

Examination of Qualifications Required of an EIBI Professional

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Over the past decade or so, there has been an increased, world-wide, demand for professionals trained to competently design, implement, and supervise Early and Intensive Behavioral Intervention (EIBI) programs for children with autism. Currently there are no established graduate training programs to prepare professionals to do this. In this paper, recommendations of specific skills needed to become a qualified EIBI-professional are offered, in the areas of intervention methods, curricula programming, working with families, supervision and assessment. Also, suggestions are given as to how these specific skills may be trained and assessed, both theoretically and clinically.

Key words: applied behavior analysis, higher education, autism, early and intensive behavioral intervention (EIBI)

Early and Intensive Behavioral Intervention (EIBI) was pioneered by Dr. O. Ivar Lovaas and colleagues in the 1970s (Lovaas, 1977; Lovaas, Koegel, Simmons, & Long, 1973), and was designed to help children with autism to acquire language and social skills while overcoming problems with excess behaviors such as aggression, self-injury, and stereotyped behavior. Based on findings from Lovaas et al. (1973) it was argued that treatment effects could be optimized if intervention (a) was based on *Applied Behavior Analysis*, (b) was started *early* in the child's life, (c) addressed all behavior excesses and deficits exhibited by a particular child, (d), provided a learning environment for the child throughout the whole day, (e) was carried out in the child's *natural environment* (such as at home and in school, rather than in an institution), and (f) included persons who are part of the child's natural environment (such as parents, teachers, peers), and (g) finally, children should enter *typical classes* to access typical peers to model appropriate behaviors, rather than attend special classes.

In 1987, Lovaas evaluated the effects of this type of intervention and found that, as a group, children made significant progress in intellectual functioning and that almost half of the children succeeded in regular classes. Although creating a great deal of controversy, Lovaas' seminal outcome study provided new hopes for parents and professionals, and opened up a new line of research. Though the research is still ongoing, it has already been shown that EIBI is an effective intervention when compared against no intervention controls or eclectic autism-specific special education interventions (Eikeseth, 2009; Eldevik, Hastings, Hughes, Jahr, & Eikeseth, 2009), that EIBI should be considered "well established", and that no other intervention presently qualifies for this status (Rogers & Vismara, 2008).

Because of the success of EIBI, there has been an increased, world-wide, demand for EIBI-trained professionals. However, there are currently no established graduate training programs to prepare applied behavior analysts to competently design, implement, and supervise EIBI for children with autism. Thus, establishing such programs should be a priority. Graduate programs designed to train EIBI-professionals

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should be research-based programs publishing research on the behavior analytic treatment of children with autism in peer-reviewed professional journals. In addition, training sites should have demonstrated through outcome research that they posit the necessary competency in EIBI.

State and provincial government agencies have begun to develop guidelines for what constitute competent EIBI practitioners (e.g., California Board of Education, 1999). Also, the Autism Special Interest Group (SIG) of the Association for Behavior Analysis has developed consumer guidelines for identifying, selecting, and evaluating EIBI practitioners. These guidelines recommend that EIBI practitioners should have postgraduate education in ABA and a minimum of one year of supervised practicum experience in an established EIBI program for children with autism and that practitioners take the Behavior Analysis Certification Board examination (Moore & Shook, 2001).

The question of which qualifications are required to become a competent EIBI-professional, and how to best train and assess them should be studied scientifically. Unfortunately, research on this topic is quite sparse, and the need for research to empirically identify which skills are needed to become a competent EIBI-professional is strong.

In one such study, Davis, Smith and Donahoe (2002) validated a procedure for identifying practitioners qualified to supervise EIBI programs. The measure was developed from a task analysis of supervisor duties and it was validated by contrasting the performance of supervisors against that of therapists. The task analysis for supervisors was based on the UCLA Model (Lovaas, 1993). Davis et al. found that the main supervisor duties consisted of: (a) programming (i.e., selecting new instructional programs for a particular child), (b) demonstrating these new programs in vivo with the child to the staff and parents, (c) using principle of behavior analysis correctly and providing accurate information about autism when supervising staff and parents, (d) providing accurate feedback (positive and corrective) on staff's teaching skills, and finally, (e) demonstrating adequate professional skills when dealing with parents and staff. Results of the study showed that the assessment dis-

criminated supervisors from therapists, and the authors developed cut-off scores for each of the measures, classifying participants as qualified or not (Davis et al., 2002).

The purpose of this paper is to identify, based on the current literature, specific knowledge and skills related to EIBI, in the areas of intervention methods, curricula programming, working with families, supervision, and assessment of outcome and treatment integrity, see Table 1. In each of the areas, skills considered important to become a competent EIBI-professional will be outlined. In addition, suggestions as to how these specific skills may be trained, both theoretically and clinically, will be given. Also, suggestions as to how the theoretical and clinical competency may be assessed will be provided. This is not, however, intended to be an exhaustive or complete list of skills related to EIBI. Other skills not mentioned here may be important as well, and there may be other perhaps better or more effective ways of training and assessing such skills. I will begin by describing what I consider to be some critical elements of the intervention methods.

Table 1. Area of competency and type of training (graduate courses, BCBA certification, and practicum training) required to become competent EIBI professional.

Area of Competency	Class work	BCBA Exam	Practicum Training
Autism and Developmental Disabilities	X		
EIBI Research and Theory	X		
ABA Principles and Procedures	X	X	X
Comprehensive Curriculum Programming	X		X
Working with Families	X		X
Supervision	X		X
Treatment Integrity and Assessing Outcome	X		X

Basic Skills: Intervention Methods

Basic intervention methods center on (a) theoretical knowledge of autism and other developmental disabilities, (b) scientific knowledge of research on EIBI, and (c) comprehensive knowledge of ABA principles and procedures.

Autism and developmental disabilities

The practitioner must posit knowledge about pervasive developmental disorders, diagnostic evaluation, standardized testing, prevalence, etiology, various treatment approaches

and the scientific evidence supporting these treatments (c.f., Matson & Sturmey, in press). In addition, knowledge of other types of developmental disabilities is necessary (c.f., Odom, Horner, Snell, & Blacher, 2007).

EIBI-Theory

Intervention methods include knowledge of research on EIBI. The practitioner must posit detailed knowledge regarding outcome research, meta analysis of EIBI, and various mediators and moderators of treatment effect (c.f., Eikeseth, in press, 2009; Eldevik et al., 2009; Eldevik, Hastings, Hughes, Jahr, & Eikeseth, 2010; Lovaas, 1993; Makrygianni & Reed, 2010; Peters-Scheffer, Didden, Korzilius, & Stumey, 2010).

ABA principles and procedures

Intervention methods include detailed knowledge of principles derived from behavior analysis. Such principles are used to increase behavioral deficits such as language, play skills, social skills, academics, self help skills, understanding of emotions and to decrease behavioral excesses such as stereotypic behavior, self-injurious behavior, tantrums and aggression. The following principles are fundamental to the treatment: Reinforcement (including reinforcement techniques to reduce inappropriate behavior) motivational operations, stimulus control procedures, higher order stimulus classes, and generalization.

Other aspects of the intervention method include identifying skills to be taught, performing task analyses, objectively defining target behaviors, identifying materials to be used during teaching, identifying reinforcers, performing operations to motivate the child for learning, and planning a prompting and prompt fading strategy. *Discrete Trial Teaching* is a central aspect of the intervention method. Discrete trial teaching can be used to teach a wide variety of skills, such as language and communication, play, social skills, self-help skills, and academic skills (Lovaas et al., 1981). *Natural Environment Teaching* is another important procedure used (Hart & Risley, 1980). It focuses on teaching behaviors in the situation they naturally occur.

Many skills, however, may be difficult to learn from natural environment teaching because the skill is very complicated and few learning opportunities occur naturally over the course of the day. Consequently, natural environment teaching is often combined with discrete trial teaching, where a particular skill can be broken down into smaller components and practiced repeatedly until mastered. *Incidental Teaching* (Hart, 1982; Hart & Risley, 1975) is another important intervention method used specifically to teach spontaneous communication. Finally, *Functional Behavior Assessment* is used to investigate functional relationships between aberrant behavior and specific environmental events so that effective interventions can be designed (Cooper, Heron, & Heward, 2007).

The practitioner must be able to use the ABA principles not only in one-to-one teaching, but also in small and large group settings, and in transitions across these settings, and when shadowing the child in a mainstream environment such as in a regular class room. The principles and teaching methods mentioned above are described in further detail elsewhere (e.g., Catania, 1998; Cooper et al., 2007). The coursework involved in the BCBA is at an appropriate level for theoretical training in ABA principles.

Theoretical training and assessment

Theoretical training and assessment of theoretical skills may be provided through graduate programs in behavior analysis. Assessment of theoretical competency in ABA (but not theory on autism and developmental disabilities, and EIBI-theory) can be achieved also through the Behavior Analysis Certification Board Examination (www.bacb.com).

Clinical training and assessment of clinical skills

Clinical training in intervention method may be gained while working in an apprenticeship with a competent EIBI-professional, applying the above mentioned methods and principles. A competent EIBI-professional must be able to carry out clinically all of the principles and methods mentioned above, across several

children with different levels of learning disabilities. Additional research is needed on how to best train and assess these clinical skills.

Clinical and theoretical skills in Intervention Methods form the basis for which more advanced skills can be learned, such as curriculum programming, working with families, supervision of EIBI programs, assessing treatment integrity, developing child and curriculum measures, and assessing program integrity and outcome.

Comprehensive Curriculum Programming

Curriculum description

The curriculum has been described in numerous teaching manuals (e.g., Leaf & McEachin, 1999; Lovaas, 1977, 2003; Lovaas et al., 1981; Maurice et al., 1996; Maurice et al., 2001). The early curriculum addresses social initiations, joint attention, manding, responding to social stimuli, responding to simple verbal instructions, matching identical objects, imitating gross motor actions or actions with objects, imitating sounds and words, identifying and naming objects, playing independently with toys, and basic interactive skills such as turn taking.

The intermediate curriculum includes parallel play; observational learning; turn-taking games with peers; commenting, describing and asking questions; simple reciprocation; further language training such as identification and naming of abstract concepts including colors, prepositions, pronouns and emotions; repeating sentences; early academic skills such as identifying letters and numbers; drawing and writing; and self-help skills such as dressing and undressing, toilet training, and increasing the types of food and drink taken.

The advanced curriculum is designed to enhance cooperative play, pretend play, social language such as conversation and asking social questions, social-emotional skills such as theory of mind, developing peer relationships, general knowledge and interest in a wider range of topics, appropriate leisure activities, advanced academic skills, and learning in the classroom environment.

Many of the target skills are too complex to be taught as one behavior. To achieve mastery of such complex skills (e.g. toy play and language), task analyses and chaining are used break down behaviors into smaller units that can be reliably measured and more easily taught.

In EIBI programs, the curriculum programs are individually tailored to meet each child's individual needs. This is achieved by accurately assessing deficits, excesses, and typical behaviors of each individual child. Moreover, existing strengths of the particular child are accommodated and efforts are made to remediate behavioral deficits. Also, as much as possible, programming follows the path of typical development. To learn how to individualize programming, and to program in accordance with typical children's development, knowledge of typical children's development is important.

Theoretical Training and Assessment

Theoretical knowledge in curriculum programming and child development can be gained and assessed from graduate courses covering these topics.

Clinical training and assessment of clinical skills

To gain practical training in curriculum programming, working in an apprenticeship manner with a competent EIBI-professional with several different children covering all levels of programming is necessary. Competency in curriculum programming can be assessed by having the apprentice designing curriculum programs for specific children and to have the appropriateness of these programs evaluated by a supervisor (Davis et al., 2002). Practical training in typical child development can be gained by working in preschools and kindergartens.

Working with Families

Parents are trained on intervention methods to become co-teachers for their child. They also learn how to manage the child's challenging behaviors, and how to help the child use the skills he or she has learned in everyday life.

Parents are also taught how they can maintain a good family environment and how to care for siblings. Knowledge of evidence-based parent training programs and family intervention programs is important to posit for the competent EIBI-professional (e.g., Kazdin, 2005).

Theoretical training and assessment.

Theoretical knowledge on how to work with parents, siblings and families can be gained and assessed from graduate courses covering these topics.

Clinical training and assessment of clinical skills.

To gain clinical training in how to work with parents, siblings and families, working in an apprenticeship manner with competent EIBI-professional with at least three families may be necessary. Clinical competency can be assessed by having the EIBI-professional observe the apprentice working with the families.

Supervision

High intensity and high quality supervision from a competent EIBI-supervisor is required to obtain a state-of-art EIBI program. Supervision typically takes place in the children's home or school during team meetings. The child, the parents and the therapists are present during these meetings. During the team meeting, the supervisor and the team analyze data from the child's log book and actively work with the child to review current programs, revise procedures to reduce aberrant behaviors, and provide feedback to the parents and therapists on their teaching competency. In addition, new programs and interventions are implemented and demonstrated. At the end of the meeting, the supervisor provides typically a written report detailing procedures and programs to be implemented. Occasionally, supervision may take place during treatment sessions, during meetings with parents, school staff or other professionals involved with the child.

Recent research has suggested that there is a relationship between intensity of supervi-

sion amount of IQ change in EIBI-programs (Eikeseth, Hayward, Gale, Gitlesen, & Eldevik, 2009). What constitutes the optimal supervision intensity may vary from child to child, and depend on child characteristics, parental involvement, and the competency of the therapists. However, as much as weekly or bi-weekly supervision may be required in most cases.

Theoretical training and assessment

Theoretical knowledge in supervising EIBI-programs can be gained and assessed from graduate courses covering these topics.

Clinical training and assessment of clinical skills

To gain clinical training in supervision of EIBI-programs, working in an apprenticeship with a competent EIBI-supervisor with at least three children at all levels of programming may be necessary. Competency in supervision can be assessed by having the apprentice supervise programs for specific children and to evaluate the appropriateness of the supervision provided by the apprentice. More specifically, the measure developed by Davis et al. (2002) can be used to assess supervisor skills.

Assessing treatment integrity and program outcome

Despite the evidence for the effectiveness of EIBI, research has also indicated that not all programs described as EIBI programs are equally effective (Bibby et al., 2001; Eldevik, Eikeseth, Jahr, & Smith, 2006; Magiati, Charman, & Howlin, 2007). One reason for this may be that the treatment is not sufficiently intensive. Indeed, a high-quality EIBI program is *not* sufficient to produce maximum gains if the intensity of the program is too low or the intervention period too brief.

Another reason for an ineffective EIBI program may be that it does not meet the standards in terms of program quality. Highly intensive teaching and supervision will not produce optimal gains if teachers and/or supervisors do not have the necessary qualifications.

Assessment of treatment integrity

Treatment integrity implies assessment of intervention quality and intervention quantity. The latter is merely an assessment of number of hours of intervention the child actually receives per week, and an assessment of the child-staff ratio. However, distinguishing treatment from other types of child interaction may sometimes be challenging. One way of defining treatment is to say that treatment requires the use of (a) behavioral principles to establish skill for which (b) written goals exist. For example, according to the definition just presented, if a child is shadowed by a therapist is playing with another child, this would qualify as one-to-one treatment if the shadow teacher employs, for example, a token economy system to reinforce the play behavior, and the play behavior is a target (acquisition or generalization) described in the child's curriculum.

Intervention quality involves at least two variables: First, the extent to which the behavioral principles and methods are applied appropriately. Second, assessment of intervention quality must entail an assessment of the appropriateness of the child's curriculum, such as the extent to which the targets are appropriate to the child's skill level and learning style. Assessment of intervention quality may be conducted qualitatively, for example, by being cite visited by experts in the field that are independent of the specific service provider. Such assessment can also be done quantitatively. However, additional research is needed on how to best assess the appropriateness of the child's curriculum and how to best assess correct use of behavioral principles and methods.

Assessment of outcome

Assessment of program outcome is an important variable to determine the effectiveness of the services provided and to extend the research on EIBI. To do so, standardized assessment of cognitive, language, adaptive, social emotional functioning should be obtained at intake, every year during treatment, and at the end of the treatment. A more comprehensive assessment battery contains, in addition to those measures already mentioned, assessments of "autism symptoms" and family variables, including family stress.

Training in assessment

Clinical and theoretical training in assessing treatment integrity and program outcome may be gained and assessed from graduate courses covering those topics.

Summary and Conclusions

It is important to meet the increased, world-wide, demand for qualified EIBI-professionals. Unfortunately, there is a large gap between the supply of competent EIBI-professionals and the demand for EIBI services. Hence, there is an urgent need to develop graduate university programs to train professionals to competently design, implement, and supervise EIBI programs for children with autism. This paper has outlined some key skills considered important to become a qualified EIBI-professional. Basic intervention methods center on theoretical knowledge of autism and other developmental disabilities, scientific knowledge of research on EIBI, and comprehensive knowledge of ABA principles and procedures. Theoretical competence in developmental disabilities, EIBI and ABA principles can be trained and assessed through graduate classes. The latter (ABA principles) can be assessed also through the Behavior Analysis Certification Board Examination. Clinical training in intervention method can be gained and assessed while working in an apprenticeship with a competent EIBI-professional, applying the methods and principles described above. A priority for future research could be to study how to best train and assess such clinical skills. Also, dismantling research could be done to determine which ABA principles and intervention methods are fundamental to an effective EIBI program. Other important skills are appropriate curriculum planning and development, working with families, and supervision. These skills can be learned through working in an apprenticeship with a competent EIBI-professional, and by studying available teaching manuals, evidenced based parent training programs, and typical development. Finally, knowledge on how to assess treatment integrity and outcome is also necessary, and can be established through graduate courses covering these topics.

Though the recommendations given here are based on available research, the empirical database is quite limited. Hence, there is a need for more research on which qualifications are required to become a competent EIBI-professional, and how to best train and assess them. This could be a priority for future research.

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