EIBI	.158		.181	
Number of children therapist worked with at the time of data collection		.090		.087
Number of children therapist has worked with in total	.104		.102	

r = Pearson Product Moment correlation coefficient

r_s = Spearman's Rho correlation coefficient

No significant correlations were found between continuous variables and perceived therapeutic self-efficacy subscale scores, although correlations between the number of hours that therapists delivered home-based EIBI each week and subscale scores approached significance. In addition, no significant differences between categorical variables and perceived therapeutic self-efficacy subscale scores were found. Whilst not being significant, the *F* value for supervision frequency regarding perceived therapeutic self-efficacy for teaching a child who is difficult to engage was relatively high. Thus, the effects of supervision frequency on perceived therapeutic self-efficacy in this domain were explored further by first comparing those therapists who received supervision once every two weeks or more with those therapists who received supervision less than once every two weeks, and second comparing those therapists who received supervision once a month or more with those therapists who received supervision less than once a month.

Table 10.

Associations Between Categorical Variables and Perceived Therapeutic Self-Efficacy Subscales for the Present Sample

Variable	Factor 1 <i>Teaching a child who is difficult to engage</i>		Factor 2 <i>Teaching a child whilst being observed</i>	
	t	F	t	F
Marital status ^a		.848		.289
Education ^b	-.646		-1.344	
Training ^c		.008		.640
Supervision frequency ^d		2.787		1.635

^a Married, and living with spouse; Living with partner; Divorced / Separated / Single and not living with partner

^b Bachelors, masters or doctoral level education; Less than bachelors level education

^c Three types of training; Two types of training; One type of training

^d Once or more every 2 weeks; Between once every 2 weeks and once a month; Less than once a month

For the first comparison, a one-sample Kolmogorov-Smirnov test revealed that perceived therapeutic self-efficacy scores for both groups were normally distributed. Results from Levene's test were not significant, indicating that equal variances could be assumed. An independent t-test revealed that there was no significant difference in perceived therapeutic self-efficacy scores for teaching a child who is difficult to engage with between those therapists who received supervision once every two weeks or more and those therapists who received supervision less than once every two weeks ($t(75) = -.373$, ns). For the second comparison, a one-sample Kolmogorov-Smirnov test also revealed that perceived therapeutic self-efficacy scores for both groups were normally distributed. Results from Levene's test again were not significant, indicating that equal variances could be assumed. An independent t-test revealed that there was a significant difference in perceived therapeutic self-efficacy scores for teaching a child who is difficult to engage between those therapists who received supervision once a month or more and those therapists who received supervision less than once a month ($t(75) = -2.291$, $p < .05$). Thus, it appears that those

therapists who receive more frequent supervision have a lower sense of perceived therapeutic self-efficacy in this domain.

4.4 Discussion

Factors governing the quality of therapists' delivery of home-based EIBI for young children with autism are not well understood at present. Psychological variables such as perceived self-efficacy may be considered functionally important in influencing therapist behaviour (cf. Bandura, 1997). A lack of adequate psychometric measures, however, hampers practical and theoretical advances in developing and maintaining high-quality intervention delivery. The purpose of the present study was to identify dimensions of self-efficacy relevant to therapists teaching young children with autism engaged in home-based EIBI. In addition, a psychometrically sound measure of perceived therapeutic self-efficacy has been developed. Items were identified by therapists in the previous study related to barriers to intervention delivery. A wider audience of therapists' responses to these items were analysed using factor analysis techniques. Two distinct dimensions of perceived therapeutic self-efficacy were extracted. These dimensions related to working with a child that is difficult to engage with, and working with a child whilst being observed. The internal consistencies of the two subscales were very high, and the correlation between subscale scores indicated that they were measuring different aspects of therapists' experiences.

As with previous approaches to developing scales investigating staff characteristics (e.g. Mitchell & Hastings, 1998), a particular strength of the present study is that the items used were based on therapists' experiences of working with young children with autism in home-based settings. In keeping with Bandura's (2001) procedure for developing perceived self-efficacy scales the barriers identified were likely to be representative of those experienced by therapists in general, and the resulting dimensions of perceived therapeutic self-efficacy may be more likely to be recognised in practice. While it is possible that other dimensions of perceived therapeutic self-efficacy exist, those presented here are derived from therapists' own experiences.

Whilst the measure of perceived therapeutic self-efficacy presented here has a very high level of internal consistency, there are a number of other

properties of the scale that could be investigated. First, the test-retest reliability of the measure could be explored. During the process of developing a measure of care staffs' emotional reactions to challenging behaviour in learning disability settings, for example, Mitchell and Hastings (1998) asked a small number of staff to complete their measure on one occasion and again after a month. The test-retest reliability of the measure was determined by analysing the correlation between factor scores on both occasions. A similar procedure could be implemented with the current measure to establish how stable perceived therapeutic self-efficacy scores are over time. This would be a useful research direction to take. A second avenue would be to explore how social desirability influenced therapists' responses to the items presented in the questionnaire. Although a number of procedural safeguards were built into the current design to minimise these threats in the present study (see section 4.2.2.1; cf. Bandura, 2001), a measure of social desirability such as the Marlow-Crowne social desirability scale (Strahan & Gerbasi, 1972) could have been included in the questionnaire to determine if therapists' responses were significantly associated with social desirability bias.

Therapists' scores on the different subscales of perceived therapeutic self-efficacy were investigated to determine if they were related to therapists' demographic or intervention-related characteristics. The only variable found to be related to perceived therapeutic self-efficacy was supervision frequency. More explicitly, and perhaps surprisingly, it appears that those therapists who receive less frequent supervision have a higher sense of perceived therapeutic self-efficacy for teaching children who are difficult to engage with. This is a finding that needs to be replicated in future research using this measure with therapists in home-based EIBI contexts. If these findings were to be replicated, however, it is worth considering why this relationship exists. One possible reason may be that supervisors may provide more supervisory input to those therapists who appear to be less confident in dealing with children in challenging situations. Thus, those therapists who have less perceived therapeutic self-efficacy for delivering intervention to children who they find difficult to engage with may, in fact, receive more supervisory contact as supervisors attempt to increase confidence and subsequent therapeutic skills. An alternative explanation may be that therapists who receive more frequent supervision consider themselves less

competent in dealing with situations where children are more difficult to engage than those receiving less frequent supervision. In effect, the fact that therapists are receiving input may suggest to them that they are not delivering home-based EIBI adequately enough to be left alone with less frequent supervision. Future research may help to establish and clarify the nature of this relationship.

Apart from supervision frequency, no other demographic or intervention-related characteristics were related to perceived therapeutic self-efficacy. This is in keeping with the original model of perceived therapeutic self-efficacy, whereby therapists' perceptions of their own and others experiences, the views of significant others and therapists' awareness of their own physiological reactions whilst delivering therapy are all expected to contribute to a sense of being able to deliver intervention effectively (cf. Bandura, 1997). Thus, it is therapists' perceptions of the experience of delivering home-based EIBI that is likely to influence their sense of perceived therapeutic self-efficacy for working with children who are difficult to engage with and whilst being observed. The next chapter moves from considering the more general factors such as demographic and intervention-related factors addressed in the present study to explore how factors specified in the perceived self-efficacy model may influence therapist beliefs in the present context.

CHAPTER FIVE

Research Stage 3: Exploring Perceived Therapeutic Self-Efficacy

Chapter Summary

Although the theoretical basis of self-efficacy is quite advanced, little is known about the mechanism of perceived therapeutic self-efficacy in the present context. The study presented in the previous chapter described the development of a measure of perceived therapeutic self-efficacy. The aim of the present chapter is to explore the basis of this therapist belief in relation to theoretically important sources of self-efficacy.

Perceived self-efficacy beliefs are considered to be derived from enactive experiences, vicarious experiences, verbal persuasion, and awareness of physiological and emotional responses. These four factors were considered alongside general self-efficacy beliefs, knowledge of behavioural principles and supervision frequency in exploring predictors of perceived therapeutic self-efficacy. The same group of therapists who participated in the previous study were asked to rate their experiences of delivering home-based EIBI. A subsequent factor analysis revealed three distinct sources of perceived self-efficacy relating to (i) verbal persuasion, (ii) a combination of enactive experiences and perceptions of stress, and (iii) vicarious experiences. Following this, regression models demonstrated that supervision frequency independently predicted perceived therapeutic self-efficacy for teaching a child who is difficult to engage with. In addition, general self-efficacy beliefs moderated the impact of enactive experiences on this dimension of perceived therapeutic self-efficacy. Enactive experiences, general self-efficacy, and knowledge of behavioural principles independently predicted perceived therapeutic self-efficacy for teaching a child whilst being observed; no interactions were observed. This chapter ends with a discussion of these results and considers directions for further research.

Research Stage 3: Exploring Perceived Therapeutic Self-Efficacy

5.1 Introduction

The previous study reported the development of a measure of perceived therapeutic self-efficacy for delivering home-based EIBI to young children with autism. Two distinct dimensions of perceived therapeutic self-efficacy were identified using factor analysis techniques; these related to teaching a child who is difficult to engage with and delivering home-based EIBI whilst being observed. Exploratory analysis revealed that all but one of the therapist or intervention-related characteristics included in the questionnaire were unrelated to therapists' ratings of perceived therapeutic self-efficacy across these dimensions. The only relationship observed was between supervision frequency and ratings of perceived therapeutic self-efficacy for teaching a child that is difficult to engage with, such that an increase in the frequency of supervisory contact was related to a decreased sense of therapeutic self-efficacy in this domain. The present study extends the analysis of perceived therapeutic self-efficacy to examine theoretically important sources of these particular beliefs.

The present study explores the conceptual basis of self-efficacy theory in relation to the context of home-based EIBI for young children with autism. Specifically, if perceived therapeutic self-efficacy is related to the quality of delivery of home-based EIBI it would be of benefit to understand the factors contributing to therapists' beliefs in their own abilities. Four sources of self-efficacy have been identified in the theoretical literature: enactive experience, vicarious experience, verbal persuasion, and awareness of physiological and emotional states (Bandura, 1977, 1997). Therapists' experiences in challenging situations provide information that could subsequently be used to form perceived therapeutic self-efficacy beliefs that are likely to be instrumental in guiding future interactions with children. In the general teaching literature a combination of enactive experiences and awareness of physiological and emotional states are considered most important in forming self-efficacy beliefs regarding teaching ability (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). There is a lack of

research, however, exploring the validity and impact of such experiences on actual self-efficacy beliefs (Henson, 2001). Given that our understanding of perceived therapeutic self-efficacy in the present context is not as advanced as teaching efficacy in more typical educational contexts, an exploration of the predictive value of sources of self-efficacy on therapists' beliefs would be of practical and theoretical benefit.

Self-efficacy theory is clear in specifying that beliefs of perceived competence are derived from the four distinct sources mentioned above. It is therefore likely that the quality of therapists' intervention experiences are more influential in forming perceived therapeutic self-efficacy beliefs than the length of time a therapist has delivered home-based EIBI, for example. As therapeutic and intervention-related factors have been found, in all but one instance, not to be associated with perceived therapeutic self-efficacy, further research could investigate the association between therapists' perceptions of their own experiences of delivering intervention and perceived therapeutic self-efficacy. In keeping with the original theory, other associations to be explored in relation to perceived therapeutic self-efficacy include therapists' views of their colleagues' ability to deliver intervention, therapists' perceptions of the supervision they receive, and the stress therapists experience whilst delivering interventions. In addition to exploring these associations, other factors could also be considered. A recent study of special education teachers working with children with autism found that increased commitment to teaching philosophy was positively associated with feelings of teaching self-efficacy for teachers instructing with ABA and TEACCH techniques (Jennett, Harris, & Mesibov, 2003). As the focus of the study was on teachers in school settings, it would be useful to explore other such variables in a home-based EIBI context.

According to Bandura (1997), perceived self-efficacy beliefs constitute feelings of competence in specific domains. Thus, perceived therapeutic self-efficacy refers to therapists' beliefs in their ability to deliver home-based EIBI to young children with autism. Alongside these particular beliefs, general feelings of self-efficacy may be influential in determining perceived therapeutic self-efficacy, or the actual quality of intervention delivery. General self-efficacy beliefs are formed from past experiences in a range of different situations; thus, those who have had positive and successful experiences in a wide variety of

areas of life are likely to have more general expectations of success in future activities (Sherer et al., 1982). Some social-cognitive theorists have rejected the validity of generalised self-efficacy beliefs on the basis that self-efficacy is contextually specific and primarily concerned with perceived capabilities to surmount challenges encountered in these domains (Cervone & Scott, 1995). It is plausible, however, that therapists who have been successful in a range of past experiences are likely to have higher expectations of personal success whilst delivering home-based EIBI. In addition, general self-efficacy beliefs may affect the manner in which therapeutic sources of self-efficacy influence specific perceived therapeutic self-efficacy beliefs (cf. Baron & Kenny, 1986). Conceptually, general self-efficacy beliefs may be expected to moderate the impact of sources of self-efficacy on specific perceived therapeutic self-efficacy beliefs. The benefits, for example, of widespread success in other areas of life may diminish the impact that discouraging situations would normally have in decreasing perceived therapeutic self-efficacy in the present context.

The present study extends the analysis of perceived therapeutic self-efficacy to include theoretically important sources of these therapist beliefs. Thus, the aim of the present study is to determine the factors that predict perceived therapeutic self-efficacy. Therapists were asked to rate their experiences of delivering home-based EIBI in relation to each of the sources of perceived self-efficacy beliefs, and the ratings were analysed to detect the presence of distinct sources of perceived therapeutic self-efficacy. Next, regression models were derived to explore the predictive value of therapists' perceptions of their own experiences of delivering home-based EIBI on perceived therapeutic self-efficacy. Following the discussion of previous research presented above, independent main-effects relationships were examined alongside interactions between general self-efficacy beliefs and source factors.

5.2 Method

5.2.1 Participants

The same group of therapists who participated in the study reported in the previous chapter were involved in the following analysis. See section 4.2.1 for details.

5.2.2 Questionnaire

In addition to the items described in section 4.2.2, the questionnaire asked therapists about sources of perceived therapeutic self-efficacy, general self-efficacy, and knowledge of behavioural principles. A copy of the questionnaire is included in Appendix Three.

5.2.2.1 Sources of Perceived Therapeutic Self-Efficacy

Four measures were developed for the present research to assess sources of perceived therapeutic self-efficacy. Each measure contained 3 items, derived from the theoretical literature on sources of perceived self-efficacy (Bandura, 1977). The first measure focused on therapists' views of their own enactive experiences, and included items on therapists' own perceived success and effort required whilst delivering home-based EIBI to young children with autism. The second measure focused on therapists' vicarious experiences, and asked for their views on other team members that they had observed and worked with. The third measure focused on therapists' own experiences of verbal persuasion by supervisory staff, and included items on perceived supervisor competency and supportiveness. The fourth measure focused on therapists' perceptions of their own physiological and emotional status during sessions. Items gauged how stressed or tired therapists felt during sessions, and how relieved they felt after sessions had finished. Items are presented in Figure 8. Ratings were made on a 7-point Likert scale, with appropriate descriptive anchors. Therapists' scores on items 1, 3, 10, 11, and 12 were reversed due to the wording of the items. A total score for each source of self-efficacy was obtained by summing therapists' responses to items on each measure. Total scores for each measure ranged from 3 to 21; high scores indicated a more positive influence on perceived therapeutic self-efficacy. Internal consistencies for these four measures, as determined using Cronbach's alpha, were -.20, .39, .79, and .47 respectively. Thus, internal consistencies for these measures were low, except for items measuring verbal persuasion.

5.2.2.2 General Self-Efficacy

Bosscher and Smit's (1998) shortened version (GSES-12) of Sherer et al.'s (1982) General Self-Efficacy Scale was used to measure therapists' general

self-efficacy beliefs. This scale contained 12 items, and participants rated their agreement with each item on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). After reversing responses for items 4, 5, 6, 7, and 8, summing the ratings on the 12 items derives a total score ranging from 12 to 84. Higher scores are indicative of lower feelings of general self-efficacy. The internal consistency of this measure in the present research was high (Cronbach's alpha = .83).

Enactive experiences

1. How difficult have you found it to deliver intervention programmes?
2. How successful have you been at delivering intervention programmes?
3. How much effort has it taken for you to be this successful?

Vicarious experiences

4. How effective are other therapists that you work with?
5. How much have you learnt from observing other therapists that you work with?
6. How similar to you are other therapists that you work with? (e.g. background, education, personal characteristics)

Verbal persuasion

7. How competent do you think your supervisors have been?
8. How supportive do you think your supervisors have been?
9. Compared to your own views, how accurate do you feel that your supervisors' feedback about your performance has been?

Perceptions of own physiological and emotional status during sessions

10. How stressed (tense, anxious) do you feel whilst delivering intervention programmes?
11. How tired (exhausted, drained) do you feel whilst delivering intervention programmes?
12. How relieved do you feel when you finish a teaching session?

Figure 8: Items included in the sources of perceived therapeutic self-efficacy scale.

5.2.2.3 Knowledge of Behavioural Principles

Therapists completed Furtkamp, Giffort, and Schiers' (1982) Short Form B of O'Dell, Tarler-Benlolo, and Flynn's (1979) Knowledge of Behavioural Principles as Applied to Children (KBPAC) questionnaire. This measure contains 10 scenario-based, multiple-choice-format items. Each scenario presents an issue related to children's challenging behaviour or other aspects of their development. Therapists were required to choose between four possible response options, one of which was deemed 'correct' in that it reflects a behavioural approach or perspective on the issue presented. Thus, responses to each item are scored as correct or incorrect, generating a total score between zero and 10. The internal consistency of this measure in the present research was acceptable ($K-R = .61$).

5.2.3 Procedure

The procedure was the same as that described in section 4.2.3.

5.3 Results

As noted above (see section 5.2.2.1), the internal consistencies of three of the four measures of sources of perceived therapeutic self-efficacy were low. As an initial strategy a composite measure was devised incorporating all 12 items included in the four measures of sources of perceived therapeutic self-efficacy. Cronbach's alpha for this 12-item scale was .48, indicating low reliability. To obtain a composite scale that had acceptable internal consistency, items were removed systematically until Cronbach's alpha was equal to or in excess of .70. This method generated a 6-item composite measure with an alpha of .70. Despite having an acceptable level of internal consistency, a problem with the method used was that the resulting 6-item composite scale did not include items relating to all sources of perceived therapeutic self-efficacy. Therefore, a factor analytic procedure was used to identify any specific dimensions of sources of perceived therapeutic self-efficacy that could be derived from therapists' responses to the 12 items comprising these four measures. After the factor analysis was performed, derived factor scores were used in separate regression models to evaluate if they predicted therapists' scores on dimensions of perceived therapeutic self-efficacy.

5.3.1 Sources of Self-Efficacy Factor Analysis

An exploratory principal components factor analysis was used to investigate the presence of separate domains of sources of perceived therapeutic self-efficacy. The therapists-to-items ratio (6.4:1) was sufficient to warrant this form of analysis (Floyd & Widaman, 1995). As with the previously reported factor analysis (see section 4.3.1), items were examined to ascertain their suitability for inclusion in the factor analytic procedure. Bivariate correlations for the sources of perceived therapeutic self-efficacy scale items are presented in Table 11. First, visual inspection of the correlation matrix revealed a substantial number of significant correlations between items. Next, all 12 items were included in an initial analysis to establish the sampling adequacy (i.e. the degree to which items could be predicted without error by other items) of both individual items and the correlation matrix. A sampling adequacy of .50 or above for the entire correlation matrix and individual items is considered acceptable for inclusion of items (Hair et al., 1995). Although the KMO measure of sampling adequacy for the 12-item correlation matrix was acceptable at .567, the sampling adequacy of five individual items did not exceed .50. Thus, the item with the

Table 11.

Bivariate Correlations for the 12-Item Pool of Sources of Perceived Therapeutic Self-Efficacy Scale

	1	2	3	4	5	6	7	8	9	10	11	12
1												
2	<u>.45</u>											
3	.12	-.07										
4	-.04	.18	.07									
5	-.16	-.05	<u>-.20</u>	<u>.34</u>								
6	.06	.03	.12	.12	.15							
7	-.01	.06	<u>-.20</u>	<u>.24</u>	.18	.12						
8	-.11	-.01	-.12	<u>.31</u>	<u>.28</u>	.01	<u>.69</u>					
9	-.01	<u>.30</u>	<u>-.21</u>	.18	<u>.35</u>	-.03	<u>.42</u>	<u>.55</u>				
10	<u>.68</u>	<u>.24</u>	.12	-.08	-.03	.14	-.01	-.10	.04			
11	.15	.06	<u>.32</u>	<u>-.24</u>	-.11	-.07	-.12	-.11	<u>-.21</u>	<u>.21</u>		
12	<u>.40</u>	.15	.16	-.12	-.07	.01	<u>-.31</u>	<u>-.29</u>	-.09	<u>.34</u>	.16	

Note. Item numbers refer to items described in Figure 8.
Underlined values = $p < 0.05$

lowest sampling adequacy was removed. Sampling adequacy values for individual items were recalculated, along with the KMO value for the entire matrix. This procedure was repeated if necessary until both the matrix and individual items achieved an acceptable level. As a result, items 2 and 6 were removed, and 10 items were included in the subsequent factor analysis (KMO = .642). Finally, the nature of the 10-item correlation matrix was examined. Given that Bartlett's Test of Sphericity was significant ($\chi^2 = 196.54$, $p < .001$), it was concluded that the matrix was not an identity matrix. Thus, it was deemed suitable to use factor analysis techniques on the data.

Initial analysis of the ten remaining items revealed four factors with eigenvalues over 1.0. As in the previous study, a scree plot was constructed from these eigenvalues. This plot, displayed in Figure 9, indicated that a change in the steepness of the curve could be placed at three factors. Therefore, principal components analyses were conducted specifying three or four factors to be extracted. Factors were also rotated to obtain the optimal solution. From a theoretical perspective, sources of perceived therapeutic self-efficacy are independent, but are also likely to be associated with each other to some degree (Bandura, 1977). Thus, four separate rotated factor solutions were derived; 3-

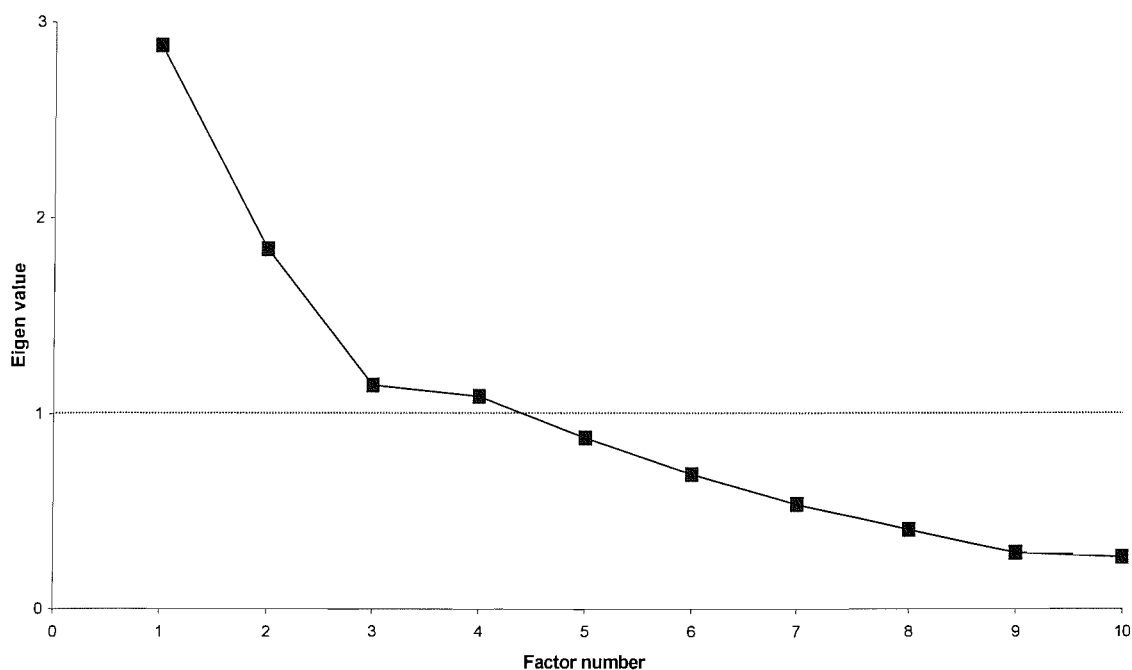


Figure 9: Scree plot of eigenvalues for extracted sources of perceived therapeutic self-efficacy factors. The dashed line represents acceptable eigenvalue criterion.

and 4-factor solutions using the orthogonal Varimax procedure to maintain independence between factors, and 3- and 4-factor solutions using the oblique Promax procedure to allow the factors to correlate with each other during rotation.

Despite the different rotational methods used, the 3- and 4-factor solutions obtained were quite similar. The 4-factor solution appeared to be the most rational of those extracted given that the factors seemed to represent verbal persuasion, vicarious experiences, difficulty/stress and effort expended in delivering home-based EIBI. Based on the reasoning given above, the oblique solution was chosen over the orthogonal solution, although in practice there was no difference between the items included in the derived factors for both solutions. Using the procedures described in 4.3.1 regarding item loadings, all 10 items were retained in the solution. The four factors appeared to represent a good model for the data given that the residuals in the reproduced correlation matrix were low, with 47% of residual values being less than .05.

5.3.2 Item Analysis

As before (see 4.3.2), raw scores for each item in each factor were correlated with an adjusted total score for that factor to ascertain if individual items were measuring the same construct as the factor to which they belonged. Adjusted scores were calculated by summing the total raw scores of the items in the factor, excluding the raw score of the item concerned. All items were required to correlate with the relevant adjusted factor score at or above .30. One-sample Kolmogorov-Smirnov tests were used to compare the individual items, or adjusted factor scores, to a normal distribution to determine whether parametric or nonparametric correlational statistics were to be used. Nonparametric correlational statistics indicated that all items except those comprising Factor 4 (items 3 and 11) correlated with the relevant adjusted factor score at or above .30, and as such were to be retained in the derived solution. A subsequent factor analysis with the remaining 8 items derived a 3-factor solution that is displayed in Table 12. Scores for items included in the final scales and item-total correlations are presented in Table 13; responses to all items were not normally distributed.

Table 12.

Factor Analysis of Therapists' Ratings of Sources of Perceived Therapeutic Self-Efficacy

Item	Factor loading		
	Factor 1 <i>Verbal persuasion</i>	Factor 2 <i>Enactive experience</i>	Factor 3 <i>Vicarious experience</i>
How difficult have you found it to deliver intervention programmes?	-.108	<u>.892</u>	.121
How effective are other therapists that you work with?	.088	.044	<u>.697</u>
How much have you learnt from other therapists that you work with?	.013	.047	<u>.847</u>
How competent do you think your supervisors have been?	<u>.908</u>	-.026	-.103
How supportive do you think your supervisors have been?	<u>.854</u>	.049	.090
Compared to your own views, how accurate do you feel that your supervisors' feedback about your performance has been?	<u>.633</u>	-.150	.262
How stressed (tense, anxious) do you feel whilst delivering intervention programmes?	-.114	<u>.878</u>	.053
How relieved do you feel when you finish a teaching session?	-.417	<u>.596</u>	-.203
Eigen value	2.664	1.820	1.051
Variance	33.30	22.76	13.13

Note: Significant factor loadings are underlined

Factors labels were chosen to represent each of the items derived from the analysis as closely as possible. Factor 1 (*verbal persuasion*) was composed of items that referred to therapists' experiences of supervision. This factor accounted for 33.30% of the variance in therapists' responses. Items relating to therapists' perceptions of difficulty and stress experienced whilst delivering home-based EIBI made up Factor 2 (*enactive experience*). This factor accounted for 22.76% of the variance in therapists' responses. Factor 3 (*vicarious experience*) contained items regarding therapists' perceptions of other therapists that they worked with, and accounted for 13.13% of the variance in therapists' responses. In all, the derived factor solution accounted for 69.19% of the variance in therapists' responses. High scores on all factors represent more 'positive' influences on perceived therapeutic self-efficacy.

Table 13.

Item Scores and Corrected Item-Total Correlations for the Sources of Perceived Therapeutic Self-Efficacy Subscales

Factor	Item	Median	Range		Corrected item-total correlations
			Min	Max	
1	7	6	2	7	.64
	8	6	2	7	.65
	9	6	3	7	.55
2	1	3	1	6	.63
	10	2	1	6	.52
	12	4	1	7	.34
3	4	6	3	7	.33
	5	7	2	7	.33

Note. Item numbers refer to items described in Figure 8.

5.3.3 Internal Consistency

The internal consistency of factor subscales was determined by examining the extent to which items correlate with other items in each subscale. Factors 1 and 2 were found to have acceptable levels of internal consistency as determined by Cronbach's alpha, but Factor 3 was found to have low internal

consistency (Factor 1 = .79; Factor 2 = .71; Factor 3 = .51). Despite low reliability, Factor 3 was included in the subsequent analysis. Results of this analysis, however, must be interpreted in light of this finding. Finally, correlations between subscale scores indicate that Factor 2 is distinct from Factors 1 and 3, but that there is some degree of relationship between Factors 1 and 3 ($r_s(77) = .381, p < .01$).

5.3.4 Descriptive Statistics for the Sources of Perceived Therapeutic Self-Efficacy Scale

Factor scores for each subscale of sources of perceived therapeutic self-efficacy were obtained by summing therapists' responses to items that loaded on each factor. Average scores for the present sample are displayed in Table 14; one-sample Kolmogorov-Smirnov tests were used to ascertain the normality of factor scores for the individual measures of sources of self-efficacy. Results indicated that the distribution of scores on the verbal persuasion and enactive experience scales were normal, but that the distribution of scores on the vicarious experience scale was not.

Table 14.

Sources of Perceived Therapeutic Self-Efficacy Scores for the Present Sample

Factor	Mean	(SD)	Median	Range	
				Min	Max
1 ^a	17.59	3.03			
2 ^b	14.88	3.46			
3 ^c			12	7	14

^a Minimum scale score = 3, maximum scale score = 21

^b Minimum scale score = 3, maximum scale score = 21

^c Minimum scale score = 2, maximum scale score = 14

5.3.5 Analysis of Perceived Therapeutic Self-Efficacy for the Present Sample

Thus far, factor analysis of therapists' responses has identified three sources of perceived therapeutic self-efficacy. The next phase of the analysis is to explore the predictive value of therapists' perceptions of their own experiences on the two dimensions of perceived therapeutic self-efficacy identified in the

previous chapter. Thus, therapists' ratings of sources of verbal persuasion, enactive experiences and vicarious experiences were input into two separate multiple regression models as predictors of dimensions of perceived therapeutic self-efficacy beliefs. In addition, a number of other variables were considered for inclusion. Given the findings of the previous chapter, supervision frequency was included in the regression model pertaining to perceived therapeutic self-efficacy for teaching children that are difficult to engage with. Therapists' knowledge of behavioural principles as applied to children and general self-efficacy beliefs were also included in the regression models. Prior to running the regression analysis, however, the associations between these two variables and the dimensions of perceived therapeutic self-efficacy were explored. If significant associations were found, the variables were to be included in the regression models. To explore the presence of moderator effects, interaction terms representing therapists' general self-efficacy beliefs and perceptions of relevant sources of perceived therapeutic self-efficacy were also entered into both models. If significant interactions were found, data plots could be derived to explore this relationship in further detail.

5.3.5.1 Exploratory Analysis of General Self-Efficacy and Knowledge of Behavioural Principles

Mean scores regarding general self-efficacy beliefs and knowledge of behavioural principles for the present sample are displayed in Table 15. While there are no comparative data relevant to the present sample, therapists appeared to have relatively strong general self-efficacy beliefs. Therapists' knowledge of

Table 15.

Behavioural Knowledge and General Self-Efficacy Scores for the Present Sample

Variable	Mean	(SD)
KBPAC ^a	6.66	2.08
GSES-12 ^b	26.29	8.33

^a Minimum scale score = 0, maximum scale score = 10

^b Minimum scale score = 12, maximum scale score = 84; High GSES-12 scores represent low general self-efficacy beliefs

behavioural principles was greater than that identified in earlier samples of entry-level direct care staff and health professionals attending classes in behaviour modification, and staff working in special schools in the UK (Furtkamp, Giffort, & Schiers, 1982; Sturme, Newton, Milne, & Burdett, 1987).

The associations between dimensions of perceived therapeutic self-efficacy, therapists' general self-efficacy beliefs and knowledge of behavioural principles were analysed prior to including the predictor variables in both regression models. One-sample Kolmogorov-Smirnov tests were used to ascertain the nature of the distribution of scores in relation to these variables; associations were subsequently explored using parametric tests. The associations are displayed in Table 16.

Table 16.

Associations Between General Self-Efficacy, Knowledge of Behavioural Principles and Perceived Therapeutic Self-Efficacy Subscales for the Present Sample

Variable	Factor 1	Factor 2
	<i>Teaching a child who is difficult to engage</i>	<i>Teaching a child whilst being observed</i>
	r	r
KBPAC	.208	.339 **
GSES-12 ^a	-.400 ***	-.493 ***

^a High GSES-12 scores represent low general self-efficacy beliefs

r = Pearson Product Moment correlation coefficient

** p < .01

*** p < .001

Therapists' general self-efficacy beliefs were significantly and linearly associated with both dimensions of perceived therapeutic self-efficacy. Thus, perceived therapeutic self-efficacy beliefs for teaching children who are difficult to engage, and whilst being observed, seem to increase with increasing feelings of general self-efficacy. Increased perceived therapeutic self-efficacy for teaching a child whilst being observed was also significantly and linearly associated with an increase in therapists' knowledge of behavioural principles.

Following this analysis, therapists' general self-efficacy beliefs were included in regression models as a predictor of perceived therapeutic self-efficacy across both domains. In addition, therapists' knowledge of behavioural principles was included as a predictor variable in the regression model of perceived therapeutic self-efficacy for teaching a child whilst being observed, and frequency of supervision based on monthly occurrence (see section 4.3.4) were included as predictor variable in the regression model of perceived therapeutic self-efficacy for teaching a child that is difficult to engage with.

5.3.6 Regression Models of Perceived Therapeutic Self-Efficacy

As stated in section 5.3.4, the distribution of scores on the verbal persuasion and enactive experience scales were normal, but the distribution of scores on the vicarious experience scale was not. Variables entered into a regression analysis are required to be normally distributed. A histogram of the distribution of scores on the vicarious experience scale indicated a negative skew; therefore therapists' scores on this factor were reflected before a square-root transformation was applied. The resulting vicarious experience scale scores were normally distributed, and were reflected once again to restore the original order of the factor scores. Factor scores for the sources of self-efficacy measures were included in the subsequent regression analysis.

All predictor and criterion variables were examined for the presence of outlier observations prior to the calculation of regression models. For a sample with less than 80 observations, standardised values greater than or equal to 2.5 can be considered outliers (Hair et al., 1995). Thus, all variables were converted into z-scores and were retained in this form for the regression analyses. A small number of extreme observations were found in all variables except general self-efficacy and knowledge of behavioural principles. No therapists, however, were found to have been responding consistently at an extreme level on a substantial number of variables. After checking against the original questionnaire responses, all extreme observation values were retained in the analysis because they appeared to be genuine responses.

5.3.6.1 Regression Analysis of Perceived Therapeutic Self-Efficacy for Teaching a Child Who is Difficult to Engage With

Predictors of perceived therapeutic self-efficacy for teaching a child who is difficult to engage with were explored using a simple regression model. Therapists' ratings of verbal persuasion, enactive experiences, vicarious experiences, and general self-efficacy beliefs were entered into a regression model as predictors of standardised ratings of perceived therapeutic self-efficacy for teaching a child who is difficult to engage with. In addition, a so-called 'dummy variable' representing supervision frequency was also included. This variable was scored as zero for therapists who received supervision less than once a month and 1 for therapists who received supervision once a month or more. Bivariate correlations between all key variables are presented in Table 17.

Table 17.

Bivariate Correlations Between Key Variables Regarding Perceived Therapeutic Self-Efficacy for Teaching a Child Who is Difficult to Engage With

		1	2	3	4	5	6
PTSE F1 ^a	1						
Supervision frequency	2	<u>-.26</u>					
GSES-12 ^b	3	<u>-.40</u>	.18				
Verbal persuasion	4	.02	.13	-.19			
Enactive experience	5	<u>.44</u>	<u>-.24</u>	<u>-.32</u>	-.16		
Vicarious experience	6	.02	-.02	-.13	<u>.35</u>	-.15	

^a PTSE F1 = Perceived therapeutic self-efficacy for teaching a child who is difficult to engage with

^b GSES-12 = General self-efficacy beliefs

Underlined values = $p < 0.05$

In addition to these main effects, three interaction terms were included to explore the moderating influence of general self-efficacy on the relationship between individual sources of self-efficacy and perceived therapeutic self-

efficacy. Interaction terms were entered as the product of the standardised general self-efficacy and individual sources of self-efficacy scores, following the method described by Baron and Kenny (1986). All independent predictor variables and interaction terms were included simultaneously in the analysis. Thus, the beta values obtained represent the contribution of each variable or interaction term to the prediction of perceived therapeutic self-efficacy for teaching a child who is difficult to engage with, independent of the contribution of all other variables.

The results of the regression analysis are displayed in Table 18. Of the independent predictors, only therapists' enactive experience scores were a significant predictor of perceived therapeutic self-efficacy for teaching a child who is difficult to engage with. As therapists' perceptions of positive enactive experiences increase, so do feelings of perceived therapeutic self-efficacy in this domain. There is also evidence of a significant interaction between therapists' general self-efficacy beliefs and perceptions of their own enactive experiences, indicating that the influence of enactive experience on perceived therapeutic self-efficacy is moderated by therapists' general self-efficacy beliefs.

Table 18.

Regression Analysis of Perceived Therapeutic Self-Efficacy for Teaching a Child Who is Difficult to Engage With^a

Predictor	β	t	p
Supervision frequency	-.171	-1.685	ns
General self-efficacy beliefs (GSES-12) ^b	-.197	-1.842	ns
Verbal persuasion	.024	.218	ns
Enactive experience	.334	3.122	< .01
Vicarious experience	-.054	-.511	ns
Verbal persuasion \times GSES-12	.131	1.186	ns
Enactive experience \times GSES-12	.320	3.146	< .01
Vicarious experience \times GSES-12	-.158	-1.476	ns

^a $R^2 = .40$, adj. $R^2 = .32$, $F_{8,68} = 5.550$, $p < .001$

^b High GSES-12 scores are indicative of low feelings of general self-efficacy

Prior to deriving a data plot to explore this interaction, the model was examined to ascertain if it was an accurate representation of the data (Field, 2000). To determine if this was the case, the difference between therapists' responses and the responses predicted by the model were examined. The difference between these two sets of observations, termed residual values, signify the error present in the regression model. Standardised residual values exceeding ± 2 can be considered outliers, and up to 5% of observations in a sample may be expected to have standardised residuals beyond this limit. In the present sample four observations (5%) were found. These observations were further investigated to determine the likelihood that one or more may have influenced the regression model unduly. Two statistics can be calculated to determine the influence that a single observation has on the regression model. First, Cook's distance was computed for the four observations; values greater than 1 indicate that the observation in question has excessively influenced the model. None of these observations were found to have a Cook's distance of 1 or more, so they were unlikely to have undue impact on the derived regression model. Next, the leverage values of these four observations were examined. If the regression model was an accurate representation of the data set, all leverage values should be similar. Of the four observations found to be outliers, one (observation 59) was found to have a leverage value greater than two times the average leverage value for the sample. As outlying observations with high leverage values may disproportionately influence a regression model, a further regression model was calculated with responses from observation 59 omitted. This is presented in Table 19.

After removing observation 59, the variance in perceived therapeutic self-efficacy for teaching a child who is difficult to engage with that is explained by the model increased from 40% to 48%. Thus, observation 59 can be considered influential and its removal from the model is justified. The beta values of therapists' frequency of supervision and general self-efficacy beliefs became significant; thus, perceived therapeutic self-efficacy in this domain increases with increasing general self-efficacy and decreases with increasingly frequent supervision. The beta value for the interaction between general self-efficacy and enactive experience increased. In contrast, the beta value of the enactive experience variable decreased. For the number of participants and predictor

variables included in the model, the power, or probability that the analysis would find R^2 to be greater than zero with $\alpha = .01$, is at least .99.

Table 19.

Regression Analysis of Perceived Therapeutic Self-Efficacy for Teaching a Child Who is Difficult to Engage With Minus Observation 59^a

Predictor	β	t	p
Supervision frequency	-.253	-2.660	< .05
General self-efficacy beliefs (GSES-12) ^b	-.230	-2.295	< .05
Verbal persuasion	-.134	-1.253	ns
Enactive experience	.279	2.742	< .01
Vicarious experience	.032	.318	ns
Verbal persuasion \times GSES-12	.164	1.604	ns
Enactive experience \times GSES-12	.387	4.009	< .001
Vicarious experience \times GSES-12	-.171	-1.713	ns

^a $R^2 = .48$, adj. $R^2 = .41$, $F_{8,67} = 7.623$, $p < .001$

^b High GSES-12 scores are indicative of low feelings of general self-efficacy

Despite the regression model presented in Table 19 being representative of therapists' responses, it is also important to ascertain if the model can be generalised beyond the present data set (Field, 2000). All correlations between predictor variables were less than .90, suggesting that multicollinearity was not present in the variate. This was confirmed by examining the variance inflation factors and tolerance levels of all variables. The variance inflation factor of an individual predictor variable gives an indication of the extent to which that variable has a substantial relationship with other predictor variables. Tolerance values are a measure of the variance explained by a single predictor variable that is accounted for by that variable only and not other predictor variables included in the regression model. Both the variance inflation factors and tolerance values were at acceptable levels for all predictor variables included in the regression model. Thus, all predictor variables could be considered sufficiently independent to the extent that the regression coefficients and resulting equation are likely to be stable across different data sets. The use of regression analysis is dependent

on the differences between observed and predicted values (i.e. residuals) being constant at each level of the predictor variable. This is termed homoscedasticity. Apart from the three remaining observations identified as outliers above, a plot of standardised residuals against standardised predicted values did not indicate heteroscedasticity. It is also assumed in regression analysis that the differences between observed and predicted values will be random and normally distributed. The normality of standardised residuals was confirmed by inspecting a histogram and normal probability plot of the data, in addition to examining the results of a one-sample Kolmogorov-Smirnov test. Based on the examination of the data, it can be concluded that the model presented in Table 19 is accurate for the sample of therapists' that participated in the present research. The ratio of variables-to-participants (1:10) also suggests that the model presented here can be generalised to other samples of therapists (Hair et al., 1995).

A data plot was created to explore the interaction effect found in the model, following the method described by Aiken and West (1991). This is presented in Figure 10, and demonstrates that when therapists perceive delivering home-based EIBI to young children with autism to be relatively straightforward and stress-free (i.e. score high on the enactive experience scale), general self-efficacy beliefs have little impact on perceived therapeutic self-efficacy for teaching a child who is difficult to engage with. When therapists find home-based EIBI delivery to be more difficult and stressful (i.e. score low on the enactive experience scale), however, those with higher general self-efficacy beliefs have higher perceived therapeutic self-efficacy in this domain.

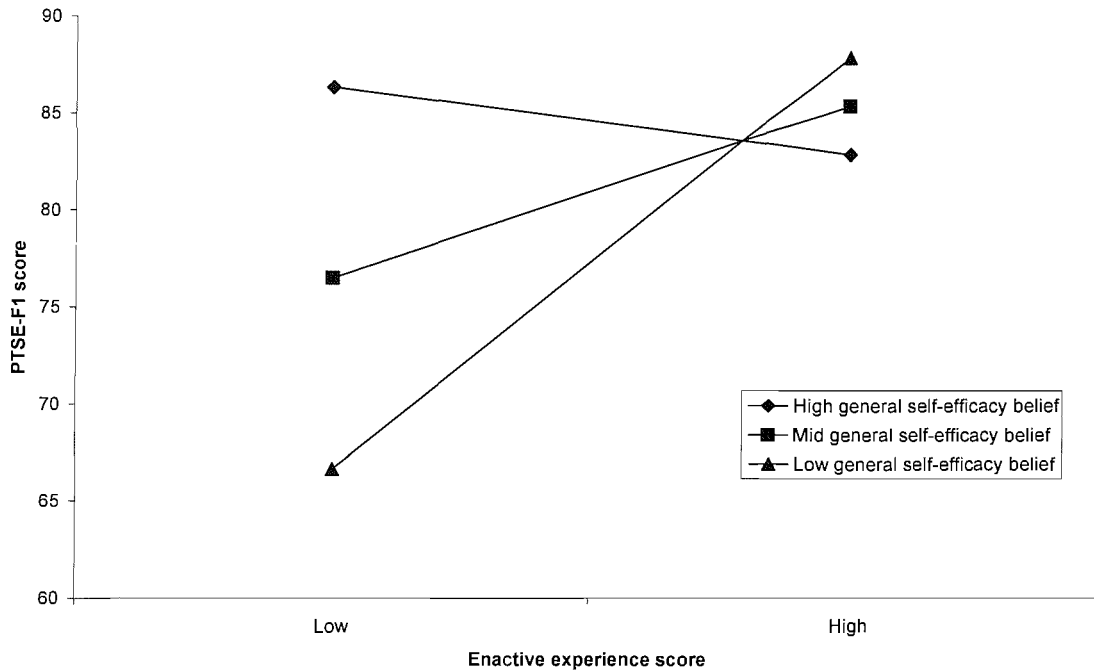


Figure 10: Interpretation of the moderating effect of general self-efficacy beliefs on the relationship between enactive experiences of home-based EIBI and perceived therapeutic self-efficacy for teaching a child who is difficult to engage with (PTSE-F1).

5.3.6.2 Regression Analysis of Perceived Therapeutic Self-Efficacy for Teaching a Child Whilst Being Observed

A similar regression method was used to explore predictors of perceived therapeutic self-efficacy whilst being observed. All of the predictor variables included above were retained, excluding supervision frequency. Therapists' knowledge of behavioural principles was also entered into the regression model, as this was found to be significantly associated with perceived therapeutic self-efficacy in this dimension (see 5.3.4.1). Bivariate correlations between all key variables are presented in Table 20.

As before, interactions between general self-efficacy ratings and individual sources of self-efficacy were included to investigate moderator effects (Baron & Kenny, 1986), and independent predictor variables and interaction terms were included simultaneously in the analysis. Thus, the beta values obtained represent the contribution of each variable or interaction term to the prediction of perceived therapeutic self-efficacy for teaching a child whilst being

observed, independent of the contribution of all other variables, including therapists' knowledge of behavioural principles.

Table 20.

Bivariate Correlations Between Key Variables Regarding Perceived Therapeutic Self-Efficacy for Teaching a Child Whilst Being Observed

		1	2	3	4	5	6
PTSE F2 ^a	1						
KBPAC ^b	2	<u>.34</u>					
GSES-12 ^c	3	<u>-.49</u>	<u>-.24</u>				
Verbal persuasion	4	.03	-.10	-.19			
Enactive experience	5	<u>.59</u>	<u>.27</u>	<u>-.32</u>	-.16		
Vicarious experience	6	-.05	.12	-.13	<u>.35</u>	-.15	

^a PTSE F2 = Perceived therapeutic self-efficacy for teaching a child whilst being observed

^b Knowledge of behavioural principles as applied to children

^c GSES-12 = General self-efficacy beliefs

Underlined values = $p < 0.05$

The results of the regression analysis are displayed in Table 21. Of the independent predictors, therapists' knowledge of behavioural principles, general self-efficacy beliefs, and enactive experience scores were significant predictors of perceived therapeutic self-efficacy for teaching a child whilst being observed. As therapists' knowledge of behavioural principles, general self-efficacy beliefs, or perceptions of positive enactive experiences increase, so do feelings of perceived therapeutic self-efficacy in this domain. There is no evidence of significant interactions between sources of self-efficacy and general self-efficacy beliefs.

Table 21.

Regression Analysis of Perceived Therapeutic Self-Efficacy for Teaching a Child Whilst Being Observed^a

Predictor	β	t	p
Knowledge of behavioural principles (KBPAC)	.187	2.044	< .05
General self-efficacy beliefs (GSES-12) ^b	-.269	-2.792	< .01
Verbal persuasion	.102	1.018	ns
Enactive experience	.449	4.683	< .001
Vicarious experience	-.135	-1.402	ns
Verbal persuasion \times GSES-12	.120	1.220	ns
Enactive experience \times GSES-12	.162	1.820	ns
Vicarious experience \times GSES-12	-.155	-1.626	ns

^a $R^2 = .52$, adj. $R^2 = .46$, $F_{8,68} = 9.225$, $p < .001$

^b High GSES-12 scores are indicative of low feelings of general self-efficacy

As before, it is necessary to examine how representative the regression model is compared to the data that was collected (Field, 2000). Three observations (4%) were found to have standardised residual values exceeding ± 2 . None of these values, however, were found to have a Cook's distance of 1 or more and leverage values of the observations were within 2 times the average leverage value for the sample. Thus, all observations were retained in the analysis and the model presented in Table 21 holds. For the number of participants and predictor variables included in the model, the power, or probability that the analysis would find R^2 to be greater than zero with $\alpha = .01$, is at least .99.

Despite the regression model presented in Table 21 being representative of therapists' responses, it is once again important to ascertain if the model can be generalised beyond the present data set (Field, 2000). Correlations between predictor variables were less than .90, suggesting that multicollinearity was not present in the variate. This was confirmed by examining the variance inflation factors and tolerance levels of all variables; both were at acceptable levels. A plot of standardised residuals against standardised predicted values indicated that the model might suffer from a degree of heteroscedasticity. Partial regression plots

were created whereby the residuals of each predictor variable and the outcome variable are plotted against each other. Through examination of partial regression plots it appeared that therapists' residual scores on the measure of verbal persuasion might not be constant across the possible range of scores. It is also assumed in regression analysis that the differences between observed and predicted values will be random and normally distributed. An inspection of a histogram and normal probability plot of standardised residuals, in addition to examining the results of a one-sample Kolmogorov-Smirnov test, indicated that the distribution of residual values in the regression model was normal. Thus, it is likely that the model presented in Table 21 is accurate for the sample of therapists' that participated in the present research, and given the ratio of variables-to-participants (1:10), it is likely that the model presented here can be generalised to other samples of therapists (Hair et al., 1995). This must be attempted with caution, however, given the degree of heteroscedasticity present in the model.

5.4 Discussion

The aim of the present study was to explore predictors of perceived therapeutic self-efficacy. The initial part of this investigation asked therapists to rate their experiences of delivering home-based EIBI in relation to sources of perceived self-efficacy beliefs identified in the theoretical literature. Therapists' ratings were analysed to detect the presence of distinct sources of perceived therapeutic self-efficacy. The results of an exploratory principal components factor analysis revealed three sources of perceived therapeutic self-efficacy relating to (i) verbal persuasion, (ii) a combination of enactive experiences and perceptions of stress, and (iii) vicarious experiences. The verbal persuasion factor included therapists' perceptions of supervisor competency, supportiveness and the quality of feedback that they received. The enactive experience factor was composed of therapists' insights into the difficulty and stress they experience whilst delivering home-based EIBI to young children with autism. Finally, the vicarious experience factor encompassed therapists' observations of other therapists that they worked with and views regarding their colleagues' effectiveness whilst working with young children with autism. The internal

consistencies for all but the latter subscale were high, and the correlations between subscale scores demonstrate that they measure different sources of perceived therapeutic self-efficacy. Whilst it may have been expected that four distinct sources of perceived self-efficacy may have emerged, researchers in the wider teaching self-efficacy literature have suggested that teachers' enactive experiences and accompanying physiological or emotional reactions are closely linked (Taschannen-Moran et al., 1998). Thus, three distinct predictors of perceived therapeutic self-efficacy are likely to be relevant in the present context.

Although the theoretical basis of self-efficacy is quite advanced, little is known about the mechanism of perceived therapeutic self-efficacy in the present context. Following the initial analysis, regression models were calculated to explore the predictive value of therapists' ratings of the three sources of self-efficacy, general self-efficacy beliefs, knowledge of behavioural principles and supervision frequency on perceived therapeutic self-efficacy. Independent main-effects relationships were examined alongside interactions between general self-efficacy beliefs and source factors. Perceived therapeutic self-efficacy for teaching a child who is difficult to engage with was found to increase with more positive perceptions of therapists' own experiences of delivering home-based EIBI, higher levels of general self-efficacy, and less frequent supervisory contact. Possible explanations for the relationship between supervision frequency and perceived therapeutic self-efficacy in this domain were addressed in the previous chapter. In line with self-efficacy theory, results of the regression analysis suggest that difficult or stressful experiences of delivering home-based EIBI are associated with lower feelings of perceived therapeutic self-efficacy for teaching a child who is difficult to engage with. Results from the present study also provide evidence to suggest that therapists' general self-efficacy beliefs moderate the association between therapists' perceptions of their own experiences and perceived therapeutic self-efficacy: when therapists' found intervention delivery to be more challenging, those with greater feelings of general self-efficacy tended to have more positive perceived therapeutic self-efficacy beliefs for teaching a child who is difficult to engage with. Thus, general self-efficacy beliefs act as a protective factor of perceived therapeutic self-efficacy in this domain when therapists experience difficulties delivering the intervention. Although therapists' general self-efficacy beliefs and perceptions of

difficulty and stress also independently predicted perceived therapeutic self-efficacy beliefs for teaching a child whilst being observed, no evidence of a moderating relationship was found. In addition, therapists' who were more knowledgeable of behavioural principles were more likely to have greater feelings of perceived therapeutic self-efficacy in this domain. The present discussion will now turn to consider these results further.

The present research found that perceived therapeutic self-efficacy beliefs across both dimensions were predicted by therapists' perceptions of their own experiences of delivering home-based EIBI to young children with autism. In contrast, therapists' perceptions of their own vicarious experiences and verbal persuasion were not found to be associated with perceived therapeutic self-efficacy. Although self-efficacy beliefs are derived from a number of sources, enactive experiences are consistently presented as the most influential (Bandura, 1977, 1997). Theoretical consideration of general teaching self-efficacy suggests that the most prominent sources of these beliefs are teachers' enactive experiences and any accompanying physiological arousal responses (Taschannen-Moran et al., 1998). The present study lends empirical support to this argument given that a combination of therapists' perceptions of the difficulty and stress experienced whilst delivering intervention programmes were the most powerful predictors of perceived therapeutic self-efficacy beliefs across both domains (see items making up the enactive experience factor in Table 9.).

There may be plausible reasons why vicarious experiences and verbal persuasion are not significantly associated with perceived therapeutic self-efficacy. Unlike therapists' enactive experiences and physiological responses, which by definition are always available to be drawn from, vicarious experiences and verbal persuasion are acquired primarily through interaction with other therapists or supervisory staff. Home-based EIBI is, for the most part, delivered on a one-to-one basis by a therapist to a specific child. This style of intervention is likely to afford little opportunity for therapists to observe their colleagues delivering intervention programmes. Vicarious experiences act as sources of self-efficacy information by allowing individuals to judge their own abilities against others in similar situations. Therapists are likely to have some opportunities to observe their colleagues, but these occasions are likely to be infrequent as a consequence of the style of intervention delivery. This may explain why

vicarious experiences were identifiable as a distinct factor but do not predict perceived therapeutic self-efficacy. Vicarious experiences are identifiable as a factor because therapists' views on items relating to observing other therapists' correlate with each other. While it is likely that therapists have some idea of the capabilities of their colleagues and a factor relating to vicarious experiences is identifiable, the style of home-based EIBI delivery may mean that they do not have accurate information regarding other team members' skills and capabilities upon which to base their own self-efficacy beliefs.

A similar scenario may be envisaged with regard to the lack of predictive power of verbal persuasion on perceived therapeutic self-efficacy in the present study. This particular source of self-efficacy information is likely to be gained primarily in the home-based EIBI context from supervision sessions, where more senior staff may encourage therapists' and express faith in their capabilities to deliver complex intervention targets. The salience of verbal persuasion as a source of perceived therapeutic self-efficacy may be tempered, however, by the relative infrequency of supervision sessions and the finding that therapists rely on their own experiences to generate beliefs regarding their own abilities. Despite the fact that nearly half of all therapists in the present study received supervision at least once a fortnight, this still leaves therapists' working on their own with no significant source of support for a great deal of time each week. It may not therefore be surprising that therapists' perceptions of their own experiences of delivering one-to-one intervention are more predictive of perceived therapeutic self-efficacy beliefs than the views of supervisory staff. In addition, if supervisors' and therapists' perceptions are not congruent, verbal persuasion is less likely to be predictive of perceived therapeutic self-efficacy beliefs; it is reasonable to assume that most people believe they have a better idea than others of their own abilities (Bandura, 1997).

The extent to which verbal persuasion acts as a source of self-efficacy information is also likely to depend on the credibility and expertise of the supervisor. Recent research investigating home-based EIBI programmes in the UK found that the vast majority of supervision provided was not of the standard or frequency provided in reported best outcome interventions (Mudford, Martin, Eikeseth, & Bibby, 2001, see also section 2.3). While the therapists who participated in the present research were supervised by a variety of organisations,

no objective data are available on the quality of supervision received.

Comparative research with more proficient supervisory staff in, say, the United States of America may reveal a different picture. It is also worth keeping in mind that there is no guarantee that supervisors who are competent in delivering and organising behavioural technologies will be competent in supporting, encouraging and managing therapists. Consultants and supervisory staff may need to be made aware of factors that influence intervention delivery and act in such ways that help to improve therapists' interactions with young children with autism. Examples of this may include involving therapists in the development of intervention targets and approaching their skill deficits in an uncritical manner (Clarke & Cautilli, 2001).

An additional finding worth discussing relates to therapists' knowledge of behavioural principles. Results of the present study suggest that therapists' knowledge in this area is a significant predictor of perceived therapeutic self-efficacy for teaching a child whilst being observed, but not for teaching a child who is difficult to engage with. The first finding is consistent with what would be expected; those therapists who are more erudite in behavioural techniques and strategies are more likely to feel competent in the presence of other therapists or more technologically competent supervisory staff. It is surprising, however, that therapists' knowledge of behavioural principles is not predictive of perceived therapeutic self-efficacy in situations where a child is difficult to engage with; a situation that is likely to demand a solid understanding of behavioural technologies. The correlation between perceived self-efficacy in this domain and behavioural knowledge was positive but only approached statistical significance and was not therefore included in the subsequent regression analysis (see Table 10). This finding could be explored and confirmed or refuted with further research.

There are a number of implications related to the present findings. First, therapists' enactive experiences have been found to be associated with perceived therapeutic self-efficacy. There are several potential avenues related to this that could be explored in future research or practice. As supervisors select intervention targets for children, the practicalities involved in delivering the targets should also be considered. If therapists find intervention targets complex or challenging to deliver then perceived therapeutic self-efficacy, and

consequently child progress, could suffer. Future research could aim to explore the manner in which supervisors and consultancy staff select intervention targets and the extent to which they consider the ease and practicality of delivering techniques alongside effectiveness in the decision-making process. Finally, the results of the present study also suggest that general self-efficacy beliefs predicted perceived therapeutic self-efficacy in both domains, independent of the effects of all other variables. Thus, those therapists who have had more positive and successful experiences in a wide variety of areas of life are likely to have greater perceived therapeutic self-efficacy beliefs (cf. Sherer et al., 1982). Therapists' general self-efficacy beliefs may be important in sustaining perceived therapeutic self-efficacy during times when intervention delivery is particularly arduous. Screening therapists' general self-efficacy beliefs prior to working with children may give supervisors an idea of where to target subsequent support or training needs. The additional finding that general self-efficacy beliefs are associated with domain-specific beliefs of perceived therapeutic self-efficacy may have important theoretical implications. As detailed above, self-efficacy beliefs are considered to be derived from multiple sources of information. In comparison to the vast literature on perceived self-efficacy, exploration of general self-efficacy beliefs has been largely neglected. The data presented here suggest that general self-efficacy beliefs may be influential in moderating the effects of information that is used to generate and maintain domain-specific perceived self-efficacy beliefs. It may be that future research (not necessarily limited to the present context) including a measure of these beliefs reveals that general self-efficacy is important to consider alongside more 'traditional' sources in forming perceived self-efficacy beliefs.

Although the findings of the present study offer an insight into perceived therapeutic self-efficacy, it would be sensible to remember that the data presented here represent, to the authors' knowledge, the first large-scale survey involving therapists delivering home-based EIBI to young children with autism in the UK. Thus, the generalisability of the findings is unknown, and replication with different samples of therapists, both in the UK and abroad, would help to establish the extent to which they can be applied in practice. Future research using the measures developed in the present study could also employ confirmatory factor analytic procedures to determine the accuracy of dimensions

of perceived therapeutic self-efficacy. Other barriers to intervention delivery may also be identified that could be included in subsequent research studies. Despite this, our knowledge of perceived therapeutic self-efficacy has been expanded through the development of a measure of therapists' beliefs and further analysis of how they may be constructed. The question following this investigation surely relates to the nature of the influence of perceived therapeutic self-efficacy on therapists' delivery of home-based EIBI. It would be expected that perceived therapeutic self-efficacy beliefs would influence therapists' cognitions, emotions, motivation, and the choice of interventions they use, in addition to the quality of subsequent interactions with young children with autism (see section 2.6.1.2; cf. Bandura, 1989, 1997). The next step in exploring perceived therapeutic self-efficacy is to demonstrate the effects of therapists' beliefs on their interactions with children during sessions. The final chapter considers the directions that future research studies could take along with possible implications of these and subsequent findings.

CHAPTER SIX

Concluding Discussion

Chapter Summary

This final chapter summarises the background of the thesis and research that is presented herein. In addition, methodological issues, further research directions and potential theoretical and clinical implications of the findings are discussed.

Further research avenues that are suggested focus mainly on establishing the link between perceived therapeutic self-efficacy and procedural fidelity. Methods for investigating this link directly, or via theoretically important mediating factors, are considered. Constructive replication of the research presented in the current thesis is also discussed.

Theoretically, the present results expand our understanding of the mechanism of perceived therapeutic self-efficacy in relation to home-based EIBI for young children with autism. There are a number of possible reasons why the findings may differ from perceived self-efficacy theory more generally, and this is considered in relation to the context to which the theory is applied.

Finally, the clinical implications of the research are discussed. The present thesis suggests that a cognitive approach to working with therapists may be useful in increasing the efficacy of a behaviourally based intervention. In addition, the characteristics of therapists who participated in the current research are highlighted and compared to those in best outcome intervention models. Both of these points have implications for the role of supervisory and consultancy staff that devise home-based EIBI programmes for young children with autism.

Concluding Discussion

The literature review that opened this thesis recognised that home-based EIBI can be an effective option for young children with autism. Although research studies demonstrate the success of this intervention, more careful analysis of the data suggest that not all children benefit to the same extent from similar intervention protocols. It is possible that these inconsistent outcomes may stem from an insufficiently powerful behavioural technology, poor intervention integrity, and/or poor procedural fidelity, the latter of which was the focus of the present thesis. The research presented subsequently investigated perceived therapeutic self-efficacy beliefs as a factor influencing procedural fidelity in this context, in particular seeking to develop a valid and reliable measure of this construct and to explore how therapists' beliefs relate to theoretically important sources of self-efficacy. The first part of this final chapter presents a summary of the findings of this research. Following this, a discussion of the methodology employed in the thesis is presented. Finally, I consider the theoretical and clinical implications of these findings and provide suggestions for further avenues that could be explored in subsequent investigations in this area.

6.1 Summary of Main Findings

While perceived therapeutic self-efficacy was identified as a factor that may be important in governing therapists' delivery of home-based EIBI, it became apparent at the end of Chapter 2 that there was no valid measure of this therapist belief. As a precursor to developing such a measure, the interview study presented in Chapter 3 sought to identify facilitating factors and barriers that therapists considered to influence their capacity to deliver home-based EIBI to young children with autism. The barriers identified in this study could then be used in devising a measure of perceived therapeutic self-efficacy in the present context. Therapists working for a range of home-based EIBI service providers in the south of England were asked about their own experiences in relation to specific personal attributes, characteristics of the children with whom they were working, aspects of intervention sessions and instructional targets, components

of training and elements of continuous supervision. Therapists' responses were then analysed to detect common content across the range of therapists that were interviewed.

The results of this study identified a number of facilitating factors and barriers that therapists considered to impact on their ability to deliver home-based EIBI to young children with autism. In line with past studies in other staff groups and settings, therapists found that interventions were easier to deliver with more competent, likeable and compliant children with autism. Training in a variety of areas including skills instruction, behaviour management and the theoretical foundations of home-based EIBI also helped therapists in their work. In contrast, therapists identified that children who made slow progress during teaching and/or displayed challenging behaviour during sessions were likely to be significant barriers influencing their delivery of intervention programmes. Therapists also remarked that more complex procedures, and those requiring more resources, reduced their capacity to deliver interventions. In contrast with published reports of therapist performance, however, participants interviewed in the present research identified that being observed whilst working with children was a barrier that impeded their delivery of intervention targets. Although interesting and provocative in their own right, the results of the interview study provided the foundations for creating a measure of perceived therapeutic self-efficacy.

Following the identification of barriers to delivering home-based EIBI, the next stage in the research process was to develop a measure of perceived therapeutic self-efficacy based on therapists' responses. Chapter 4 described the process of converting the barriers identified in the interview study into items in a measure of perceived therapeutic self-efficacy. A large number of therapists from around the UK rated their perceived ability to teach a child with autism in relation to all of the barriers identified. Subsequent factor analysis of therapists' responses revealed two distinct, valid and reliable dimensions of perceived therapeutic self-efficacy. The first of these related to teaching a child that is difficult to engage with, and included items that focused on surmounting difficulties associated with disruptive, inattentive or aggressive child behaviour. Subsequent analysis revealed that those therapists who received more frequent supervision had weaker self-efficacy beliefs in this domain. The second

dimension related to teaching a child whilst being observed, and included items focusing on the effects of being observed by supervisory staff, parents or other therapists. No demographic or intervention-related variables were related to perceived therapeutic self-efficacy beliefs in this domain. Thus, the factors identified represent different aspects of the therapeutic experience and are largely consistent with self-efficacy theory in that the factors are, with one exception, unrelated to demographic or intervention-related characteristics of the sample.

Given the findings above, the investigation progressed to consider how therapists' perceptions of their own experiences of delivering home-based EIBI would determine their perceived therapeutic self-efficacy beliefs in this context; this is a position consistent with self-efficacy theory (cf. Bandura, 1997). Chapter 5 described a more focused analysis of how theoretically important sources of self-efficacy beliefs operated in the present context. The results of this study identified three sources of perceived therapeutic self-efficacy relating to therapists' perceptions of (i) their own experiences of working with children, (ii) supervision that they had received, and (iii) therapist colleagues that they had observed. These sources are similar to those found in the literature regarding more general teaching self-efficacy, and represent distinct dimensions that may influence perceived therapeutic self-efficacy.

Following this, further analysis revealed that perceived therapeutic self-efficacy beliefs for teaching a child who is difficult to engage with increase with more positive perceptions of therapists' own experiences, higher levels of general self-efficacy, and less frequent supervisory contact. In addition, there was also evidence to suggest that general self-efficacy beliefs act as a protective factor of perceived therapeutic self-efficacy in this domain when therapists experience difficulties delivering the intervention. Perceived therapeutic self-efficacy for teaching a child whilst being observed also increased with more positive perceptions of therapists' own experiences and increased knowledge of behavioural principles. Although it did not act as a protective factor in relation to this dimension, perceived therapeutic self-efficacy for teaching a child whilst being observed also increased with increasing general self-efficacy beliefs.

6.2 Methodological Critique of the Present Thesis

The previous section provided a summary of the findings of the present thesis. While this research contributes to our understanding of the delivery of home-based EIBI for young children with autism and, more specifically, perceived therapeutic self-efficacy, the results must be considered in the context of the strengths and limitations of the methods used. This section will discuss pertinent methodological issues relating to the studies presented in this thesis, starting with the interview study presented in Chapter 3.

6.2.1 Research Stage 1: Therapists' Perspectives on Achieving Procedural Fidelity

The aim of the first research stage was to identify facilitating factors and barriers that therapists considered to influence their capacity to deliver home-based EIBI to young children with autism. While the interview schedule developed for the purpose achieved this aim, it is useful to reflect on how the study could have been improved. Nineteen therapists in the south of England were recruited as participants, comparing favourably with similar published interview studies of staff working with people with intellectual disabilities (cf. Hastings, 1995). Therapists were recruited from a limited geographical area, however, and an increased number of participants may have highlighted issues that were not raised in the reported findings. Face-to-face interviewing is an intensive process that requires significant resources to complete successfully. Organisation of interviews and time spent travelling to therapists' homes restricted the total number of interviews that could be conducted by one researcher alone; the impact of these issues could be reduced in future research by conducting interviews over the telephone. While this would likely have decreased the resource-related implications, telephone interviews may have reduced the quality of the data obtained. An important part of the interview process is establishing and maintaining a rapport with the interviewee. This serves to help the interviewee feel at ease and is conducive to gathering quality data. This process is likely to be compromised if telephone interviews are used to collect therapists' opinions to the exclusion of other methods. Alternatively, additional interviewers could have been recruited to increase the amount of

information collected. While this strategy would also be likely to reduce the impact that interviewer bias had on the findings, it would have required additional resources to employ and train researchers; these resources were not available at the time of data collection.

A further issue relating to the first research stage was the style of interview used and the types of questions that were selected. A semi-structured interview was devised to help maintain a focus on issues considered pertinent to the research, whilst at the same time allowing a degree of flexibility to maintain rapport during the interview. This method of data collection relied on devising questions reflecting areas thought to impact the delivery of behaviourally-based intervention techniques. This process was conducted with my supervisory team and generated a large number of questions that were used during interviews. It is likely, however, that the resultant interview schedule represented the views of this group and did not include other issues that may have been relevant to therapists delivering EIBI in home-based settings. More general ‘scoping’ questions were included at the end of the interview to encourage participants to discuss issues that had not been raised and help safeguard against this scenario to some extent. A further point of consideration relates to the methods used to analyse interview transcripts. Content analysis was used to identify specific facilitating factors and barriers, but other methods of analysis could have yielded interesting findings. Rather than examining transcripts for statements relating to facilitating factors or barriers, for example, therapists’ responses could have been analysed using interpretive phenomenological analysis to appreciate the context that these issues resided in and what they actually meant to the therapist in question. Thus, while the methods used were successful in identifying facilitating factors and barriers relevant to the current context, the findings are by no means definitive and they should be considered in the light of these methodological issues.

6.2.2 Research Stage 2: Developing a Measure of Perceived Therapeutic Self-Efficacy

The study presented in Chapter 4 described the process of converting the barriers identified in the interview study into items in a measure of perceived therapeutic self-efficacy. Factor analysis was used to establish two dimensions of perceived therapeutic self-efficacy relevant to the present setting. While this process yielded some interesting findings regarding perceived therapeutic self-efficacy, it is important to consider aspects of the methodology used that may have had a bearing on the results. The methods used to construct the perceived therapeutic self-efficacy scale were drawn from guidelines presented by Bandura (2001). In defining the measure of perceived therapeutic self-efficacy, items included in the scale and subsequent factor analysis were identified from the previous study described in Chapter 3; this ensured that the scale would contain items that were directly relevant to therapists' experiences of delivering home-based EIBI to young children with autism. In addition to these items, therapists' experiences relating to teaching children who displayed challenging behaviour were expanded to include child aggression toward the therapist, child aggression toward others, and self-injurious behaviour. Therapists' experiences of being observed were also expanded to reflect this situation in the presence of other therapists, more senior staff, or children's parents. These items were expanded to investigate more subtle aspects of therapists' experiences, and it could be argued that other items could have been expanded in a similar manner. An issue related to expanding some items but not others may be seen in the findings presented in Chapter 4. While two distinct factors of perceived therapeutic self-efficacy were identified, the factor relating to teaching a child whilst being observed was almost exclusively made up of expanded items. This raises questions over whether this factor would have been extracted if only one item relating to being observed had been included. In addition, it may be that more factors would be extracted if all items had been expanded in some way. The factor structure identified must, therefore, be considered in relation to this and future research including an expanded list of items may reveal different aspects of perceived therapeutic self-efficacy.

Bandura's guidance regarding constructing perceived self-efficacy scales is worthy of discussion. It is suggested that barriers to specified goals (i.e.

teaching young children with autism) are presented with a response scale ranging from 'Cannot do at all' to 'Certain can do' (see Section 4.2.2.1). While this format relates to self-efficacy at a theoretical level, it is possible that it encourages a response bias. If items relating to facilitating factors were also included in the scale, it is possible that therapists would take more time reading each item and answer more accurately. A therapist may consider himself or herself more confident in being able to teach a child if the child were perceived as likeable (facilitating factor), for example, than if they were teaching a child who appeared to be making little progress (barrier). This should be reflected in the scores given to each item and would reduce any response bias prompted by uni-directional items.

A further issue relating to the development of the perceived therapeutic self-efficacy scale relates to the instructions for completing the scale. Bandura (2001) suggests that the instructions should ask respondents to rate how confident they are that they can overcome the barriers listed. The inclusion of the term 'confidence' in the scale instructions, however, represents an inconsistency in Bandura's writings. Prior to setting out guidelines for developing such scales, Bandura considered the relationship between confidence and self-efficacy, such that the former describes a strength of belief with no indication of what the belief is based on, whereas the latter describes a more specific internal attribution concerning a person's ability to do what is necessary to overcome barriers to successful attainment (Bandura, 1997). Thus, it is possible to state that one is confident that they will succeed or fail in a given activity, whereas a self-efficacy belief would be based on an internal attribution regarding personal ability to overcome barriers to failing the same activity. It may be that the word 'confidence' is used in perceived self-efficacy scales to facilitate ease of use with respondents who may not be familiar with the term 'self-efficacy', but this technique would not guarantee that individuals are considering what they would do to overcome difficult situations. Examination of individual scale items highlights this issue. Rating one's confidence in being able to teach a child who displays aggression, for example, does not specify what the therapist thinks they could do to overcome this barrier. Different therapists may take different courses of action in such situations including using risk-reduction techniques, reinforcing functionally equivalent but more socially appropriate behaviour, or seeking and

acting on advice from a more experienced colleague or supervisor. In using the word 'confidence' to avoid technical terminology, it is possible that the perceived therapeutic self-efficacy scale devised is not exploring exactly what respondents consider they have to do to and their own ability to overcome barriers to successful teaching. Asking therapists about the actions they would take in such situations and their perceived ability to execute these actions may provide a more accurate account of perceived therapeutic self-efficacy in the present context.

A final area to consider regarding the development of a measure of perceived therapeutic self-efficacy relates to the sample size used in the study. While the factor-analytic procedure employed was useful in identifying specific dimensions of perceived therapeutic self-efficacy, the number of participants who responded may impact on the generalisability of the findings beyond the current data set. The therapist-to-item ratio used in the analysis was 5:1. While this was acceptable, the ratio was very much at the low end of what would be considered appropriate for use with factor-analytic techniques (Floyd & Widaman, 1995; Hair, Anderson, Tatham, & Black, 1995). It has been suggested that factor analysis should normally be used on samples greater than 100; this was not possible given the number of therapists who responded to the questionnaire. Future studies could recruit a larger sample of therapists to complete the questionnaire. This would help to establish if the factor structure derived in the present thesis is applicable across samples or is only applicable to the sample recruited.

6.2.3 Research Stage 3: Exploring Perceived Therapeutic Self-Efficacy

The study presented in Chapter 5 explored predictors of perceived therapeutic self-efficacy. Items comprising a measure of sources of perceived therapeutic self-efficacy were generated from the literature, and factor analysis revealed three sources of perceived therapeutic self-efficacy relevant to the present setting. These were included alongside general self-efficacy, supervision frequency and knowledge of behavioural principles in regression models exploring predictors of perceived therapeutic self-efficacy and associated moderating relationships. While the findings helped develop an understanding of perceived therapeutic self-efficacy in home-based early intensive behavioural

intervention for young children with autism, it is important to consider aspects of the methodology used that may have had a bearing on the results. Issues relating to the process of developing the sources of perceived therapeutic self-efficacy scales and subsequent regression analyses will be considered in turn.

Items comprising the measure of sources of perceived therapeutic self-efficacy were derived from the theoretical literature. These items were relevant to delivering home-based EIBI to young children with autism and covered therapists' perceptions of their own enactive, vicarious, supervisory and physiological/emotional experiences during sessions. Three items were devised for each theoretical source of perceived therapeutic self-efficacy. It nevertheless remains possible that this number of items would not capture all of the pertinent issues, so it may have been useful to develop more items representing different aspects of therapists' experiences relevant to the development and maintenance of perceived therapeutic self-efficacy beliefs. An alternative approach considered in the planning of this part of the research was to use more formal measures of sources of perceived therapeutic self-efficacy. The Maslach Burnout Inventory (MBI; Maslach, Jackson & Leiter, 1996), for example, may have been useful in eliciting therapists' perceptions of their physiological and emotional reactions during teaching sessions. This measure is commonly used in healthcare research investigating staff stress, emotional exhaustion and feelings of depersonalisation in relation to service-users, and may have been particularly useful given that burnout is considered a risk factor for negative work-related attitudes (Barnett, Brennan & Gareis, 1999). Financial and practical restrictions ultimately deterred the use of such measures in the present research, given that over 270 questionnaires were distributed and each MBI takes approximately 10 to 15 minutes to complete. In designing research, a balance must be struck between what is considered for inclusion in a study and the type and level of demands placed on participants. A possible solution may be to start by exploring each of the sources of perceived therapeutic self-efficacy in more detail, and then follow up these findings with more a more comprehensive exploration of predictors of therapists' beliefs.

As considered above in Section 6.2.2, the number of participants included in the factor analysis of sources of perceived therapeutic self-efficacy may have a bearing on the applicability of the findings beyond the current data set. The

resultant factors that were identified are also worthy of discussion. The fact that only a relatively small number of items were included in the sources of perceived therapeutic self-efficacy scale limited the number of items that could be included in the derived factors. Two of the factors identified were composed of items relating specifically to vicarious experiences and verbal persuasion. The remaining factor, labelled 'enactive experience', contained items relating to therapists' perceptions of difficulty and stress experienced while delivering home-based EIBI. While these experiences of teaching children may be closely linked (see Section 5.4), it is possible that the factor label chosen may not accurately reflect the items that the factor comprises. Deciding on a label for a factor is a process that the researcher actively engages in. Descriptive labels must be meaningful and represent the items included in the factor as much as possible. A commonly used technique is to identify the item with the highest factor loading and assign a descriptive label accordingly (Hair et al., 1995). The item with the highest loading regarding this source factor was 'How difficult have you found it to deliver intervention programmes?'; the factor loading was .892 and the item related to therapists' enactive experiences. The next highest factor loading was only marginally lower at .878, being 'How stressed (tense, anxious) do you feel whilst delivering intervention programmes?' The remaining item in this factor was also devised to give an indication of therapists' perceptions of the stress experienced during intervention sessions. Given the balance of items included in this factor, an alternative descriptive label might be 'difficulty and stress experienced'.

Following the development of a measure of sources of perceived therapeutic self-efficacy, regression models were used to explore predictors of perceived therapeutic self-efficacy. These regression models included multiple independent predictor variables and interaction terms exploring the moderating effect of therapists' general self-efficacy beliefs on sources of perceived therapeutic self-efficacy. All independent predictor variables and interaction terms were input simultaneously into regression models; this allowed the independent contribution of each variable to be examined in each model. An alternative approach that may have been useful would have been to input predictor variables into the model in a hierarchical fashion. In a hierarchical regression the researcher specifies the predictor variables that are to be entered

into the model based on theoretical reasoning. Subsequent predictor variables can then be entered into the model to establish the predictive value that these have over and above the theoretically important variables previously entered (Field, 2000). Theoretically important predictor variables relevant to the current research include sources of perceived therapeutic self-efficacy. These could have been entered into the regression model initially, and their predictive value explored. Following this, general self-efficacy, supervision frequency, knowledge of behavioural principles and relevant interaction terms could have been entered simultaneously or in a stepwise approach to establish the extent to which they added to the predictive utility of the sources of perceived therapeutic self-efficacy. While the simultaneous regression methods used in the present thesis demonstrate the independent predictive value of all variables included in the analysis, hierarchical models may have established whether the additional predictor variables explained more of the variance in perceived therapeutic self-efficacy than the sources of perceived therapeutic self-efficacy alone.

A final point to consider relates to the power of the multiple regression models presented in Chapter 5. The power, or probability that a statistically significant value of R^2 would be detected if it existed in the population, was very high for both of the regression models presented. This means that, given the number of participants and predictor variables involved, it is likely the effect observed is present in the population of therapists from which the sample was drawn. This finding, however, only applies to the regression model as a whole. The models presented include a number of product terms representing the interaction between therapists' general self-efficacy beliefs and sources of perceived therapeutic self-efficacy. Even when independent predictor variables are measured with minimal or no error, there is an increased likelihood that the power of a statistical test of an interaction term will be low. This is because the product term of two normally distributed predictor variables is not normally distributed, thus violating an assumption of statistical power analysis (Aiken & West, 1991). To increase the power of a statistical test of interactions in multiple regression models, a larger sample size would be necessary to detect an effect that actually exists in the population the sample was drawn from. When measurement error is taken into consideration, the number of participants required to achieve acceptable statistical power increases considerably. While the

regression models presented in Chapter 5 demonstrate an effect that is likely to be observed in the population of therapists that the sample was drawn from, care must be taken in accepting and interpreting the moderating effect of general self-efficacy beliefs on the relationship between enactive experiences of home-based EIBI and perceived therapeutic self-efficacy for teaching a child who is difficult to engage with.

6.3 Implications of the Findings and Suggestions for Future Research

The final aim of this final chapter is to consider the theoretical and clinical implications of the results, as well as providing suggestions for future research. The present section discusses possible extensions of the research presented in the previous chapters beyond those considered above in Section 6.2. This section also evaluates the implications of the findings in relation to self-efficacy theory and working clinically with therapists who deliver home-based EIBI to young children with autism.

6.3.1 Future Research

6.3.1.1 Linking Perceived Therapeutic Self-Efficacy to Therapists' Performance

There are a number of potential avenues that could be explored through further research. The first and most logical step is to establish the link between perceived therapeutic self-efficacy beliefs and therapist performance in the present context. As perceived therapeutic self-efficacy is considered crucial to effective performance, several methods could be used to investigate the extent to which therapists' beliefs predict their own behaviour. Self-report measures of therapists' own performance could be correlated with perceived therapeutic self-efficacy ratings to establish if beliefs are associated with actual behaviour. In a similar vein, therapists could rate their perceived therapeutic self-efficacy beliefs prior to being observed whilst working with young children with autism. Independent ratings of therapists' delivery of intervention targets could then be correlated with therapists' beliefs. Alternatively, a more powerful quasi-experimental design might require therapists to first rate their perceived therapeutic self-efficacy beliefs; therapists could then be placed into a group

corresponding to either those with high or low perceived therapeutic self-efficacy beliefs. Therapists' delivery of interventions could then be observed and rated, with subsequent between-groups analysis revealing if there is any difference in the performance levels of therapists with differing perceived self-efficacy beliefs. A final design might see therapists randomly assigned to one of two groups. After checking that therapists perceived therapeutic self-efficacy beliefs and performance abilities are similar across groups, one group could receive an intervention designed to increase these beliefs; subsequent analysis would determine if perceived therapeutic self-efficacy beliefs influence behaviour if the therapists who have received the intervention perform better than those in the control group.

There are a number of methodological issues that must be overcome in all of the designs presented above. One important issue relates to the measurement of therapists' behaviour whilst delivering home-based EIBI to young children with autism. The obvious difficulties connected with self-report measures of performance are compounded by the numerous problems associated with observational measures of therapist performance. As highlighted in Chapter 2, these include questionable predictive validity, complex and cumbersome observation schedules, and the possibility that therapist behaviour could be reactive to the observational process. The results of such studies would need to be considered in the light of such issues, or alternative methods of measuring therapist behaviour could be devised that address the problems inherent in current observation schedules.

A further methodological consideration relates to the characteristics of children with autism. Rather ironically, one of the most consistent characteristics of young children with autism is that they are all individuals and act accordingly; as such they represent a potential confound in any research involving rating the performance of therapists delivering home-based EIBI. One potential solution to this problem may be to study a group of therapists working with a single child. This would mirror the scenario usually observed in the everyday practice of delivering home-based EIBI, but places limits on the number of therapists that could be studied with a single child. A more novel solution might be to use a 'standard' child with autism. Advances in computer-simulation tools have proved useful in studying aspects of staff interaction with people with intellectual

disabilities and challenging behaviour (Hastings, Remington, & Hall, 1995; Remington, Hastings, Hall, Bizo, & Brown, 2000). These simulations have a number of potential uses. If used during training, staff can learn how to implement instructional techniques or be made aware of the role that their own behaviour has on people who may be in their care. A recent development of this application, namely DTkid, has successfully demonstrated that experimentally-naïve university students can be trained to deliver discrete-trial based interventions to a simulated child with autism (Randell, Hall, Remington, & Bizo, 2005). In addition to this training role, it is possible that such a simulation may also be useful in research settings to explore factors that may be important in governing therapist behaviour. Tools such as DTkid could be embedded in the latter designs outlined above to provide a way of investigating the link between perceived therapeutic self-efficacy and delivery of home-based EIBI techniques. While computer software is always likely to have limited ecological validity and a restricted capacity to replicate all aspects of a given environment, simulations may prove to be a useful tool in examining the role and development of perceived therapeutic self-efficacy; this could be a useful avenue to explore in future research.

6.3.1.2 Mediators Between Perceived Therapeutic Self-Efficacy and Performance

Up to this point, the relationship between perceived therapeutic self-efficacy and therapist behaviour has been considered a direct one. As emphasised in Chapter 2, however, theoretical writings identify a number of mediating factors between perceived self-efficacy and behaviour. Thus, perceived self-efficacy beliefs are considered to influence how people think, feel, motivate themselves, and behave (Bandura, 1989, 1997). A more sophisticated analysis could incorporate these factors in an analysis of perceived therapeutic self-efficacy and therapists' behaviour, and examine how these beliefs influence the teaching activities that therapists' select during sessions, the effort and persistence applied in delivering these activities, the cognitive processes that are necessary to deliver the activities and overcome problems, and therapists' emotional reactions (cf. Cervone & Scott, 1995). Thus, a possible direction for further research might be to investigate the choices that therapists make during sessions and the activities that are selected dependent on self-efficacy beliefs. If

one were to extrapolate from the theoretical basis of self-efficacy, therapists' may believe, for example, that they experience difficulties when working with children whilst they are being observed. They may as a consequence choose to engage with the observer rather than the child or focus on less demanding instructional activities. Observational studies might consider therapists' patterns of activities rather than instructional performance per se in relation to perceived therapeutic self-efficacy; i.e. how do therapists' beliefs regarding their own competence affect how they spend their time during instructional sessions? An equally plausible research direction may be to consider how therapists' emotional reactions are influenced by perceived therapeutic self-efficacy. Self-efficacy theory would predict that therapists would be likely to experience emotional distress if they believed they could not cope with challenging scenarios. An extension of the research presented in previous chapters could incorporate self-report measures of emotional distress, ranging from general measures such as the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983) to more specific measures akin to those used in the intellectual disability literature (e.g. Mitchell & Hastings, 1998). Finally, vignettes could be used that depict various situations that a therapist might encounter whilst working with a young child with autism. Therapists could rate their perceived therapeutic self-efficacy and then complete measures that tap into the problem-solving strategies they use, how they would feel in that situation, and what activities they would choose to engage in with the child. These strategies could help to broaden our understanding of perceived therapeutic self-efficacy in the present context.

6.3.1.3 Replication of Research Presented in the Current Thesis

Another research direction would be to usefully replicate the interview and survey studies presented in this thesis with other samples of therapists both in the UK and internationally; this would help to establish the generality of the findings portrayed in the present thesis. There are a number of other reasons why full or partial replication of the present research would be valuable. First, replication of the questionnaire presented in Chapters 4 and 5 would help to establish the validity of the factors of perceived therapeutic self-efficacy and sources of perceived therapeutic self-efficacy (see sections 4.3.1 and 5.3.1). The exploratory factor analysis techniques used in these studies were useful in

bringing structure to a set of questionnaire items. Subsequent replications could employ confirmatory factor analysis techniques to test the hypothesis that the factor structure is accurate across comparable samples of therapists, thus ensuring that the factors are robust and not due to random variability present in the collected data. Using this technique the analyst approaches the data with a specific factor structure in mind, with the subsequent aim of establishing the similarity between the observed and predicted correlation matrices. Items that are considered not to load on to a factor are set a priori at zero. The resulting confirmatory factor structure thus incorporates the findings from the exploratory analysis and helps to clarify the generalisability of the latent variables (Everitt, 1996; Hair et al., 1995; Howitt & Cramer, 1997).

Second, the findings of the interview study presented in Chapter 3 relate specifically to discrete-trial instructional techniques. As this method of teaching is widely used in home-based EIBI the findings presented have substantial relevance to the vast majority of therapists working with young children with autism. It must be noted, however, that other instructional techniques are becoming increasingly popular despite the lack of published evidence for their effectiveness. Future interview studies could examine if therapists who deliver 'natural environment training' (see section 2.2), for example, identify substantially different facilitating factors and barriers to delivering interventions, or could even explore if therapists who deliver both styles of intervention perceive any differences in the ease of their use.

Finally, the interview and subsequent questionnaire studies could be replicated with parents or other family members of young children with autism engaged in home-based EIBI. Families are often encouraged to actively participate in delivering the intervention to their young child in order to promote generalisation and maximise exposure to effective behavioural techniques. Given that families can be highly involved, it would be useful to increase our understanding of how family members perceive their own capabilities to deliver instructional techniques. Although there is likely to be some correspondence between the facilitating factors and barriers identified by therapists and family members, it would be expected that there will also be discrepancies given the differing roles, responsibilities and pressures on family members and paid therapists working with young children with autism (cf. Allen, 1999). It is also

likely that parents and family members will have experienced working solely with their own child with autism, as opposed to the numerous children that paid therapists work with, and it would be interesting to explore how this influences family members' perceptions of delivering instructional techniques.

Although replication of the present studies would be useful, it is worthwhile considering some pragmatic issues. Although the sample sizes in the present studies were adequate for the analyses presented, a larger number of participants would have been desirable. While the present samples provided important comparison data for future research conducted with therapist delivering home-based EIBI to young children with autism, the lack of a large, accurate, and reliable national database of therapists working in this context limits the scale of any study involving this population. It is possible that research focusing on therapists who delivering home-based EIBI could be organised in conjunction with service providers, but this may also present problems. Anecdotally, it became apparent during data collection that some home-based EIBI service providers were reluctant to allow members of staff to be approached. Perhaps one message to be emphasised is that the research agenda regarding home-based EIBI needs to be expanded to investigate wider aspects of intervention delivery, and service providers will be crucial in realising this aim. Some researchers have already begun to broaden the horizons of home-based EIBI enquiry, and more work in this area should be encouraged (e.g. Dillenburger, Keenan, Gallagher, & McElhinney, 2004; Hastings & Johnson, 2001; Johnson & Hastings, 2002). The outcomes of children receiving this form of intervention depend as much on the understanding of systems as on the development of powerful behaviourally based intervention techniques.

6.3.2 Theoretical Implications

The content of this thesis has been set against the backdrop of perceived self-efficacy theory. As presented in Section 2.6.1, perceived self-efficacy theory postulates that one's beliefs in being able to achieve a given performance target are formed from perceptions of enactive experiences, vicarious experiences, verbal persuasion, and an awareness of one's own physiological and emotional condition. Perceived self-efficacy beliefs are then considered to influence behaviour through cognitive, motivational, affective and behavioural selection

processes (Bandura, 1997). The present thesis considered the first part of this model, namely the structure of perceived therapeutic self-efficacy in the present context and exploration of the predictors of such beliefs. The findings of the current research are summarised below in Figure 11.

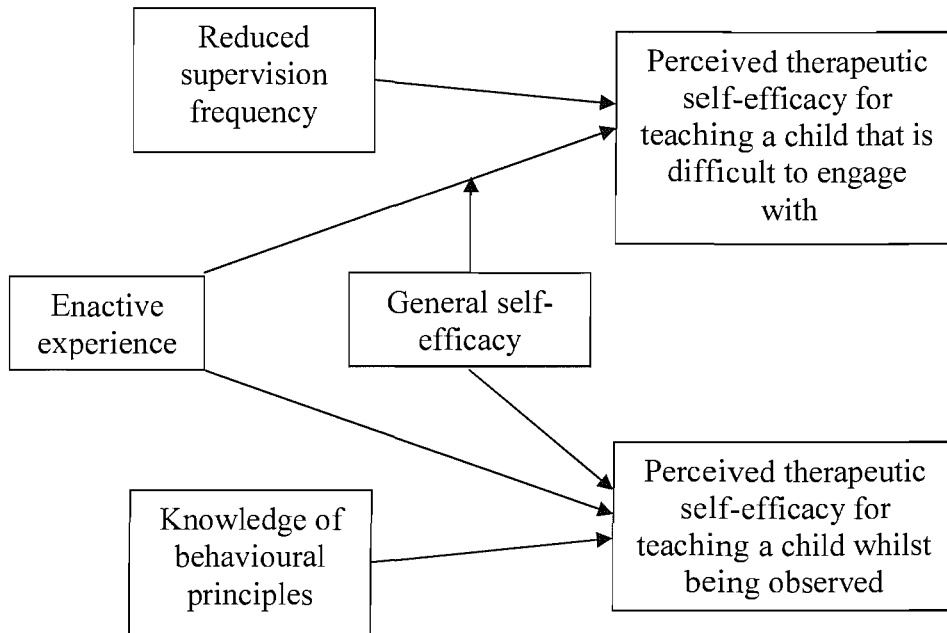


Figure 11: Graphical representation of the mechanism of perceived therapeutic self-efficacy as found in the present research.

The findings presented in this thesis clearly deviate to some degree from perceived self-efficacy theory. The reader would be advised, however, to keep in mind the methodological limitations presented in Section 6.2 when considering the following discussion. While therapists' perceptions of their own personal experiences were found to predict perceived therapeutic self-efficacy beliefs, verbal persuasion and vicarious experiences were not. Therapists' general self-efficacy beliefs were also found to have a role in predicting specific beliefs about delivering home-based EIBI, as were therapists' knowledge of behavioural principles. Finally, perceived therapeutic self-efficacy beliefs were also negatively predicted by supervision frequency. The utility of these findings will depend to a large extent on the validity of the proposed model; this is something that can be established using structural equation modelling (SEM; Everitt, 1996; Hox & Bechger, 1998). SEM is a multi-stage process that uses a group of

techniques to test the robustness of a model in relation to a novel data set. In the first stage confirmatory factor analysis procedures are implemented to validate the measurement tools that are being used, as suggested in section 6.3.1.3. Next, a path diagram is specified that describes the relationship between variables in the proposed model, and a regression model is constructed using the novel data set. Finally, a chi-square test is used to determine if the relationships predicted by the model correspond to those observed in the data. Using SEM it will be possible to establish the suitability of the model presented in Figure 11, or make revisions as necessary in relation to the original self-efficacy theory.

The theoretical deviations found in the present research may, however, be expected given the working environment of home-based EIBI. As discussed in Chapter 5, vicarious experiences might not be a significant predictor of perceived therapeutic self-efficacy owing to a lack of suitable opportunities to observe other therapists. Similarly, verbal persuasion might not be a significant predictor of perceived therapeutic self-efficacy due to the relative infrequency of supervisory contact and the possible lack of credibility of less experienced or qualified supervisory staff. The present findings do not, however, rule out the possibility that these sources of self-efficacy beliefs may be more influential in other contexts. Intensive behaviour analytic interventions such as those that provide the context for the current thesis are also delivered in environments other than the home. The increased number of staff present in settings such as school- or centre-based EIBI programmes, for example, are likely to provide more regular opportunities for observation of colleagues and an increased frequency of supervisory contact (e.g. Eikeseth, Smith, Jahr & Eldevik, 2002; Fenske, Zalenski, Krantz & McClannahan, 1985; Harris, Handleman, Gordon, Kristoff & Fuentes, 1991). Further research with therapists working in more 'social' contexts may find that vicarious experiences and verbal persuasion act as significant predictors of perceived therapeutic self-efficacy. Coupled with the finding that supervision frequency and knowledge of behavioural principles are significant predictors of therapists' beliefs, perhaps clinicians and researchers more generally should consider that the utility of elements of perceived self-efficacy theory may be limited by the context to which they are applied.

6.3.3 Clinical Implications

In addition to the theoretical implications and directions for possible future research presented above, there are also some clinical implications of the present thesis. These include integrating cognitive and behavioural interventions in home-based EIBI, and increasing general awareness of the characteristics of therapists routinely delivering this style of intervention in the UK as opposed to those working in outcome studies reported in peer-reviewed journals.

6.3.3.1 Cognitive and Behavioural Aspects of Home-Based EIBI

Home-based EIBI for young children with autism is based on the principles and techniques of applied behavioural analysis, and in particular, operant learning theory. As such, this style of intervention focuses on the behaviours that children with autism display, rather than autism as a construct. The large number of hours of intervention that are required to achieve reliable behavioural change are justified with the assertion that all people learn from their environments all of the time. Challenging behaviours are tackled through functional assessment, and alternative behaviours that are easier to perform but fulfil the same function are introduced and reinforced. Behaviourally based techniques such as discrimination training, including imitation and matching-to-sample, are used to develop children's self-help, academic, social and communication skills throughout the course of home-based EIBI. All in all, a behavioural approach to intervention that emphasises the importance of adapting the environment to the child has been shown to be highly effective in improving the lives of young children with autism (Lovaas, 2003).

While there is substantial evidence to support the behavioural component of home-based EIBI in relation to intervening with young children with autism, other aspects of intervention delivery may benefit from other approaches. Given the protracted and demanding nature of home-based EIBI, the approach taken in the present thesis has been to consider factors that may be relevant in affecting the outcomes of such an intervention. More specifically, the research presented has focused specifically on how therapists' beliefs in their own ability to deliver the intervention might impact on how they work with young children with autism. Thus, the behavioural approach to working with children has been considered alongside a cognitive approach to understanding the actions of

therapists' working in this context. This is quite a novel approach to take in the home-based EIBI arena, but has parallels in the literature relating to carers of people with intellectual disabilities who display challenging behaviour.

The effects of amalgamating a socially valid and effective behaviourally based intervention (positive programming; La Vigna & Donnellan, 1986) with a cognitive approach to understanding the actions of care staff has been considered by Kushlick, Trower & Dagnan (1997). Kushlick et al. recognised the impact that carers attitudes and beliefs could have on their responses to the challenging behaviour of people with intellectual disabilities. Drawing from the cognitive psychotherapy literature, they describe how working with carers to facilitate an understanding of the role their own thoughts may have in affecting their actions can influence carers' abilities to maintain a high quality of life for people with intellectual disabilities. Rather than stoically maintaining the view that challenging behaviour is intentional, for example, carers may be introduced to alternative ways of thinking that may be more plausible and be supported by more evidence. This in turn is likely to help carers to feel less emotionally distressed and nurture more positive and habilitative responses to people who present with challenging behaviour. Given the characteristics of children who present with an autism spectrum disorder, it will be important to consider how therapists' beliefs concerning the general lack of social communication and restricted interests that may be apparent in children, in addition to any challenging behaviour, influence their emotional and behavioural responses. The present thesis has, however, made the move away from considering staff members' beliefs regarding characteristics of clients in general to more specific beliefs associated with delivering interventions and maintaining procedural fidelity. Both approaches are likely to be useful, especially in those contexts where prescriptive interventions are provided for individuals with complex needs over extended periods of time.

It would be expected that integrating a cognitive approach to understanding therapists' delivery of a behavioural intervention would have a number of benefits. Although the subject of future research, given the theoretical basis of perceived self-efficacy one could anticipate that procedural fidelity might increase if supervisors and consultants acted to increase perceived therapeutic self-efficacy beliefs. The logical consequence of this would be to

reduce the effects of variable procedural fidelity on child outcomes, and potentially improve the prospects for young children with autism. In addition, it is also possible that therapists' may benefit from reduced emotional distress and be more effective agents of behavioural change for children receiving home-based EIBI. Such considerable advantages for both children and therapists depend, however, on supervisory and consultancy staff having adequate skills to work with people outside of the area of assessing and implementing specific behavioural technologies relevant to young children with autism. It should be kept in mind that, while there are a substantial number of hard-working and technically proficient supervisors and behavioural consultants, there is no guarantee that they possess a sufficient degree of relevant managerial skills to aid the development of therapists' perceived therapeutic self-efficacy. This is a recognised scenario in the management literature. Having highly developed trades- or sports-skills, for example, is not sufficient to assure management potential; a point exemplified by sportsmen such as Ian Rush and Alain Prost, who were successful as 'players' but foundered as football- and motor racing-managers respectively. There are a wide variety of skills associated with management and supervision, including developing effective (i) personal skills such as self-awareness, managing ones' own stress, and being able to solve problems creatively; (ii) interpersonal skills, for example having a supportive communication style, gaining respect and influence from supervisees, motivating those who work for you, and managing conflicts as and when they arise; and (iii) group skills including empowering people, delegating fairly and efficiently, and building effective teams (Whetton & Cameron, 1998). If the implications of this thesis are to be fulfilled, more attention should be directed to ensuring that supervisory staff, behavioural consultants and other clinical staff are trained in realising the potential of the therapists' under their remit.

6.3.3.2 Characteristics of Therapists Delivering Home-Based EIBI

Although not an explicit aim of the present thesis, the research conducted herein provides useful demographic data concerning therapists who deliver home-based EIBI to young children with autism in the UK. There is a basic lack of data concerning who therapists actually are, what education they have, and how experienced they are in working with young children with autism. This was

exemplified through needing to gauge the representativeness of the samples used in the present research in comparison to the opinions of experienced and respected international behaviour analysts, rather than specific databases or past research studies (see section 3.2.1, for example). In summary, all of the therapists who participated in the studies presented here were unrelated to the families of the young children with autism that they worked with, and represent the majority of people who deliver interventions in this context. The average age of therapists was in the mid-twenties to early-thirties, although the age range of participants spanned from 19 to 60 years. The vast majority of therapists were single females who did not have any children of their own. Between a half and two-thirds of therapists had a Bachelors degree or higher level of education. Most therapists who took part in the present research worked on a part-time basis with one child with autism. The only real discrepancy between the samples of therapists in the individual research studies was in the length of time they had delivered home-based EIBI, ranging from just over a year to three years experience on average.

In addition to giving clinicians and researchers an idea of who delivers routine home-based EIBI in the UK, the information is also useful in helping to establish the concordance of application with those outcome studies reported in peer-reviewed journals (e.g. Lovaas, 1987). Outcome studies and related literature are quite vague in describing who therapists actually are, but a common theme is that they are usually drawn from local schools, colleges or universities, family members and friends (Lovaas, 2003). As this thesis suggests, little is known at present about how the characteristics of therapists influence intervention delivery. Assessing therapists' commitment to long-term intervention is likely to be important, as is understanding the implications of therapists' previous experience and education on performance. Additionally, some therapists may have children of their own, and it remains to be seen if their own parenting experiences influence their interactions with young children with autism receiving specific intervention services.

A recent survey of the characteristics of home-based EIBI programmes for young children in the UK found that only 21% of parent-directed interventions were supervised by those with sufficient qualifications to oversee interventions based on the UCLA model (Mudford, Martin, Eikeseth & Bibby, 2001). Although the implications of these findings are not precisely understood,

the authors of this report suggest that, given the high degree of expectation parents have about the success of intervention programmes, they should be informed if, through practical constraints or otherwise, aspects of home-based EIBI do not meet the standards of those found in published outcome studies. As direct agents of behavioural change, perhaps this recommendation should be extended to include the therapists who work with children on a day-to-day basis. If therapists are not at the standard that would be expected in peer-reviewed studies, perhaps parents should be advised of the possible implications for child progress to maintain transparency throughout the service. As well as addressing parents' expectations regarding outcomes, it is also likely that highlighting such disparities would motivate supervisors and consultants to improve the training and supervision that therapists receive.

6.4 Conclusion

I would like to conclude this thesis by highlighted three specific issues that may be important in improving the outcomes of young children with autism receiving home-based EIBI. First, studies investigating home-based EIBI provision should aim to monitor procedural fidelity on a regular basis. Despite space restrictions in peer-reviewed journals, the importance of documenting procedural fidelity should not be underestimated. Second, where procedural fidelity is found to be poor, further research should help to highlight factors that may be responsible. In identifying the potential future research stages presented above, it is clear that there is much work to be done within this arena. As therapists are the people who turn behaviour analysts' intentions into reality, it is important that efforts are made to understand them and support the work that they do. Last, the research agenda regarding home-based EIBI should be expanded to consider a wider range of factors that could contribute to child outcomes. Other researchers are encouraged to explore these avenues to develop our understanding of the delivery of home-based EIBI for young children with autism. The current thesis presents a picture of a changing situation in intervention for young children with autism, and perceived therapeutic self-efficacy has been used as a vehicle in the present context to explore factors that could contribute to intervention efficacy. It is likely that 'widening the net'

would be a useful strategy to consider in relation to improving the outcomes of any clinical intervention as its methods and procedures develop over time. As Allen and Warzak (2000) state in the title of their assessment of parental adherence to behavioural interventions: “Effective treatment is not enough”.

APPENDIX ONE

Interview Schedule Investigating Facilitating Factors and Barriers to the Delivery of Home-Based EIBI for Young Children with Autism

Pre-interview

1. Give a brief description of who I am and the experience I have had working as a therapist on home-based EIBI programmes for young children with autism.
2. Give the interviewee information regarding the interview, letting them know that it will last approximately one hour.
3. Obtain written consent from the interviewee, checking they are aware of their right to withdraw or withhold answers to any questions.
4. Stress the confidential nature of the interview and the responses they give, especially with respect to the families they work for.
5. Obtain consent to tape-record the interview.
6. Remind the interviewee that all of the questions, unless otherwise stated, are relating to working with young children with autism.

Interview

Section A: Warm-Up and Background Information

Are you enjoying being a therapist?

Are you planning to continue delivering home-based EIBI for the future?

A few questions about before you were a therapist: -

1. Why did you start working with young children with autism?
2. How did you find out about becoming a therapist?
3. Did you have any other experience of working with children before working as a therapist?

A few questions about your work now: -

4. How many years have you been a therapist working with young children with autism in home-based EIBI programmes?
5. How many children do you work with at present?
6. How many children have you worked with in total?
7. How many hours each week do you work as a therapist?

A few questions about yourself: -

8. How would you describe yourself?
9. How do you think others would describe you?

Section B: Home-Based Early Intensive Behavioural Intervention

1. What is your overall impression of home-based EIBI?
2. What is involved in home-based EIBI?
 - a. Goals?
 - b. Setting?
 - c. Duration?
 - d. Intensity?
 - e. Methods/Procedures used?
3. What would you say are the main features of applied behavioural analysis?
4. What determines the order of events in a session?
 - a. Are there any times that you deviate from this? –Why?
5. Is there anything that makes instructional targets easier for you to do?
6. Is there anything that makes instructional targets harder for you to do?
7. Are there any instructional targets you would prefer to avoid doing? – Why?
8. Do you think the overall structure of home-based EIBI programmes makes your work as a therapist easier or more difficult? – Why?

C. Initial training: -

1. (Ask only if there was a specific response to A3) Thinking back to before you became a therapist with young children with autism, what training did you receive whilst you were... (relate to response of A3)?
 - a. What were you taught?
 - b. Who gave the training?
2. What training did you receive before you worked alone with a child with autism for the first time?
 - a. What were you taught?
 - b. Who gave the training?
3. What parts of the training you received do you think were particularly helpful to you?
4. Is there anything about the training you received that you did not find helpful, or could have been improved?
5. In retrospect, is there any other training that you would have liked to have had?
6. How important do you think that your initial training is to your performance now?
7. How important do you think initial training is to the success of home-based EIBI programmes?

D. Ongoing supervision: -

1. What do you think is the role of the supervisor in home-based EIBI?
2. Can you tell me about the supervision you receive for the/each child you work with?
 - a. Which organisation provides the supervision?
 - b. How often do you receive supervision?
 - c. How long does the supervision session last?
 - d. What is involved in the supervision session?
 - e. Who is present at the supervision session?
3. How has/have your supervisor/s been involved in the programme?
4. How do you think that your supervision has influenced your own performance?
 - a. Has it enhanced your performance? In what ways?
 - b. Has it had a detrimental effect on your performance? In what ways?
5. Is there any additional supervision that you feel you need?
6. Overall, how important do you think supervision is in determining the success of home-based EIBI programmes?

E. Child: -

1. What do you consider to be the key features of autism?
2. Do these features apply to the child/children you work with? – If not, why are they different?
3. Why do you think that home-based EIBI might be especially helpful for children with autism?
4. What things about a child do you think help you to teach them?
5. What things about a child make it more difficult for you to teach them?
6. Is there anything about the children you work with that you find difficult to cope with?
7. Is there anything you haven't experienced whilst teaching a child that you think you would find difficult to cope with?

F. Therapist: -

1. Can you define your role for me? (What do you do?)
2. What aspects about yourself suit you to this kind of work?
3. Is there anything about yourself that you think makes it harder for you to teach young children with autism?
4. How much do you think the success of home-based EIBI programmes is due to the personality of the therapists?

G. Session: -

1. Can you talk me through a typical teaching session?
 - a. Routine - Length
 - b. Thoughts
2. How do you usually feel immediately before a session?
 - a. Has this changed over the time you have been a therapist?
3. How do you usually feel immediately after a session?
 - a. Has this changed over the time you have been a therapist?
4. What do you think makes a 'good' session?
5. What do you think makes a 'bad' session?
6. How much do you think about the work you do when you are not teaching?
 - a. Has this changed over the time you have been a therapist?

H. Cool-down: -

1. Does anything get in the way of you delivering home-based EIBI? – What? – Why?
2. Is there anything about your experience of delivering home-based EIBI that we have not covered during the interview?
3. How old are you?
4. How would you describe your ethnic background?
5. What is your marital status?
6. How many dependants do you have?
7. What is the highest level of education you have achieved?
8. What other occupational commitments do you have?

Post-interview

1. Stop the tape-recording.
2. Acknowledge the interviewees participation.
3. Reaffirm the confidentiality of the interview responses given, and that the recording will be destroyed after analysis.
4. Ask the participant if they know of other therapists who might be interested in participating.

APPENDIX TWO

Codebook for Analysing Interview Transcripts

Instructions: -

1. Read the interview transcript a sentence at a time.
2. Decide if the sentence is relevant to any of the topics (underlined) in this codebook.
3. If the sentence is relevant, indicate which category (in *italics*) of response the sentence belongs to by placing a tick in the box next to that category.

*Facilitating factors*Home-Based Early Intensive Behavioural Intervention

- ❑ *Basic skill targets*
 - ‘[Targets] that require a minimal amount of materials, something like [nonverbal imitation]...you clap your hands and expect the child to clap their hands.’
 - ‘I find all the play stuff so much easier.’

Initial Training

- ❑ *Training in behaviour management techniques*
 - ‘Something I was taught from the training before was managing challenging behaviours, and that was definitely invaluable.’
 - ‘Strategies to deal with different behaviours was helpful... I was almost one step ahead of the child in that I had some idea of how to deal with different things.’
- ❑ *Training in instructional techniques*
 - ‘The things about discrete trials and prompting, it was good to get a background.’
 - ‘Obviously the reinforcement technique, with normal children you don’t do it as big as autistic children, and the prompting.’
- ❑ *Training involved observing an experienced therapist/supervisor*
 - ‘It is all very well being given a sheet and [being told] to read about [how to deliver the intervention], but actually seeing someone do it was really helpful.’
 - ‘During the initial stages you observe and watch [another therapist], and think, ‘oh that’s great, I’ll try that’.’
- ❑ *Training involves ABA theory*
 - ‘With one of the families I worked with we had the whole theory of applied behaviour analysis in general, which I did know a lot about, but not applied to this sort of therapy I suppose.’
 - ‘Once you have got the principles about ABA, the actual discrete trial stuff is straightforward, and whatever drill you are doing, it is the same way of approaching it.’
- ❑ *Training regarding the nature of autism*
 - ‘I think I found the [training] about autism generally quite useful.’

Ongoing Supervision

- ❑ *Increases confidence*
 - ‘[Supervision has made me feel] more confident... I wasn’t in the beginning.’
 - ‘It is really useful, because [my supervisor] gives me the confidence to keep going.’

Child

- ❑ *Child engages in physical interaction*
 - ‘If they are quite physical it is easier, they like to be thrown about and they like a little bit of rough and tumble, to be tickled and stuff, that makes it easier.’
 - ‘He needs that physical approach... which is really good.’
- ❑ *Child has good verbal skills*
 - ‘I think it is a lot easier if they have language.’
 - ‘Language makes it easier... you can reason with [child] and explain things.’
- ❑ *Child is compliant*
 - ‘If the child is compliant then it is much easier to get them to the table and keep their attention... then you can progress to whatever it is you want to do.’
 - ‘It can be very easy when he’s settled.’
- ❑ *Child is intellectually competent*
 - ‘... [Child] is very responsive and learns very quickly.’
 - ‘[The child] being fantastically intelligent helps!’
- ❑ *Child is likeable*
 - ‘... [Child] is really fun, and he is really sweet.’
 - ‘Its quite easy when someone doesn’t talk to you to think that they’re just like a machine, but he’s got such a character... he’s really cheeky.’
- ❑ *Child is motivated*
 - ‘He wants to work, and that is the important, he likes learning and wants to work.’
 - ‘I think it is easier if they want to be with you.’
- ❑ *Childs’ family are supportive*
 - ‘If [the family] are involved with the child and the teaching, that makes a big difference.’

Therapist

- ❑ *Therapist has patience*
 - ‘I have seen really slow starts, where you think that you are not getting anywhere... so patience.’
 - ‘I am patient.’

BarriersHome-Based Early Intensive Behavioural Intervention

- *Advanced skill targets*
 - ‘Some things are a bit more complicated, like matching, require more materials.’
 - ‘I find it quite hard to get [all of the materials] ready.’

Ongoing Supervision

- *Being observed during sessions*
 - ‘... if someone is watching me, you know from outside, I find that I am not as reinforcing for the child and things tend to go wrong.’
 - ‘Being observed affects me because I get quite jumpy, it’s just mind-boggling how different my tutoring is when I’m being watched.’
- *Therapist unsure of the aim of specific skill targets*
 - ‘I do find drills harder if I don’t see the point of them.’
 - ‘[It is a lot harder] if I don’t feel it is very useful’.

Child

- *Child has additional medical complaints*
 - ‘He had cerebral palsy as well, and a lot of medical problems, so he was in quite a lot of pain quite a lot of the time.’
 - ‘He had dismylenation, I think it’s called, so he used to have fits and spasms and zonk out.’
- *Child is disruptive during the teaching activity*
 - ‘It was really hard... she was tantruming and very frustrated.’
 - ‘He is really demanding at times, for example, he is eating all of the time.’
- *Child makes little or no progress*
 - ‘Ones where we have been working on them for ages and ages and he cannot get them... when we don’t seem to be making any progress.’
 - ‘I think the ones that I prefer to avoid doing are the ones that I know the children find hardest.’
- *Childs’ attention wanders during teaching activities*
 - ‘Their poor attention is quite difficult to deal with.’
 - ‘When he is tired, it is hard.’

- ❑ *Childs' challenging behaviour*
 - 'Ones that hit out... dealing with the self-injury I sometimes find quite difficult.'
 - 'I've worked with children that have smeared themselves with their own faeces, that is pretty tough.'

- ❑ *Childs' family disrupts teaching sessions*
 - 'Sometimes [challenging behaviour] is reinforced by the mother, and that makes it more difficult.'
 - 'The family can make it difficult.'

- ❑ *Reinforcer issues*
 - 'If you can't find anything to reinforce [the child], so they don't have fun and they just want to look over there, or stim, or if I can't break through to them.'
 - 'If it is a child where it is really difficult to get any kind of internal motivation or reinforcement.'

Therapist

- ❑ *Therapist dislikes a teaching activity*
 - 'I am not very good at art.'

- ❑ *Therapists' emotional reactions to child behaviour*
 - 'I am soft, you see them crying and I think, okay, you want to give in but you can't... it is hard to watch.'
 - 'I can be sensitive and if he does upset [me, I] can start dwelling on it.'

APPENDIX THREE

Questionnaire Sent to Therapists Delivering Home-Based EIBI to Young Children with Autism

(FIRST PAGE PRINTED ON UNIVERSITY HEADED PAPER)

Date

To Whom It May Concern:

We are a research team based at the University of Southampton, conducting a study focusing on tutors (therapists/teaching assistants) delivering home-based early intensive behavioural intervention to children with autism. We are interested in finding out about your experiences of delivering ABA to children with autism on a regular basis. We also want to find out how confident you feel when you work with young children with autism in various situations.

To obtain this information, we are asking tutors across the country involved in home-based early intensive behavioural intervention for children with autism to complete the attached questionnaire. PEACH has kindly given us permission to contact you with this invitation to participate. We hope that as many people as possible will take part in the study to help increase our understanding of the important role that tutors play in home-based early intensive behavioural intervention. PEACH have helped us mail this questionnaire to you, but neither PEACH nor the research team will know who does or does not respond to the questionnaire.

If you do not wish to participate in the research, or you are not a tutor delivering home-based early intensive behavioural intervention to young children with autism, please discard the questionnaire. Thank you for taking the time to read this information.

How do I fill out the questionnaire?

The questionnaire is divided into three sections with clear instructions for each section. We ask questions about you, your experience in home-based early intensive behavioural intervention, and your confidence whilst working in specific situations. The questionnaire will take about twenty minutes to complete.

There are two ways of answering questions. For questions with specific answers (e.g. 'Are you male or female?'), please circle the answer relevant to you. For questions that leave a space for you to answer (e.g. 'What was your age in years on your last birthday?'), please write in the space provided.

(Continued overleaf...)

Read each question carefully, but do not spend too long on each question. Please respond on the basis of your first reaction. This is NOT a test and there are no right or wrong answers to the questions. Please answer all of the questions as openly and honestly as possible.

When you have completed the questionnaire, please return it back to us in the **FREEPOST** envelope provided. You are welcome to keep this letter for future reference. It would be very helpful if you could return the completed questionnaire within the next 2 weeks.

What will happen to the answers that I give?

Completion and return of this questionnaire will be taken as evidence of you giving informed consent to be included as a participant in this study, for your data to be used for the purposes of research, and that you understand that published results of this research project will maintain your confidentiality. Your participation is voluntary and you may withdraw your participation at any time. Personal information will not be released to or viewed by anyone other than researchers involved in this project. Results of this study will not include your name or any other identifying characteristics.

If you have any queries about the research or this questionnaire, or wish to receive a summary of the project, please contact us at the School of Psychology, University of Southampton, by phoning (023) 80592916 or emailing mds4@soton.ac.uk

If you have questions or concerns about your rights as a participant in this research, you may contact the Chair of the Ethics Committee, Department of Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: (023) 80593995.

Many thanks for your participation.

Yours sincerely,

Mr. Matt Symes, Prof. Bob Remington, and Dr. Tony Brown
Centre for Behavioural Research, Analysis, and Intervention in Developmental Disabilities
School of Psychology
University of Southampton
Highfield
SOUTHAMPTON
SO17 1BJ

Dr. Richard Hastings
School of Psychology
University of Wales Bangor
Bangor
GWYNEDD
LL57 2DG

SECTION 1

The following questions ask for background information about you and your work in early intensive behavioural intervention for young children with autism. Please circle the appropriate answer or write in the spaces provided.

Are you male or female? Male Female

What was your age in years on your last birthday? _____ years

What is your current marital status?

Married, and living with spouse

Living with partner

Divorced / Separated / Single and NOT living with a partner

How many dependent children live with you? _____ children

What is the highest level of educational qualification you have completed?

No formal educational qualifications

GCSE, CSE, GCE O Levels or equivalent

GCE A Levels, HNC, GNVQ or equivalent

HND, other Diploma, or equivalent

University / Polytechnic degree

Masters or Doctoral degree

Have you obtained a certificate from the Behavior Analyst Certification Board?

BCBA (Board Certified Behavior Analyst)

BCABA (Board Certified Associate Behavior Analyst)

Neither

At present, how many hours of one-to-one home-based early intensive behavioural intervention do you deliver each week?

_____ hours each week

How long have you been delivering home-based early intensive behavioural intervention for?

_____ years _____ months

(Please turn over)

How many children with autism do you work with NOW in home-based early intensive behavioural intervention?

_____ children

How many children with autism have you worked with in TOTAL in home-based early intensive behavioural intervention?

_____ children

What training have you received? Please circle all relevant answers.

No training

Initial workshop

Shadowed an experienced tutor/supervisor/consultant

Attended courses/seminars in early intensive behavioural intervention

Who provides supervision and/or consultancy services for the child/children with autism you work with NOW? Please give names of organisations if possible – space is left for up to five children.

Child 1: _____

Child 2: _____

Child 3: _____

Child 4: _____

Child 5: _____

How often do you receive formal supervision (e.g. team meetings, individual supervision)? Please tick the box that best describes the situation for each child you work with.

	Once (or more) every two weeks	Between once every two weeks and once a month	Less than once a month
Child 1			
Child 2			
Child 3			
Child 4			
Child 5			

(Please turn over)

Below are several questions that ask you about how you would respond to a number of scenarios. Read each question and its four possible answers. Sometimes more than one answer could be correct under certain circumstances, but you should select the *best* answer or the answer that is most generally true. Tick the square beside that answer.

Example:

Probably the most important influence in a young child's life is his or her...

- Toys
- Television
- Parents
- Friends

Please do not consult others while deciding how to answer the questions.

Be sure to tick only one answer for each question.

Be sure to answer every question, even if you must guess.

1. Which of the following is most important for parents in controlling their child's behaviour?
 - The rules the parents make about behaviour.
 - The parents' understanding of the child's feelings.
 - The behaviours to which the parents attend.
 - Being strict, but also warm and gentle.

2. A boy loves football. What is most likely to happen if, each time he is playing nicely with his sister, his father invites him to play football?
 - He will always be asking his father to play football.
 - He will play nicely with his sister more often.
 - He will be annoyed with his father for interfering with his activities.
 - He will be encouraged to teach his sister to play football.

3. If you want a child to say "please" and "thank you" at the table, it is probably most important to:
 - Reprimand her when she forgets to say them.
 - Explain why good manners are important.
 - Remember to compliment her when she remembers to say them.
 - Praise other members of the family when they use these words.

(Please turn over)

-
4. A father tells his child she cannot go to the store with him because she didn't clean her room like she promised. She reacts by shouting, crying and promising she will clean her room when she gets home. What should the father do?
- Ignore her and go to the store.
 - Take her to the store but make her clean her room when they return.
 - Calm her down and go help her clean her room together.
 - Talk to her and find out why she doesn't take responsibility.
5. A baby often screams for several minutes and gets his parents' attention. Which of the following is probably the best way for his parents to reduce his screaming?
- If there is nothing physically wrong with the child, ignore his screaming even though the first few times he screams even louder.
 - Distract the child with something he finds interesting whenever he screams.
 - Ignore all noises and sounds the child makes.
 - None of the above. Babies usually have good reasons for screaming.
6. A child begins to whine and cry when his parents explain why he can't go outside. How should the parents react?
- Ask the child why going outside is so important to him.
 - Explain that it is a parent's right to make such decisions.
 - Explain again why he should not go outside.
 - Ignore the whining and crying.
7. If punishment is used for a behaviour such as playing football in the house, which type is probably best to use?
- Make the child do extra homework.
 - Clearly express your disapproval.
 - Remove the child to a boring situation each time.
 - A reasonable smacking.
8. Parents who use lots of rewards for good behaviour and few punishments will probably tend to have children who:
- Do not understand discipline.
 - Will not cooperate unless they are "paid".
 - Take advantage of their parents.
 - Are well behaved and cooperative.

(Please turn over)

9. Johnny has just torn up a new magazine. Of the following choices, which is the best way for his mother to discipline him?
- Tell him his father will smack him when he gets home.
 - Punish him there and then.
 - Explain to Johnny about the wrongness of his action.
 - Angrily scold Johnny so that he will learn that such an act is bad and upsetting to his mother.
10. Which of the following is probably most important in helping a child behave in desirable ways?
- To teach her the importance of self-discipline.
 - To help her understand the difference between right and wrong.
 - Providing consistent consequences for her behaviour.
 - Understanding her moods and feelings as a unique person.

SECTION 2

We are interested in how confident you are that you can deliver home-based early intensive behavioural intervention to children with autism in various situations. Please think about each of the situations below carefully, and be as frank and honest as you can about what you really think that you can do. These items describe situations that you could experience as a tutor whilst teaching children with autism. Rate your degree of confidence from 0 to 10 using the scale given below:

0 1 2 3 4 5 6 7 8 9 10

**Cannot
do at all**

**Moderately
certain can do**

**Certain
can do**

For example, a rating of 2 means that it is unlikely, but not totally out of the question for you to be able to teach a child in that situation. A rating of 10 means that you are absolutely certain that you can teach a child in that situation whenever you wished. A rating of 5 would mean that if you gave it your best effort, chances are about 50-50 that you could teach the child in that situation. You can use any score between 0 and 10 (1, 2, 3, etc.) to express your confidence.

Please make all of your ratings based on what you could do TODAY as the person you are NOW, rather than the person you used to be or the person you would like to be.

To familiarize yourself with the rating form, please complete the practice items on the following page.

(Please turn over)

PHYSICAL STRENGTH

If you were asked to lift objects of different weights right now, how confident are you that you can lift each of the weights described below?

0 1 2 3 4 5 6 7 8 9 10

**Cannot
do at all**

**Moderately
certain can do**

**Certain
can do**

How confident are you that you can...	CONFIDENCE
Lift a 10-kilogram (approx. 1.5-stone) object.	
Lift a 25-kilogram (approx. 4-stone) object.	
Lift a 50-kilogram (approx. 8-stone) object.	
Lift a 75-kilogram (approx. 12-stone) object.	
Lift a 100-kilogram (approx. 16-stone) object.	

We would now like you to consider items relevant to teaching a young child with autism.

(Please turn over)

Below are several questions that ask your views on home-based early intensive behavioural interventions for children with autism. Please read each question carefully, and circle the number on the scale that reflects your own view. If your views are described best by the end points of the scale, please circle either number 1 or number 7. If your views are somewhere between the two end points, please select a position on the scale that best reflects where your views should be placed. Please select a response for each of the statements, and give your honest feelings and opinions.

- How difficult have you found it to deliver intervention programmes?

1	2	3	4	5	6	7
Not at all difficult						Very difficult

- How successful have you been at delivering intervention programmes?

1	2	3	4	5	6	7
Not at all successful						Very successful

- How much effort has it taken for you to be this successful?

1	2	3	4	5	6	7
Not much effort						Lots of effort

- How effective are other tutors that you work with?

1	2	3	4	5	6	7
Not at all effective						Very effective

- How much have you learnt from observing other tutors that you work with?

1	2	3	4	5	6	7
Nothing						A lot

- How similar to you are other tutors that you work with?
(E.g. background, education, personal characteristics)

1	2	3	4	5	6	7
Not at all similar						Very similar

(Please turn over)

- How competent do you think your supervisors have been?

1	2	3	4	5	6	7
Not at all competent						Very competent

- How supportive do you think your supervisors have been?

1	2	3	4	5	6	7
Not at all supportive						Very supportive

- Compared to your own views, how accurate do you feel that your supervisors' feedback about your performance has been?

1	2	3	4	5	6	7
Not at all accurate						Very accurate

- How stressed (tense, anxious) do you feel whilst delivering intervention programmes?

1	2	3	4	5	6	7
Not at all stressed						Very stressed

- How tired (exhausted, drained) do you feel whilst delivering intervention programmes?

1	2	3	4	5	6	7
Not at all tired						Very tired

- How relieved do you feel when you finish a teaching session?

1	2	3	4	5	6	7
Not at all relieved						Very relieved

(Please turn over)

SECTION 3

The following statements are concerned with your own general capabilities. Please read each statement carefully, and circle the number on the scale that reflects your own view. If your views are described best by the end points of the scale, please circle either number 1 or number 7. If your views are somewhere between the two end points, please select a position on the scale that best reflects where your views should be placed. Please select a response for each of the statements, and give your honest feelings and opinions.

- If something looks too complicated, I will not even bother to try it.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- I avoid trying to learn new things when they look too difficult.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- When trying something new, I soon give up if I am not initially successful.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- When I make plans, I am certain I can make them work.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- If I can't do a job the first time, I keep trying until I can.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- When I have something unpleasant to do, I stick to it until I finish it.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

(Please turn over)

- When I decide to do something, I go right to work on it.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- Failure just makes me try harder.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- When I set important goals for myself, I rarely achieve them.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- I do not seem to be capable of dealing with most problems that come up in my life.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- When unexpected problems occur, I don't handle them very well.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

- I feel insecure about my ability to do things.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

(Please turn over)

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