IMPROVING MANAGEMENT SYSTEMS IN A PUBLIC SCHOOL
IN-HOME AUTISM SERVICES PROGRAM

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Thesis Prepared for the Degree of
MASTER OF SCIENCE

UNIVERSITY OF NORTH TEXAS
December 2006

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White, Victoria Anne. *Improving management systems in a public school in-home autism services program*. Master of Science (Behavior Analysis), December 2006, 51 pp, 2 tables, 24 figures, references, 27 titles.

The purpose of this study was to develop and examine the effects of enhanced training and performance management methods for an autism coordinator who managed several paraprofessional therapists providing in-home behavior therapy for young children with autism. Intervention included task clarification, targeted skill development, and improved feedback from the coordinator to the therapists. Results showed that service delivery performance of in-home trainers increased and/or became more consistent after the intervention was implemented. The intervention provided the autism coordinator with an empirically validated training and feedback system that can be successfully utilized in a sporadically supervised environment.
ACKNOWLEDGEMENTS

I’d like to thank Dr. Cloyd Hyten for his time and dedication to this project. I appreciate that you mentored me, even from 2,000 miles away. I’d like to also thank my fiancé, Chris, for always supporting my dream to become a behavior analyst and moving all around the country with me while I pursued my dream. Thank you to my parents. You’ve supported my dreams and kept me going even when I wanted to stop. One of my biggest “Thank you’s” goes to the Department of Behavior Analysis (faculty, staff and students included) at UNT. You have taught me that I will always be a student and a teacher. Thank you!
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INTRODUCTION

According to the Centers for Disease Control and Prevention (2006), the current statistics on the prevalence of autism spectrum disorders (ASD) are between 2 and 6 per 1,000 individuals. In 2003 approximately 141,000 children with ASD were receiving special education services. Because these numbers continue to grow, providing children with an appropriate education is a nationwide concern.

The Individuals with Disabilities Education Act (IDEA) states that all children with a disability are eligible to receive a public education. States obtain federal funds to provide appropriate education and related services to children with disabilities. The law necessitates that schools use the “least restrictive setting.” This means that schools must make every effort to teach a child with ASD in a regular education classroom. Methods that incorporate behavior analytic technologies are the recommended method of instruction for children with autism (National Institute of Mental Health, 2004).

With the number of students in need of services, effective and economical staff training and supervision methods are essential to public school systems that provide one-on-one services for children with autism. Managing staff performance is a critical aspect in providing children with ASD an appropriate education. Staff training and management issues have been of interest to researchers in the field of behavior analysis for over three decades. Ringer (1973) investigated the effects of modeling on the implementation of a token economy system by a classroom teacher. Initially, the experimenter and the teacher together implemented the token economy system to increase appropriate student behavior. During phase 2, the experimenter faded out of the classroom, leaving the teacher to continue implementation of the token system.
Results showed that the teacher was able to maintain the token system without the experimenter. However, her rate of verbal praise for students did not increase. This experiment indicated that modeling is an effective strategy for teaching a performance skill. The results suggest that it is necessary to utilize a combination of training techniques.

Training is often provided in a didactic package and may include two or more training components that supplement each other. Gardner (1972) evaluated the effectiveness of teaching behavior modification to institutional attendants by comparing two instructional methods: role playing and lecture. The author divided 20 female attendants into two groups. All attendants were pre-tested for current knowledge. Half the attendants received lecture style training. The other half received role-play style training. Following phase 1, all attendants were tested again for their level of knowledge. Attendants then received the style of training they had not learned. A post-test was conducted to test level of knowledge at the conclusion of the training package. Results showed that role-playing contributed more to training proficiency skills. However, both groups had similar post-test scores. This study indicates that role-playing is best when training performance skills and that a combination of role playing and lecture improves both performance skills and knowledge.

Fabry and Reid (1978) utilized a package consisting of instructions, prompts, modeling, and praise to teach foster grandparents to train severely handicapped persons in a state institution. Foster grandparents were taught to engage the resident in training interactions that supported the resident’s independence and motor control. Using the training package increased foster grandparent engagement of the resident in
the aforementioned categories. The authors were able to fade the daily presence of the experimenter and the foster grandparent skills were maintained.

Burg, Reid, and Lattimore (1979) investigated the effects of a self-recording and supervision program on interactions between institution direct-care staff and residents. Staff were provided with instructions regarding what to self-record, the criteria for how many interactions to record and the card on which to record. After each observation session the institution supervisor and the experimenter provided praise to the staff for recording at least one interaction on the card. Results showed that the rate of interactions increased noticeably for each staff person. This study demonstrated that a self-recording and supervision program can be an economical and effective technique in improving staff performance.

Component analysis of training packages demonstrates that packages consisting of only modeling and role-playing may be unsuccessful unless the training is followed by feedback (Demchak, 1987). Harchik, Sherman, Hopkins, Strouse and Sheldon (1989) reviewed behavioral techniques to train and supervise paraprofessionals. Like Demchak (1987), they suggested a training package consisting of demonstration, practice, feedback and follow-up. Harchik et al. concluded that feedback is not only a necessary component when training a skill, but also, necessary during supervision to aid in the maintenance of staff skill. Parsons and Reid (1995) provided classroom-based instruction, on-the-job observations and implemented on-the-job feedback to supervisors in charge of direct care staff. Direct care staff were trained using the teaching-skills training program (Parsons, Reid & Green, 1993). The target skills for staff were order of teaching steps, least to most prompting, reinforcement, and error
correction. Supervisors received classroom-based instruction on the implementation of the teaching-skills training program, training on how to provide systematic on-the-job feedback, and then received feedback on how they conducted their feedback session with a member of the direct care staff. Results showed that direct care staff of supervisors who received on-the-job feedback training maintained their skills, performing an average of 94% of the correct teaching skills after approximately 86 days, longer than those who did not. A similar study implemented classroom-based instruction, role-playing, and feedback to teach paraprofessional support staff to embed teaching within preschool routines (Schepis, Reid, Ownbey & Parsons, 2001). Data were not collected on the paraprofessional’s behavior, but collected on the number of the child participants’ interactions. The number of interactions for one child increased from an average of 18% of the opportunities to an average of 76% after the paraprofessional received training; the number of interactions for a second child increased from an average of 33% to an average of 96% of the opportunities.

Sarakoff and Sturmey (2004) utilized a behavioral skills training package to train teachers to implement discrete-trial instruction (DTI). The training package consisted of instructions, feedback, rehearsing, and modeling. Teachers improved from approximately 40% correct implementation in baseline to approximately 98% correct implementation after the training. The results indicated that this training package was useful in the acquisition and implementation of DTI skills. The authors suggested that future research needs to evaluate the maintenance of skills over time.

Panyan, Boozer and Morris (1970) utilized a feedback system to increase the operant training methods used by hall personnel in a state institution for children with
mental retardation. After hall personnel had received training in how to implement and record data on teaching self-help skills to children, the experimenter collected data on how many teaching opportunities there were, how many times a session was conducted with the child, what step the child had learned, and which staff conducted the session. During the experimental phase, feedback sheets were posted with the aforementioned information. Results indicated that the number of sessions conducted with respect to the number of opportunities possible increased from approximately 25% to approximately 95%. The authors note that the use of this feedback system “was an economical method whereby the performance of attendants can be maintained in the absence of daily supervision” (p. 3).

Research has determined that feedback plays a critical role in both training and post-training supervision in human service settings (Harchik & Campbell, 1998; Harchik et al., 1992; Harchik, Anderson, Thomson, Forde, Feinberg, Rivest & Luidellie, 2001; Reid & Parsons, 2000; Ricciardi, 2005). Reid and his colleagues (e.g., Reid & Green, 1990; Reid & Parsons, 1995) have been continually refining systems for staff training and management for many years. Their work can be said to represent a model for “best practices” in this area. They have shown that maintaining staff performance at acceptable levels following initial training requires ongoing management support that includes feedback. Reid and Parsons (1995) suggested a 7-component protocol for presenting feedback to staff regarding their therapeutic skills at work following training. First, begin the session with a positive or empathetic statement. Then provide positive comments regarding aspects of the skill performed correctly. Identify skill aspects performed incorrectly. Next, describe or model how the skill aspects should have been
performed. Solicit questions from the staff member and reference what will happen during the next feedback session. Finally, end the session with a positive statement about the staff member’s performance. The authors suggest providing feedback multiple times per week to effectively supervise staff for performance maintenance.

Emphasis on performance feedback is not unique to interventions in the human service area. Performance feedback is widely used in the field of organizational behavior management (OBM), the application area dealing with performance improvement in all types of organizations (Alvero, Bucklin, & Austin, 2001). For example, feedback in its various forms is the foundation for interventions referred to as executive coaching, in which management personnel in corporations are given feedback on critical management behaviors necessary to direct and motivate their employees to produce important accomplishments (see Braksick, 2000). Prominent researchers such as Harchik and Campbell (1998) and Reid and Parsons (2000) see what they do in human service settings as part of OBM. Thus, there is a long record in OBM of using performance feedback in both human service settings where management of staff therapeutic performance is the issue and in industrial and corporate settings where supervisors, managers and top executives use feedback to improve employee performance and business results.

Many of the studies regarding management of staff performance are conducted in environments such as state institutions, where a supervisor is present on a daily basis (e.g., Burg, Reid & Lattimore, 1979; Fabry & Reid, 1978; Gardner, 1972; Panyan, Boozer & Morris, 1970). Neef (1995) suggested that research utilizing the already validated training packages be conducted in environments that may not be as controlled
or supervised. In-home services for clients with ASD, provided by school district staff or independent therapists, are becoming prevalent. Therapy delivery in these settings is often provided by paraprofessionals, with only occasional face-to-face contact with a supervisor. Such settings present many management challenges to insure effective service delivery to the client, while maintaining job satisfaction for the paraprofessional so that turnover is not excessive. Bibby, Eikeseth, Martin, Mudford and Reeves (2001) evaluated the effects of in-home behavioral interventions, delivered daily by hired therapists and supervised quarterly by a consultant, for young children with autism in England. They analyzed a number of progress and outcome measures (e.g., IQ tests, Vineland adaptive behavior scores, school placements) for 66 children receiving therapy across a 12-month period. Although children made progress on some measures, they did not attain the level of improvements reported from clinic-based programs. The authors’ suggested that variations in treatment may be responsible for the different levels of treatment efficacy seen in clinic-based programs versus in-home programs. Insuring effective delivery of therapy in home-based services can be seen as a management problem. This thesis was conducted to examine these issues.

The person acting as autism coordinator in a north Texas school district had assumed the job a year prior with a Master’s degree in behavior analysis but very little in the way of a management system in place. She was eager to see if there were improvements that could be made to her communications with and supervision of her paraprofessional in-home training staff. Reid and Parsons (2000) and Schell (1998) have noted that little research has examined how to improve the performance of professional staff who supervise direct-care staff.
The purpose of this study was to develop and evaluate improved training and management methods for the autism coordinator in her duties of supervising in-home trainers providing behavior therapy services to children with autism. The goal was to develop a management system that included improved structure and focus for the autism coordinator, enhanced communications and more thorough performance feedback for the in-home trainers, and resulting skill development for the trainers that would result in therapeutic progress for their clients.
METHOD

Participants

Eleven people participated in this study. The first participant was the autism coordinator employed by the school district. She has held this position for 1 year and she holds a Master’s degree in behavior analysis. The role of the autism coordinator was to develop programming based on a child’s individual education plan (IEP) and monitor services for all children in the district who qualify for autism services. The services provided by this position include in-school assistance to teachers and children, in-home training, parent training and parent consultation. She was responsible for staff training both in the school and in the home, program monitoring and program maintenance. Four in-home trainers with varying degrees of experience and education were employed by the school district. Two of these in-home trainers held full-time positions in the school district. Two of the in-home trainer’s were in graduate programs: one for behavior analysis and one for occupational therapy. The role of the in-home trainer was to provide one-on-one instruction for the child according to the IEP goals.

Six children receiving in-home training services provided by the school district also participated. All six children had a diagnosis that fell under the category of autism spectrum disorder (ASD). Some of the children had a dual diagnosis, such as ASD and mental retardation. After the start of the intervention, one in-home trainer and the child she provided services for dropped out of the study due to relocating out of district.

Setting

Consultation sessions with the autism coordinator took place at the University.
Practice for the autism coordinator took place during in-home training sessions with the experimenter. An information session for the in-home training staff was held at special education services of the school district. Training and feedback sessions for the in-home trainers took place in the child’s home, which was the natural setting for both the in-home trainer and child.

Materials

The autism coordinator was equipped with data sheets and feedback information sheets. All in-home trainers were equipped with data sheets for recording child performance.

Performance Analysis and Planning

Prior to the start of the intervention, I met with the autism coordinator and my advisor to identify the main organizational issues and the likely causes of performance problems. A modified version of the Gilbert behavior engineering model (Gilbert, 1978/1996) was used to analyze the causes of and barriers to successful staff performance. The framework analyzes both the work environment as well as the repertoire of the in-home trainer. More specifically, the framework asks questions with regard to those elements that the in-home trainers need in order to perform at their best. There are six categories of factors that should be optimized to permit successful performance: direction (e.g., task clarification, goals, and feedback), resources (e.g., equipment or processes), contingencies (e.g., weak or conflicting consequences for performance), knowledge (e.g., skill deficits), capacity (e.g., emotional capability and
workload) and motivation (e.g., personal motives and their alignment with what the job offers). Questions pertinent to each category were asked of the autism coordinator in order to identify areas for performance improvement.

There were two main organizational issues for this human service organization: one regarding management practices and one regarding client goals. The autism coordinator job did not come with a set of organized management practices that had been field-tested. Thus, there was no management system as such, and the autism coordinator reported the need to develop such a system to clarify and focus her efforts, and to leave a management legacy when she eventually left the job. The second critical organizational issue was that children were not meeting all of the annual goals stipulated by their IEP. Likely causes were identified. The autism coordinator had observed that the in-home trainers were not consistently performing important therapy skills when working with children. She did not consistently provide written feedback to the in-home trainer, nor did she consistently follow-up on areas she provided feedback on to the in-home trainer. She also suggested that she did not have an effective feedback method to coach the in-home trainers, especially because she met with in-home trainers infrequently. The autism coordinator identified that there was an inability on her behalf to provide a high density of reinforcement for performance improvement. Further meetings with both the autism coordinator and the in-home trainers identified several areas other than skill deficits and supervision difficulties that may have played a role in the larger issues. In-home trainers were isolated from their professional peers. They also had limited contact and collaboration with the child’s school teachers.
Because the autism coordinator had been in this position for 1 year, it was decided that rolling out a project would be a great opportunity to target the issue without diminishing rapport between the autism coordinator and the in-home trainers.

Baseline

The autism coordinator explained to the in-home trainers that the mission of her work and this project was to enhance the learning environment and opportunities for the children receiving services. Surveys were sent to in-home trainers to obtain information regarding their perceptions of the autism coordinator’s current method of feedback, useful tools as a professional, and rewards systems. Parents were also given surveys to identify what materials and workshops might be useful to help them as a parent of a child with autism.

During this period, the autism coordinator collected data on in-home trainer performance during her scheduled observation sessions. The length and frequency of observations are based on the IEP’s allotment of time. See Table 1 for dates of observations sessions conducted by the autism coordinator. Trainer 1 Child A received a 1-hour observation session approximately every 2 weeks. Trainer 1 Child B received a 1-hour observation session every week because it was a new case. Trainer 2 and child received a 1-hour observation session approximately every 3 weeks. Trainer 3 Child A received a 1-hour observation session approximately every 2 weeks. Trainer 3 Child B received a 1-hour observation session approximately every 2 weeks. The following therapeutic skills were being observed during baseline and targeted for improvement during the intervention phase (see Figure 24 for a sample data sheet):
1. Trainer engages in at least one of the child’s preferred activities non-contingently for building rapport. 
   At the start of the session, the in-home trainer will engage in one activity with the child regardless of the child’s behavior.

2. Delivering clear, one-time instructions (adapted from an unpublished thesis by Sawyer, 2000).
   The in-home trainer delivers an instruction only one time in a clear and neutral voice before allowing the child to respond or delivering a prompt. The child's face should be oriented towards the trainer's body for the onset of the instruction for it to be given "clearly."

3. Follow through
   The in-home trainer prompts, or guides, the child to follow through with the instruction if the child does not do so independently.

4. Trainer reinforces correct/appropriate responding
   The in-home trainer provides a reinforcer, a small, preferred edible or a preferred tangible item, immediately following a correct or appropriate response from the child.

5. Trainer utilizes teaching programs that address the student’s IEP goals.
   The in-home trainer will utilize teaching programs suggested by the autism coordinator to address the student’s IEP goals.

6. Trainer collects data on the child’s behavior regarding these goals.
   The in-home trainer will utilize the data sheet provided by the autism coordinator. Data will be collected on those teaching programs suggested by the autism coordinator.

7. Trainer reinforces appropriate behavior not related to IEP goals.
   The in-home trainer will provide reinforcement for appropriate behavior related to “personal” goals such as eye contact, sitting and following one-step directions.

8. Trainer ends session positively with child to maintain rapport.
   The in-home trainer will end the session following the delivery of a reinforcer after a correct/appropriate response from the child or engaging in one of the child’s preferred activities.
The trainer targeted 15 trials during the session to record information with regard to clear instructions, follow through and reinforcement. The criterion set for the in-home trainer was to engage in these behaviors for 13 out of 15 trials. The criterion allowed for error to occur, but meeting or surpassing it demonstrated that the in-home trainer was competent with this skill. An instruction was counted as a clear instruction based on how the in-home trainer worded the instruction. A count for the number of times the instruction was provided per trial was taken separately. Not all IEP goals had to be addressed during each session. However, most in-home trainers did address all the IEP goals during an individual session. It is important to note that the in-home trainer was not restricted to addressing only IEP goals.

Intervention

Phase 1. After the surveys were returned, the information session was held. The autism coordinator and I met with the in-home trainers to follow up on information collected from the survey regarding useful tools as a professional and reward system preference. A task clarification of the responsibilities of the in-home trainers was conducted. The task clarification consisted of informing the in-home trainers of the therapeutic skills that would be targeted to enhance their repertoires and enhance the learning environment and opportunities for the child. Because each student has a program and instructional approach that is tailored to that child’s individual needs, it was important that the information session be general so as not to lose the importance of individualizing the therapeutic skill to the child. In-home trainers were shown a written rationale for the importance of each skill along with verbal examples and non-examples.
of each skill. In-home trainers were allowed to ask questions. The in-home trainers asked for more detail about rapport-building activities. One in-home trainer verbally explained some of the rapport activities she engaged in with the child. Other questions asked were to further clarify the desired therapeutic skill. In-home trainers also asked for tools to help them communicate with other professionals. Reward systems were also discussed. The in-home trainers stated in both the survey and in the start up session that they were not interested in being recognized publicly or by other administrators in the district’s Department of Special Education. However, they wanted the autism coordinator to continue to recognize their performance as professionals.

Phase 2. The autism coordinator continued to visit and observe the in-home trainers in a time frame similar to baseline. The autism coordinator was given a new feedback and coaching strategy based on the Reid and Parsons (1995) protocol for providing diagnostic feedback to staff as part of performance improvement programs. Most children receive 1-2 hours per month of visit and observation time from the autism coordinator. Feedback sheets were modified to function as a prompt for the autism coordinator to engage in each step of the feedback and coaching strategy as well as provide written feedback for the in-home trainer (see Figure 23 for a sample). Following observation, the steps of the feedback and coaching strategy were as follows:

1. Begin session with a positive or empathetic statement
2. Provide praise for skills performed correctly
3. Identify skills performed incorrectly
4. Model, practice and provide feedback on how to perform skill correctly
5. Solicit questions and concerns from the in-home trainer
6. Reference what will happen next session
7. End session with a positive statement about the trainer’s performance and the child’s performance.

The autism coordinator targeted only one critical therapeutic skill per observation. During the follow-up session, which was the next observation, the autism coordinator provided feedback to the in-home trainer regarding the skill that was targeted previously. If the in-home trainer performed the skill correctly, a new skill was targeted for that observation session. If the in-home trainer did not perform the skill correctly, the skill continued as the target until the next observation session. Skill targets that were not performed, or not consistently performed, during baseline were picked as targets by the autism coordinator. None of the in-home trainers were targeted for every skill.

Other elements were added to address factors that were possibly interfering with in-home trainer performance. Information from pre-intervention consultations and the information sessions indicated that the in-home trainers felt they were isolated from peers. Such isolation made it difficult to share best practices, ideas, or to have other useful communications with their peers. An e-mail group was formed to provide an opportunity for in-home trainers to contact one another with professional questions. In-home trainers were also given the opportunity to participate in group meetings to discuss current therapeutic problems and provide tips and other job related information. The autism coordinator also set up a system to provide opportunities for the in-home trainer and the school teacher to communicate and collaborate, if necessary.

Interobserver Agreement

The experimenter collected interobserver agreement (IOA) during observation sessions conducted by the autism coordinator. IOA was collected by the experimenter
on 29% of the experimental sessions across in-home trainers. IOA scores were calculated by using the formula \((\text{agreements} / (\text{disagreements} + \text{agreements}) \times 100)\). Agreement scores averaged 95.6% across observed sessions.
RESULTS

The Autism Coordinator

Prior to the start of intervention, the autism coordinator did not consistently provide written feedback to the in-home trainers. She was unable to produce written feedback, other than the data sheets, from observations sessions conducted during baseline. After intervention, she provided the in-home trainer with both verbal and written feedback at each observation session. Figure 24 is a sample feedback sheet that the autism coordinator utilized during observation sessions. Analysis of the written feedback showed that she provided an average of 5 praise statements per observation session (range: 3-6). A breakdown across trainers shows that she provided an average of 4.25 and 5.25 written praise statements for in-home Trainer 1 during sessions with Children 1A and 1B, respectively. The autism coordinator provided an average of 5.5 written praise statements to in-home Trainer 2. She provided 5.25 and 5 praise statements to in-home Trainer 3 during sessions with Child 3A and Child 3B, respectively. Praise statements referenced both the in-home trainer’s performance and the child’s performance.

An average of one corrective statement was provided per observation session. These corrective statements referenced target skills to be improved. Occasionally, the autism coordinator provided two corrective statements, which referenced two target skills to be improved. For in-home Trainer 1, this occurred 2 out of 4 times during sessions with Child 1A and 1 out of 4 times with Child 1B. For in-home Trainer 3, this occurred 1 out of 4 times during sessions with Child 3A. This did not occur during any session with in-home Trainer 2 or during sessions in which in-home Trainer 3 was
working with child 3B. The autism coordinator reported that the feedback sheets were helpful and easy to use, and she continued to use them after the termination of formal data collection in this study.

Trainer 1 Child 1A

Figures 1-3 show data on the therapeutic behaviors of the trainer as recorded by the autism coordinator during her visits to the home. Figure 1 shows data on critical therapeutic skills (items 2, 3, and 4 from the 8-item list described above and in Figure 24). In Figure 1 (and Figs. 4, 8, and 12), clear instructions, item 2, was counted only with reference to how the in-home trainer worded the instruction. Figure 2 (and Figs. 5, 9, and 13) represents the number of instructions per trial, which was tracked separately. Trainer 1 performed the critical therapeutic skills of clear instructions and follow through with Child 1A at or around acceptable levels during baseline. Reinforcement delivery, however, was consistently below acceptable levels. After intervention, Trainer 1’s performance improved slightly, with follow through achieved in the final 3 sessions while reinforcement delivery improved from a mean of 11.3 in baseline to a mean of 13.3. Figure 2 shows the number of instructions per trial provided by the in-home trainer. The goal was to reduce instructions to 1 per trial. During baseline observation sessions, Trainer 1 was delivering an average of 25.6 instructions to Child 1A per 15 trials. After the task clarification session, the first skill targeted for Trainer 1 with Child 1A was clear, one-time instructions. After a feedback and training session on this skill, number of instructions decreased to an average of 19.3 per session.
Figure 3 identifies which of the remaining therapeutic skills (items 1, 5, 6, 7, and 8) were engaged in during each session the autism coordinator observed. A filled in box identifies that the in-home trainer engaged in the critical therapeutic skill as defined by the autism coordinator. The first phase change line indicates the intervention had begun and the in-home trainer had attended the information session held by the experimenter and the autism coordinator. The targeted behavior for the observation session is indicated on the top of each intervention session column. The autism coordinator followed up on the targeted behavior during the next observation session. During baseline with Child 1A, Trainer 1 performed approximately 50% of the remaining therapeutic skills per observation session. She was variable in the skills that she performed; however, she consistently omitted the skill of reinforcing other appropriate behavior. After intervention, the percentage of these therapeutic skills being performed improved to 95%.

As shown in Figure 4, prior to intervention, Trainer 1 was providing clear instructions at acceptable levels during baseline. However, she was not following through with Child 1B’s responses or providing reinforcement at acceptable levels for most baseline sessions. After the task clarification session, Trainer 1 was performing all three critical therapeutic skills at or above acceptable levels while working with Child 1B and without direct intervention. During baseline observation sessions, Trainer 1 delivered on average 22.3 instructions to Child 1B per 15 trials. After the task clarification session, the number of instructions delivered to Child 1B decreased to an
average of 19 per 15 trials (Figure 5). One time instructions were never directly targeted during intervention for Trainer 1 when working with Child 1B. However, this skill was targeted for Trainer 1 with Child 1A, which suggests that the skill generalized across children for this trainer. Figure 6 shows that during baseline with Child 1B, Trainer 1 performed approximately 71% of the remaining therapeutic skills per observation session. This performance level was due to the trainer’s omission of rapport building at the start and end of the session. After intervention, the percentage of therapeutic skills being performed improved to 94%. Rapport building was the second skill targeted during intervention. After targeting this skill, Trainer 1 performed this skill during the remaining observation sessions with Child 1B.

**Trainer 2**

Trainer 2 performed all of the critical therapeutic skills at or above acceptable levels, with the exception of one observation session (session 2 during baseline; see Figure 7). During baseline, Trainer 2 delivered an average of 21.5 instructions per 15 trials (shown in Figure 8). After the task clarification session, the number of instructions decreased to 17 per 15 trials. Clear, one-time instructions were targeted during the second session of the intervention (session 5). The number of instructions delivered during the rest of the intervention observation sessions averaged 17.5 instructions per 15 trials (Figure 8). With the exception of one baseline session, Trainer 2 performed all remaining therapeutic skills both before and after intervention (see Figure 9).
Trainer 3 Child 3A

Figure 10 shows that Trainer 3 performed critical therapeutic skills well below acceptable levels during baseline with Child 3A. After the task clarification session, there was little improvement. The autism coordinator first targeted the skill of reinforcement delivery. After direct intervention on reinforcement delivery, all three critical therapeutic skills improved to at or above acceptable levels. During baseline observation sessions, Trainer 3 delivered on average 30 instructions to Child 3A per 15 trials. After the task clarification session and without direct intervention, the number of instructions delivered to Child 3A decreased to an average of 22 instructions per 15 trials although an increasing trend appeared to develop; see Figure 11. During baseline with Child 3A, Trainer 3 performed approximately 66% of the remaining therapeutic skills per observation session (Figure 12). She consistently failed to collect data. It’s important to note that this in-home trainer had never taken data during her employment as an in-home trainer. After the autism coordinator targeted this skill during the intervention, Trainer 3 collected data consistently with Child 3A. After intervention, the percentage of the remaining therapeutic skills being performed improved to 95%.

Trainer 3 Child 3B

Figure 13 shows that prior to intervention, Trainer 3 performed critical therapeutic skills well below acceptable levels. After the task clarification session, there was little improvement. The autism coordinator first targeted the skill of following through with the child’s response. After direct intervention on follow through, all three critical therapeutic skills improved to at or above acceptable levels for most of the subsequent sessions. It
is important to note that at the same time follow through was targeted for sessions with Child 3B, reinforcement was being targeted for sessions with Child 3A. During baseline observation sessions, Trainer 3 delivered on average 31 instructions to Child 3B per 15 trials. After the task clarification session and without direct intervention, the number of instructions delivered to Child 3B decreased to an average of 22 instructions per 15 trials (Figure 14).

Figure 15 shows that during baseline with Child 3B, Trainer 3 performed approximately 28% of the remaining therapeutic skills per observation session. Trainer 3 was not consistently performing any of the remaining therapeutic skills with Child 3B. After the autism coordinator targeted rapport-building skills, Trainer 3 consistently performed these skills with Child 3B. The autism coordinator also targeted reinforcement of other appropriate behavior. During the session in which this skill was targeted, Trainer 3 performed the skill and maintained the skill for the duration of the study. The percentage of remaining therapeutic skills being performed during the intervention improved to an average of 70%. It is important to note that the in-home trainer was not collecting data on Child 3B’s behavior. This is because she was practicing and becoming fluent with the skill when working with Child 3A. Anecdotal observations by the autism coordinator indicated that the trainer started collecting data with Child 3B after session 7.

Child Progress on IEP Goals

Figures 16 through 22 show data on progress toward goals specified in the individual education plan (IEP) developed for Children 1A, 1B and 2. The graphs show
the accumulation of mastered steps of goals over the course of the academic school year. The diagonal line represents the progress trajectory needed for the child to master the IEP goal. The dashed line represents the onset of intervention for the in-home trainers (the point at which the group information session was held: March 7, 2006). Progress towards mastering IEP goals was not monitored until the end of the academic school year, as we were planning a shift from therapeutic skills to IEP goal attainment for those trainers who were performing all the targeted critical therapeutic skills. Table 2 shows all IEP goals set for each child. By mid-April, Child 1A had only mastered 2 one and two-step directions out of the 8 necessary to master the goal (Figure 16). Figures 17 and 18 show that Child 1A had yet to master any steps towards mastering those two goals. While reviewing the data in June, the autism coordinator and the experimenter discovered that the in-home trainer was not using the correct procedure for introducing skills. She was introducing and teaching skills, but not consistently enough for the child to reach the IEP mastery criteria.

Prior to the intervention with Trainer 1, Child 1B had mastered 5 imitations (see Figure 19). Child 1B acquired 5 imitation skills within one month. Upon further inspection, during the month of February, the in-home trainer introduced imitation programs other than gross motor imitation. She started collecting data on verbal imitation as well as imitation with objects. This gave the trainer the opportunity to teach toward the IEP goal, but not be confined to one imitative category. Child 1B mastered two direction-following skills prior to intervention (Figure 20). Following trainer intervention, Child 1B had an increase in the cumulative number of direction-following skills being mastered. Although the two goals were not met by the end of the academic
year, child 1B had mastered 7 out of 15 imitations necessary to meet the goal and 4 out of 6 one-step directions necessary to meet the goal.

Child 2 had his annual meeting to set his IEP goals in December. Figure 21 shows that the child’s progress was above the projected trajectory to attain the goal of 20 functions mastered before intervention with Trainer 2 began. Following intervention, the number of functions mastered increased from 15 to 20, thus meeting the necessary number of skills to master the IEP goal. Figure 22 shows that child 2 had mastered 22 out of a goal of 50 sight words prior to the intervention with Trainer 2. Following intervention, child progress continued and the child acquired 30 sight words. This did not meet the necessary number of sight words to master the IEP goal by the end of the academic year.

Because in-home trainer 3 did not collect data until the last few sessions, the autism coordinator used anecdotal information from her observation sessions to assess progress for Children 3A and 3B at the end of the academic school year. According to these observations, Trainer 3’s clients were making progress toward IEP goals, although none had been attained by the end of the school year.

Trainer Communications

Analysis of records and appointments showed that several in-home trainers took advantage of the enhanced communication opportunities that were afforded them as part of the plan to aid in “professionalizing” the job. During intervention, two of the in-home trainers, Trainer 1 and Trainer 3, utilized the e-mail group one time each. In-
home Trainer 3 also set up a meeting with Child 3B’s classroom teacher to discuss techniques and educational materials that would help support the child’s learning.
DISCUSSION

The results of the current study suggest that modeling and feedback are effective and economical tools to improve staff performance in sporadically supervised environments such as client homes. These findings support the objectives that were set forth in this study. First, a package, which combined the use of task clarification, modeling, feedback and follow-up was effective in improving the service delivery performance of in-home trainers. Secondly, embedded in the performance improvement package was the use of a checklist to prioritize and organize the interaction between the autism coordinator and the in-home trainer. Although we were unable to tease out this component, the improvement in in-home trainer performance between baseline and intervention support its value as a useful tool in providing feedback to the in-home trainers, which resulted in improved service delivery. Finally, in-home trainer service delivery skills targeted by the autism coordinator improved, and continued to improve or maintain at acceptable levels for the duration of the study. Because of the success of the package and its ease of use, the autism coordinator continued to utilize the feedback checklist, which incorporated the modeling and follow-up components, after the completion of the study.

During the study all in-home trainers showed marked improvement in areas which were targeted by the supervisor for modeling and feedback. It’s important to note is that, for most of the in-home trainers, there was improvement in the performance of certain skills following the task clarification session held at the start of the intervention phase. Researchers and employers should continue to investigate the utilization of task clarification sessions as a tool to improve and maintain staff performance. Ricciardi
(2005) has even recommended that it be the first step in a competency-based staff training model. The use of this tool will save money and time for the organization if there is a deficit in staff knowledge, rather than a deficit in the ability to perform the skill.

When there are skill deficits the results of this study indicate that modeling and feedback, along with supervisor follow-up on targeted skills, are effective tools for improving in-home trainer performance in a sporadically supervised environment. All in-home trainers increased consistency of implementation of critical therapeutic skills and decreased the number of instructions delivered per trial. Trainer 1A/B and Trainer 3A/B improved instruction delivery, follow-through with child response and reinforcement delivery to above baseline levels, which met the goal set by the supervisor. These two in-home trainers also appeared to generalize some of the skills across children. Trainer 1 was targeted to decrease the number of instructions delivered per trial with Child 1A. A decrease was seen not only with Child 1A, but also with child 1B. Trainer 3 was targeted to increase the delivery of reinforcement with Child 3A. There was an increase in the delivery of reinforcement with both children, although this skill was not targeted with Child 3B.

A key limitation of this study was the use of an AB experimental design. By using an AB design, we cannot assert that what the autism coordinator did was responsible for the improvement in the in-home trainer performance, because we cannot rule out alternative explanations for the improvement (see Barlow & Hersen, 1984; Hayes, Barlow & Nelson-Gray, 1999). However, some of the weakness of an AB design is mitigated by the fact that specific in-home trainer skills improved when targeted for feedback by the autism coordinator. It seems unlikely that some other variable could
account for this. In-home trainers did not receive additional training by an outside source during this time. It is possible that conversations with other in-home trainers and/or teachers might have helped to improve their skills, as that was encouraged as part of the intervention plan. The chance that an unknown background variable would have affected each trainer’s unique skill deficits seems remote. Therefore, we are reasonably confident that the intervention package was responsible for improved in-home trainer performance, and the data suggest that the coaching/feedback element was largely responsible for the effects. A multiple baseline design would have been a better alternative design to control for confounding variables coinciding with treatment onset, but ethical and logistical constraints prohibited its use in this study. There was an average of 3.2 weeks between observation sessions of each trainer by the autism coordinator. Because it was important to intervene as soon as possible for the benefit of the child, delaying intervention in multiple baseline fashion over this time frame was not considered ethical in this case.

The data on child progress toward individual education plan (IEP) goals revealed that children made some progress during the study, but only Child 2 achieved one of the goals by the end of the academic year. Some children were making progress on some IEP goals during baseline and this makes it difficult to conclude that the intervention with their in-home trainers was responsible for continued improvement. The lack of goal attainment is a disappointing outcome as IEP goals were one of the main organizational issues identified at the outset. There may be several reasons why progress on IEP goals was not more dramatic. First, the relatively brief amount of time devoted to the intervention phase necessitated a focus on trainer skill development and consistency of
therapy delivery. Addressing the skill or performance deficits of the in-home trainers one skill at a time during the intermittent supervision and feedback sessions meant that this skill development took up most of the time available before the end of the academic year. Toward the end it became clear that skills had improved, and it appeared that the autism coordinator was running out of trainer skills on which to give feedback. It was determined that a subsequent phase should shift the focus of the autism coordinator’s feedback from trainer behavior to trainer results (production of progress toward the child client’s IEP goals.) At that point, the IEP data were first graphed and the nature of the gap in goal attainment became apparent. There was not sufficient time to re-focus efforts to produce goal progress at that point in the school year. There is an important lesson here for studies of this nature: monitor therapeutic outcomes from the beginning, even if the focus of your efforts is on therapist skill development. Had this monitoring been ongoing, corrections to in-home trainer skills could have been made, or the adequacy of IEP goals could have been revisited.

At the end of the school year, two of the three in-home trainers were resigning from their positions due to graduate studies. The turnover affected three of the five students. It is still possible for the autism coordinator to track the progress of the child on his or her IEP goals. However, there would be many confounds when accounting for the progress or lack of progress in goal attainment given such staff turnover.

Future research in the human service field, especially in organizations providing educational services to children with autism, should include a stronger focus on the effects that staff training has on the acquisition of skill or improvement in client performance. This information should be used to evaluate the skills being targeted for
both the staff and the client. Improvement in staff performance logically would seem to be a necessary precursor to improved client performance, assuming that the staff therapy skills targeted actually affect client performance, and that the improved client performance would lead to IEP goal attainment. These assumptions were judged to be true by the autism coordinator, but data on goal attainment would still be necessary to verify that therapeutic procedures are aligned with client goals. Were they not aligned, it may indicate problems with the goal-setting process itself (a result of annual committee decisions), or with how IEP goals are translated to operational therapy aims by the autism coordinator and the in-home trainers.

In one of the few published studies to examine interventions affecting managers, supervisors, direct-care staff and clients in a residential facility for persons with developmental disabilities, Methot, Williams, Cummings, and Bradshaw (1996) trained all levels of management to utilize feedback more effectively in their management interactions with subordinates. Despite improvements in the management skills and use of contingent consequences by all levels in the management hierarchy, the effects on client performance (measured in their study by occurrences of problem behavior and on-task behaviors related to IEP plans) were modest and variable. In their study, no formal behavior change programs were in place for the clients, and no explicit IEP goals were articulated. In the present study, behavior change programs were in place for the clients but yet rather modest progress toward IEP goals was also observed. Perhaps, as Methot et al. suggested, a focus on client outcomes together with therapist behavior from the outset would lead to better client progress ultimately.
An important additional objective was achieved by this study. The autism coordinator, being fairly new in her administrative role, did not have a fully developed management system for her in-home trainers, with enhanced communication, training, and feedback guidelines and job aids developed for this study. The management system developed for this study gave her tools, plans, and more structure to her supervisory actions. Although no baseline data on her feedback comments was taken, her own self-report suggested she had not been consistent in praising trainer success and offering corrections when needed. Data from the data/feedback forms shows that once this tool was in place, she was consistent in providing the needed feedback during her supervision visits. Should she leave the job, she would be able to hand over a set of empirically-validated management practices to the next incumbent, something that was not in place when she took the job.

In addition, the project nature of the study, with the project name, the meetings, and the enhanced communication possibilities may have helped to create a less isolated, more “professionalized” work atmosphere for the in-home trainers. The study was too brief to assess the impact of this on longer term issues such as trainer recruitment and turnover. However, it is possible that such important organizational outcomes could be affected positively by participating as a team member in an important, delineated project which deliberately sought to enhance professional pride for these trainers through group meetings and communication with the school teachers who deal with their clients during the school day. Greater pride in one’s work may also supply an important automatic reinforcer for the trainers who often work with few signs of progress and little professional recognition for their efforts (a lean reinforcement
environment; see Hyten, 2001 for a discussion of the role of automatic reinforcement in larger work reinforcement systems.) Anecdotally, the autism coordinator reported that she felt better about her supervisory duties and that her feedback was received very well by the trainers.

Autism coordinators, similar professionals, and researchers may find this package to be useful when training and coaching staff despite its several shortcomings. A limitation of this study was that it commenced in the second half of the academic year. Future studies could start at the beginning of the academic year when there would be more time for intervention and follow-up. A follow-up at least 3 months after termination of the treatment phase would be useful in assessing maintenance of therapist skills and child progress. Also, care should be taken when developing a schedule to conduct observation sessions. In this study, time between observation sessions was variable due to issues such as illness and difficulties arranging appointments. These variations meant that feedback from the autism coordinator might not have been synchronized with the earliest point when trainers needed it. Future research might also seek to develop a systematic approach toward identifying the succession of trainer’s skills to target for training and feedback.

The results of the current study support the use of staff training and supervision packages that utilize modeling, feedback and follow-through in a sporadically supervised environment. Systems advocated by researchers such as Parsons and Reid (1995) and Harchik et al. (1989) appear to be effective management tools in a variety of human service environments. As Neef (1995) suggested, research regarding training the trainers should be conducted in different environments. The current study
was one step toward assessing the effectiveness of empirically supported training tools in such a different environment: client homes where important therapy services are delivered by relatively isolated paraprofessionals with infrequent supervision.
Figure 1. Number of trials in which Trainer 1 performed the critical therapeutic skills: provided a clear instruction, followed through with a response and delivered reinforcement for the appropriate response across sessions with Child A. Column labels indicate the skill targeted by the autism coordinator during that session. The criterion line is marked at 13.

Figure 2. Number of instructions, or discriminative stimuli, delivered by Trainer 1 to Child 1A during the observation session. The autism coordinator provided feedback and training on this skill during session 4. The criterion line is set at 15 (one instruction per trial).
### Figure 3

Chart showing Trainer 1 behavior during therapy with Child 1A across sessions. Filled boxes indicate performance at or above criterion. Column labels indicate skill targeted for feedback by autism coordinator during that session.

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### Figure 4

Number of trials in which Trainer 1 performed the critical therapeutic skills: provided a clear instruction, followed through with a response and delivered reinforcement for the appropriate response across sessions with Child 1B. Column labels indicate the skill targeted by the autism coordinator during that session. The criterion line is marked at 13.

- **Baseline**
  - Clear Instruction
  - Child Response
  - Reinforcement Delivery

- **Intervention**
  - sr+ other
  - rapport
  - clear inst

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Figure 5. A line graph indicating the number of instructions, or discriminative stimuli, delivered by Trainer 1 to Child 1B during the observation session. This skill was never targeted for Trainer 1 with Child 1B. The criterion line is set at 15 (one instruction per trial).

Figure 6. Chart showing Trainer 1 behavior during therapy with Child 1B across sessions. Filled boxes indicate performance at or above criterion. Column labels indicate skill targeted for feedback by autism coordinator during that session.
Figure 7. Number of trials in which Trainer 2 performed the critical therapeutic skills: provided a clear instruction, followed through with a response and delivered reinforcement for the appropriate response across sessions. Column labels indicate the skill targeted by the autism coordinator during that session. The criterion line is marked at 13.

Figure 8. Number of instructions, or discriminative stimuli, delivered by Trainer 2 during the observation session. The autism coordinator provided feedback and training on this skill during session 5. The criterion line is set at 15 (one instruction per trial).
**Figure 9.** Chart showing Trainer 2 behavior during across sessions. Filled boxes indicate performance at or above criterion. Column labels indicate skill targeted for feedback by autism coordinator during that session.

**Figure 10.** Number of trials in which Trainer 3 performed the critical therapeutic skills: provided a clear instruction, followed through with a response and delivered reinforcement for the appropriate response across sessions with Child 3A. Column labels indicate the skill targeted by the autism coordinator during that session. The criterion line is marked at 13.
Figure 11. Number of instructions, or discriminative stimuli, delivered by Trainer 3 to Child 3A during the observation session. This skill was never targeted by the autism coordinator. The criterion line is set at 15 (one instruction per trial).

Figure 12. Chart showing Trainer 3 behavior during therapy with Child 3A across sessions. Filled boxes indicate performance at or above criterion. Column labels indicate skill targeted for feedback by autism coordinator during that session.
Figure 13. Number of trials in which Trainer performed the critical therapeutic skills: provided a clear instruction, followed through with a response and delivered reinforcement for the appropriate response across sessions with Child 3B. Column labels indicate the skill targeted by the autism coordinator during that session. The criterion line is marked at 13.

Figure 14. Number of instructions, or discriminative stimuli, delivered by Trainer 3 to Child 3B during the observation session. This skill was never targeted by the autism coordinator. The criterion line is set at 15 (one instruction per trial).
Figure 15. Chart showing Trainer 3 behavior during therapy with Child 3B across sessions. Filled boxes indicate performance at or above criterion. Column labels indicate skill targeted for feedback by autism coordinator during that session.

Figure 16. A line graph that shows the cumulative number of one and two step instructions mastered by child 1A over the course of the academic school year. The dashed line indicates the start of the intervention phase for the in-home trainers. The diagonal line shows the trajectory of progress necessary to meet the IEP goal by the end of the academic school year.
Figure 17. A line graph that shows the cumulative number of imitations with objects mastered by child 1A over the course of the academic school year. The dashed line indicates the start of the intervention phase for the in-home trainers. The diagonal line shows the trajectory of progress necessary to meet the IEP goal by the end of the academic school year.

Figure 18. A line graph that shows the cumulative number of matching items mastered by child 1A over the course of the academic school year. The dashed line indicates the start of the intervention phase for the in-home trainers. The diagonal line shows the trajectory of progress necessary to meet the IEP goal by the end of the academic school year.
Figure 19. A line graph that shows the cumulative number of imitations mastered by child 1B over the course of the academic school year. The dashed line indicates the start of the intervention phase for the in-home trainers. The diagonal line shows the trajectory of progress necessary to meet the IEP goal by the end of the academic school year.

Figure 20. A line graph that shows the cumulative number of one step directions mastered by child 1B over the course of the academic school year. The dashed line indicates the start of the intervention phase for the in-home trainers. The diagonal line shows the trajectory of progress necessary to meet the IEP goal by the end of the academic school year.
Figure 21. A line graph that shows the cumulative number of functions mastered by child 2 from December, when new goals were introduced. The dashed line indicates the start of the intervention phase for the in-home trainers. The diagonal line shows the trajectory of progress necessary to meet the IEP goal by the end of the academic school year.

Figure 22. A line graph that shows the cumulative number of first grade sight words mastered by child 2 from December, when new goals were introduced. The dashed line indicates the start of the intervention phase for the in-home trainers. The diagonal line shows the trajectory of progress necessary to meet the IEP goal by the end of the academic school year.
Figure 23. A sample feedback sheet which the autism coordinator used as a guide for both her observation and for providing feedback. A copy was provided to the in-home trainer following the end of the observation session.
Trainer ID Number: ____________  
Observer:  KS  VW

Yes  No  N/A

Trainer engages in at least one of the child’s preferred activities non-contingently

Giving an instruction one time and clearly and following through
C = clear  U = unclear  I = tally number or times the Sd is given

Circle R if child responds (either prompted or independently)

Trainer reinforces correct/appropriate responding

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</table>
| 15   | C             | U             | I:       | R          | Y N

Yes  No  N/A

Trainer utilizes teaching programs that address the student's Individual Education Plan (IEP) goals.

Trainer collects data on the child's behavior regarding these goals

Trainer reinforces appropriate behavior not related to IEP goals

Trainer ends session positively with child

Figure 24. A sample data sheet used by the autism coordinator to identify therapeutic skills performed by the in-home trainer.
Table 1

*Dates of Autism Coordinator Observations Sessions*

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<td>Trainer 3B</td>
<td>1/11/06</td>
</tr>
</tbody>
</table>

Table 2

*2005-2006 Individual Education Plan Goals*

<table>
<thead>
<tr>
<th>Child</th>
<th>IEP Goals</th>
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</thead>
</table>
| Child 1A  | 1.0 Complete 4, 6 and then 8 one and two step tasks with physical prompts, then no more than 1 verbal prompt and/or visual cues as needed.  
2.0 Follow the sequence of steps to complete a toileting routine with no more than 7, 5 and then 3 physical prompts.  
3.0 Imitate play with 2, 4 and then 6 objects as demonstrated by parent/trainer.  
4.0 Will match 2, 4 and then 6 objects, then pictures without prompts from trainer/parent. |
| Child 1B  | 1.0 Imitate 5, 10 and then 15 motor movements as demonstrated by trainer/parent with no more than 1 verbal prompt.  
2.0 Using picture symbols and/or verbal approximations, will request 4, 6 then 8 desired items/activities.  
3.0 Will follow 2, 4 then 6 one step directions upon verbal request of trainer/parent, without physical assistance. |
| Child 2   | 1.0 Follow 2 and 3 step directions with minimal physical, then verbal prompts only.  
2.0 Write first and last name and 6, 9 and then 12 familiar words on lined paper.  
3.0 Read 25, 40 then 50 first-grade level sight-reading words.  
4.0 Name 10, 15 and 20 items when function is stated by trainer/parent. |
| Child 3A  | 1.0 Complete 4, 6 and then 8 motor imitations upon verbal requests while seated in front of in-home trainer/parent.  
2.0 Follow 4, 6 and then 8 directions delivered by in-home trainer or parent with visual prompts only.  
3.0 Demonstrate compliance behavior by performing tasks for 30, 60 and then 90 consecutive seconds with minimal prompting |
| Child 3B  | 1.0 Execute 6, 8 and then 10 motor imitations upon request and through modeling.  
2.0 Follow simple one step directions while engaging in play with verbal prompts and physical assistance.  
3.0 Demonstrate appropriate play with 3, 4 and 5 toys that involve up to three steps and or play variations with modeled prompts.  
4.0 Pull shirt over head and pull arms through, Will pull up pants and put on socks and slip on shoes with minimal physical prompts.  
5.0 Trace straight and curved lines on paper with hand over hand prompts, hand at elbow, then without physical prompts. |
REFERENCES


