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# Training practicum students in child-directed interaction: Efficacy of modeling versus bug-in-the-ear feedback

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Training Practicum Students in Child-Directed Interaction:  
Efficacy of Modeling Versus Bug-in-the-Ear Feedback

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A thesis submitted to the Graduate Faculty of

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## Abstract

Training direct-care paraprofessionals to work with children who have developmental disabilities has been a prevalent concern among researchers and practitioners. Although behavioral interventions are designed by professionals, they are generally implemented by paraprofessionals. Therefore, the accuracy of program implementation by paraprofessionals depends on the quality of the training provided. In the present study, two female undergraduate practicum students were recruited through a public four-year university in Virginia to obtain training in child-directed interaction (CDI). The purpose of CDI is to help build rapport between the adult and child by teaching the adult to provide positive attention to a child's desirable behaviors in the form of PRIDE (Praise, Reflect, Imitate, Describe, and Enthusiasm) skills, while actively ignoring the child's undesirable behaviors. CDI will eventually be incorporated into a training program that will allow undergraduate practicum students to provide behavioral services to clients in the community under the supervision of a licensed clinical psychologist who is also a Board Certified Behavior Analyst (BCBA). This study documented the frequency of PRIDE skills exhibited by both participants in three distinct phases: Baseline, Training/Modeling, and BIE Feedback. Both Training/Modeling and BIE Feedback resulted in a higher frequency of PRIDE skills exhibited by both participants compared to baseline. Training/Modeling had a larger effect for both participants, while BIE feedback may serve as a method to "fine-tune" PRIDE skills.

## Training Practicum Students in Child-Directed Interaction: Efficacy of Modeling Versus Bug-in-the-Ear Feedback

Training paraprofessionals to provide direct-care treatment to children with developmental disabilities has been a prevalent concern among researchers, administrators, and practitioners because the quality of services provided to clients depends on the skills and efforts of the staff (Greene, Willis, Levy, & Bailey, 1978; Richman, Riordan, Reiss, Pyles, & Bailey, 1988). Although treatment interventions are designed by professionals, the interventions are generally implemented by paraprofessionals (Oliver & Skillman, 2002), thus it is important that professionals adequately communicate procedures to trainees to ensure treatment programs are correctly implemented (Quilitch, 1975). Four categories of management programs have become a part of the staff training literature: antecedent, self-control, contingency management, and multi-faceted interventions (Reid & Whitman, 1983; Oliver & Skillman, 2002). Each will be discussed briefly.

### *Antecedent Procedures*

Antecedent procedures include verbal and/or written instructions and modeling (Oliver & Skillman, 2002). Reid and Whitman (1983) described instructions as “instructional manipulations” consisting of two categories. The first category describes the general explanations provided to staff members regarding what the job assignment entails. It also provides specific information regarding the parameters of the job

assignment, including what to do, when to do it, and who should do it (Reid & Whitman, 1983).

The second category, modeling, refers to the physical demonstration of a certain behavior while being observed by a staff member (Warren, 2007), and plays an integral role in the acquisition of both socially appropriate and deviant behavior (Brody, Lahey, & Combs, 1987). Furthermore, modeling has been shown to be an effective type of antecedent intervention when examined as a separate training technique (Reid & Whitman, 1983). In a study done at a neuropsychiatric facility, Wallace, Davis, Liberman, and Baker (1973) found that supervisor modeling of techniques was successful in increasing the quantity of staff-patient interactions, even in the absence of the supervisor. Brody et al. (1987) investigated the effects of intermittent modeling on observational learning of adjective usage with an experimental group that received consistent modeling, a second experimental group that received intermittent modeling, and one control group that did not receive any modeling. The two experimental groups did not differ from one another in adjective use, but both surpassed the control group in performance.

### *Self-Control*

Self-control refers to procedures in which individuals manipulate antecedents and/or consequences to target behaviors they are trying to self-manage (Reid & Whitman, 1983); the efficacy of such programs has been evaluated in situations ranging from classrooms to outpatient settings (Jones, Nelson, & Kazdin, 1977). Self-control procedures allow trainees to develop stimulus control over their own behavior by placing themselves in the presence of specific stimuli, or by avoiding other stimuli, thereby



altering the frequency of their own behavior by self-administering consequences (Jones et al., 1977).

### *Contingency Management*

Contingency management procedures place emphasis on consequences of specific staff behavior (Oliver & Skillman, 2002) in the form of performance lotteries, group contingencies, performance feedback, and/or punishment strategies (Reid & Whitman, 1983). Lottery contingencies require trainees to meet performance criterion levels and win the lottery drawing in order to receive a reinforcer, whereas group contingencies require the performance of a group to meet criterion levels in order for individuals to receive reinforcers (Reid & Whitman, 1983). Both feedback and incentives have been effective in modifying the behavior of trainees (Oliver & Skillman, 2002). For example, Bricker, Morgan, and Grabowski (1968) found that the amount of interaction exhibited by attendants working with institutionalized children increased when reinforcers such as trading stamps, video-tape records, and comments about appropriate training behaviors were delivered.

### *Performance Feedback*

Ford (1980) defined feedback as information that is returned in relation to an output or performance. Researchers (Alvero, Bucklin, & Austin, 2001) have defined feedback as information given to individuals that describes the quality or quantity of their previous performance, the delivery of praise following a successful performance (Roscoe, Fisher, Glover, & Volkert, 2006) and a discriminative stimulus and/or reinforcer for behavior (Peterson, 1982). Performance feedback has been used to facilitate the acquisition and maintenance of a variety of behaviors in a variety of settings (Roscoe et

al., 2006) and can be written, delivered privately, publicly posted, vocal, and/or delivered in the form of praise (Reid & Whitman, 1983). Supervisory feedback is an important component of staff training and maintenance of staff performance (Parsons & Reid, 1995). Several studies have found that both feedback and praise have resulted in successful training of employees and staff members working with individuals with disabilities (Crowell, Anderson, Abel, & Sergio, 1988). Feedback has also been effective in treating phobic disorder, and improving academic performance, customer service, and staff performance in the implementation of behavior modification skills (Roscoe et al., 2006).

Research suggests that effective feedback is systemic, corrective, positive, and prompt (Scheeler & Lee, 2002). Prompt feedback has been shown to be more effective than delayed feedback in increasing desirable behaviors (Stumphauzer, 1971; Price, Martella, Marchand-Martella & Cleanthous, 2002), increasing the delivery of positive consequences and instructional prompts (Price et al., 2002), and improving efficacy and efficiency exhibited by trainees (Scheeler & Lee, 2002). Prompt feedback is also more effective because it makes relevant discriminative stimuli more salient by reducing the time between the behavior and feedback. However, traditional supervision strategies have relied on after-the-fact discussions of what occurred, and merely offering suggestions on how to improve in similar circumstances in the future (Giebelhaus, 1994). In some cases, feedback has not been delivered until one to two days after the training session occurred during post-training conferences (Scheeler, McKinnon, & Stout, 2011). Delayed feedback allows trainees to practice errors and often relies on field notes and anecdotal reporting (Scheeler & Lee, 2002). Delayed feedback also prohibits trainees from

receiving reinforcement and/or intervention during the training session in which the greatest potential for learning occurs (Giebelhaus, 1994).

### *Bug-in-the-Ear Feedback*

An alternative to delayed feedback is live supervision in which the supervisor observes the trainee firsthand, and is able to provide immediate feedback while the trainee is actively engaged with a client (Gallant & Thyer, 1989). During live feedback, the supervisor is able to stop the trainee from incorrectly performing a procedure and use corrective feedback to inform the trainee of what to do instead; the trainee can then perform the correct procedure in the next learning trial within the same training session (Scheeler et al., 2011). However, some researchers speculate that providing live feedback may be disruptive for teachers and/or students who are undergoing training (Scheeler & Lee, 2002). One solution to this dilemma is the use of the bug-in-the-ear (BIE) device, a small, inexpensive wireless communication technology that allows supervisors to deliver concise, corrective feedback promptly, yet unobtrusively through an earpiece (Giebelhaus, 1994; Scheeler et al., 2011). The BIE device has been effective because it provides supervisors the opportunity to reinforce selected behavior just seconds after the occurrence (Gallant, Thyer, & Bailey, 1991).

The device has been used in a variety of training fields, including psychology, medicine, and dentistry (Giebelhaus, 1994), with a variety of populations such as parents, counselors, students, and even clients (Price, Martella, Marchand-Martella & Cleanthous, 2002). Gallant et al. (1991) examined the effects of BIE when training two therapists across three experimental conditions. Baseline supervision consisted of a meeting between the senior author and the trainee prior to and immediately after the training

session, followed by a phase using the BIE. The results revealed that the trainees' use of the skills remained consistently low during baseline and increased substantially while receiving immediate feedback. Even when an "Information Only" phase was included following baseline, in which the senior investigator and trainee met prior to each session to go over working definitions of the skills, the skills still did not markedly increase until the BIE device was used. Furthermore, Price et al. (2002) delivered BIE feedback and specific praise to a student with ADHD in his classroom to reduce the number of inappropriate verbalizations; the feedback resulted in a decline in inappropriate verbalizations. In addition, when BIE feedback was used to train five special education practicum students in three-term contingency trials, all five participants increased the target behavior more quickly than when delayed feedback was used (Scheeler et al., 2011). BIE technology has gained popularity since the late 1980s, and in addition to its ease of use and non-intrusiveness, other advantages of the device include strengthened relationships between students and faculty, and reduction in student anxiety when addressing potentially difficult situations (Rock et al., 2009).

### *Multi-faceted Procedures*

Multi-faceted procedures refer to strategies that use a variety of techniques in a training program. The goal of mixed procedures is to provide a maximally powerful intervention using resources that are relevant to institutional settings (Reid & Whitman, 1983). When comparing the effectiveness of written instruction, training workshops, and performance feedback in staff training in an institution for persons with mental retardation, Quilitch (1975) found that written instruction and the workshops were ineffective procedures, while feedback effectively motivated staff to lead daily

recreational activities. When antecedent procedures such as written or verbal instructions, modeling, and role playing (Reid & Whitman, 1983) are implemented alone, they are not generally successful in modifying staff behavior. However, when such strategies are combined with performance feedback, whether posted publicly or presented privately, staff performance is more likely to improve (Oliver & Skillman, 2002).

### *Child-Directed Interaction (CDI)*

Child-directed interaction (CDI) is derived from Parent-Child Interaction Therapy (PCIT), an evidence-based, short-term behavioral treatment program designed for children ages 2-7 who exhibit disruptive behavior disorders (Hardwood & Eyberg, 2004; McIntosh, Rizza & Bliss, 2000). The development of PCIT was influenced by Hanf's two-stage therapeutic approach for children with disruptive behavior (as cited in Lambha, 2010). This approach was based on operant learning in that it taught parents to shape their children's behavior by ignoring undesirable behaviors and delivering positive attention to the desirable ones in the first phase. Parents were taught proficient disciplinary skills in the second phase. PCIT has been successful in reducing parent stress levels, improving the relationship between parent and child, increasing child compliance with parental requests, and improving overall parenting skills (McIntosh et al., 2000). PCIT is also based on Baumrind's developmental theory (Baumrind, 1991), which holds that authoritative parenting (i.e., a combination of good communication, firm control, and nurturance) yields optimal child mental health outcomes. As a result of the success of PCIT, Teacher-Child Interaction Training (TCIT) was designed to improve the teacher-child relationship by helping the teacher develop adequate strategies for dealing with behavior problems in their classrooms (McIntosh et al.). Both PCIT and TCIT are two-

stage models that include Child-Directed Interaction (CDI) and Parent-Directed Interaction and Teacher-Directed Interaction, respectively.

Child-directed interaction (CDI) is the first phase of both Parent-Child Interaction Therapy (PCIT) and Teacher-Child Interaction Training (TCIT) that teaches the adult to use positive and differential social attention in the form of PRIDE skills (**P**raise, **R**eflect, **I**mitate, **D**escribe, and **E**njoy) to improve the relationship with the child (Harwood & Eyberg, 2004; McIntosh et al., 2000). Parents and teachers are taught to use specific types of positive attention that typically functions as positive reinforcement for the children's behavior. In addition, the adults are taught to refrain from asking questions, placing commands on the child, and engaging in sarcastic, sassy, rude, or imprudent speech, which often provide attention to the negative behaviors and result in the adult leading the play rather than the child (Lambha, 2010). Some studies (Eisenstadt, Eyberg, McNeil, Newcomb, & Funderburk, 1993) have found that CDI may not be necessary for decreasing the noncompliance of children with disruptive behavior, but it is important in strengthening the relationship between the adult and the child. CDI allows the adult to engage in a cooperative and positive reciprocal interaction (Lambha, 2010). Kockanska, Forman, Askan, and Dunbar (2005) suggested that a mutually responsive orientation (MRO) enhances the child's enjoyment when interacting with the adult, increases self-regulated compliance with the adult, and decreases the need for harsh disciplinary assertions.

Although the current study will not be utilizing the second phases of PCIT or TCIT, CDI will be used as a means for practicum students to establish rapport with their clients using the PRIDE skills. The first skill, labeled praise, provides specific feedback

to the child's behavior (e.g., "Good job tying your shoes). Praise is used to compliment the child's behavior, which generally results in an increase in the behaviors that precede the praise (Lambha, 2010). The fact that behaviors preceding praise typically increase suggests that praise serves as a positive social reinforcer in that the child continues to engage in the praised behavior in order to maintain the attention and approval of the adult (Lambha, 2010). More specifically, the child does this because praise selects the behavior to increase. Labeled praise also demonstrates that the adult was attending to the child, rather than simply complimenting the child at random. Furthermore, behavior descriptions (e.g., "you're drawing a flower"), reflective statements (e.g. child says "I like horses," parent says, "you like horses"), and imitative responses (e.g. mimicking the child's body language) also function as social consequences that typically result in an increase in desirable behavior and compliance. The final PRIDE skill, enjoyment, refers to the adult expressing enthusiasm in the form of smiling, laughing, and the use of the other PRIDE skills. Burts, McKinney, and Burts (1985) found that when teachers were frequently enthusiastic in classrooms with typically developing children, the children were more responsive and attentive.

The target behaviors that will be assessed in the current study are negative talk, direct and indirect commands, questions, and unlabeled praise. Negative talk includes any verbal response to a child's behavior that is sassy, sarcastic, critical, rude, and/or demonstrates disapproval of the child's actions (e.g., "stop running," "you are not a very good artist"). Asking questions is considered a target behavior because it allows the adult to remain in control. For example, if a child begins playing with blocks and the adult asks "what are you going to build", the adult now assumes control of the situation because the

child is expected to answer. Direct commands include any demands placed on the child, such as “come here” or “do this”. Indirect commands are commands that are less authoritative than direct commands, and often sound as if the adult is giving the child a choice, such as “why don’t you color” or “let’s clean up.” Unlike labeled praise, unlabeled praise is nonspecific to the child’s behavior (e.g. “Good job”). Unlabeled praise does not provide adequate information to the child regarding what they did that was praise-worthy. In extreme cases, unlabeled praise may reinforce undesirable behaviors, particularly if the child is engaging in a target behavior while engaging in a desirable behavior simultaneously. Negative talk, direct and indirect commands, and questions all take the lead away from the child during play and instead give the control to the adult. In addition, negative talk and commands provide differential attention to the child’s undesirable behavior, which may result in an increase in those behaviors if both positive and negative attention are reinforcing to the child.

It is important that professionals and paraprofessionals establish a good working relationship with their clients, particularly when working in the client’s home. In addition to establishing a relationship with the client, practitioners should also build rapport with the parents and family members of the clients because the practitioner will frequently be working in their home. Implementing CDI provides a friendly environment for the practitioner and the client while engaging in leisure activities. Furthermore, the friendliness accompanied by CDI allows the practitioner to build a relationship with the clients and their family in a non-intrusive way. Parents and clients may view a practitioner who places demands on the client shortly after the initial meeting as too intrusive.



### *The Current Study*

As previously stated, designing effective training programs for paraprofessionals is a topic of concern. Therefore, practicum experiences are a necessary requirement that provides students with opportunities to experience technological and ideological principles in practices within their field (O'Reilly et al., 1992). However, there is a growing concern about the quality of supervision that students, teachers, and other trainees receive (Scheeler et al., 2011). For example, Garfield and Kurtz (1976) surveyed 855 clinical psychologists and found that one in every four respondents was dissatisfied with his/her training and did not feel prepared for the profession (Isaacs, Embry, & Baer, 1982). In addition, many students and pre-service teachers reported they are not receiving adequate supervision and feedback in field experiences (Scheeler et al., 2011).

The purpose of the study is to examine the efficacy and efficiency of a variety of training methods to train practicum students in CDI. The results of this study will assist in the development of a training program that will train future practicum students interested in working with children on the autism spectrum in the implementation of discrete-trials, incidental teaching, and CDI. Students who successfully complete the training program will be allowed to provide in-home behavioral treatment to clients in the community under the supervision of a board certified behavior analyst. The current study used a combination of written instruction and modeling in one phase and BIE feedback in another phase to train undergraduate practicum students in CDI. Feedback was defined as information delivered to the participant regarding her performance of CDI in the form of corrective statements, praise, and verbal prompts to engage in a certain behavior or activity. CDI served as a non-intrusive way for the practicum students to build a working

relationship with the client. To my knowledge, Lambha (2010) conducted the only other study to incorporate CDI in to a training program outside of PCIT and TCIT. praises (no more than 4 of each per session) exhibited by participants than in baseline.

## **Method**

### **Participants**

Two undergraduate (one sophomore and one senior) psychology practicum students attending the same public university in Virginia were recruited to participate in the current study. Both participants were previously involved in studies in which they received training in the coding of CDI exhibited by teachers in two classrooms. However, neither had had any previous training in the direct application of these techniques. Each participant signed a consent form that provided an overview of the study, consistent with the protocol approved by the university's Institutional Review Board (IRB). Participants were required to interact during 5-minute sessions with children with suspected autism who were undergoing an assessment in the Inter-Professional Autism Clinic. All parents of the children were provided with and signed consent forms stating the nature of the study and that it would be part of their child's assessment. All training procedures were conducted at the Inter-Professional Autism Clinic in Harrisonburg, VA under the supervision of a licensed clinical psychologist who is also a Board Certified Behavior Analyst. Another child was regularly used for the study who was undergoing weekly occupational therapy treatment at the clinic. The parents provided consent, and all sessions took place under the direct supervision of a licensed occupational therapist. Upon completion of the study, participants were asked to complete a questionnaire measuring social validity (see Appendix B).

### **Apparatus**

Bug-in-the-Ear (BIE) device. The current study used an Anchor assistive listening UHF 16 channel belt pack receiver (Model: WB-6000) with a gooseneck style microphone. The transmitter is powered by an included AC power adapter, operates in

the UHF band frequency on 16 channels, and is powered by two DC 1.5V AA size batteries. The ear buds are manufactured from One Good Earbud™ and are attached to a stereo 3.5mm right angle plug that weighs 0.4 ounces (12 grams) and has a 42 inch long chord.

### **Observation Procedures and Reliability**

Dyadic Parent-Child Interaction Coding System-II, 3rd Ed. (DPICS-II; Eyberg, Bessmer, Newcomb, Edwards, & Robinson, 1994). DPICS-II is a behavioral coding system used in a clinical setting to assess and measure interactions between parent and child during Parent-Child Interaction Therapy (PCIT). The current study used the Abridged Manual for the Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg, 2010) to assess interactions between practicum students and children in the autism clinic. Data collection consisted of the primary investigator coding participants' interactions using the behavioral definitions provided in the manual (see Appendix A). The primary investigator listened to a 10-sec interval recording on her iPod and recorded behavior on the recording sheets she created specifically for this study (see Appendix C).

Observations occurred in the Inter-Professional Autism Clinic by the primary investigator who has received extensive training in CDI. Another graduate student with previous training in CDI served as a second observer for 30% of observations to measure interobserver reliability (see Table 1). When measuring reliability, the second observer coded behavior with the primary investigator using an iPod splitter that allowed both investigators to listen to the same iPod simultaneously while recording independently. Interval-by-interval interobserver agreement (IOA) and scored-interval IOA were used to calculate reliability for both the target behaviors and PRIDE skills. Interval-by-interval

(IOA) was scored by calculating the number of intervals in which both observers agreed on the occurrence or non-occurrence of the behavior, and then divided by the total number of intervals. Scored-interval IOA was scored by calculating only the intervals in which either observer recorded an occurrence of a behavior. The IOA means across all behaviors ranged from 93.5-99.5% for interval by interval, while the means ranged from 33-90% for scored interval.

### **Experimental Procedures**

A multiple baseline across participants design was used and consisted of three phases: Baseline, Modeling, and Bug-in-the-Ear Feedback. Both participants began the study at the same time, but the other phases were staggered so that the participants entered the second and third phases at varying times. Participants were never present with one another for any of the sessions. Although PCIT and TCIT require that the adults deliver 10 praises, 10 reflective statements, and 10 behavior descriptions in a 5-min session in order for to reach the criterion for mastery, the current study did not specify a criterion level. Each session took place in a 9m by 5m sensory motor room containing ball pits, trampolines, and swings, and/or a 4m by 5m room containing a variety of toys. Clients were assessed in the Inter-Professional Autism Clinic for 3 hours per assessment day. The sessions only occurred during the first 30 min and the last 45 min of the assessment when the client was allowed to engage in free play with practicum students. An occupational therapist was present during all free play activities to ensure the child and participant met all safety guidelines.

**Baseline.** Participants were asked to play with the child. The client was usually engaging in free play activities with an occupational therapist and graduate students, so

the participants were asked to play alongside everyone else. No specific instructions were provided to the participants before, during, or following a session. The primary investigator would simply thank the participant for coming at the end of the appointment.

**Training/Modeling.** Participants were provided with the abridged DPICS manual a week prior to the onset of the second phase of the study and were asked to review the training manuals on their own time. Directly before the first session of the second phase, the primary investigator discussed the purpose of CDI and how to correctly use the PRIDE skills. During modeling sessions, participants watched the primary investigator model CDI with a client for 5 min before being asked to do the same for 5 min. The primary investigator met briefly with the participant at the beginning and end of each session to address any questions and/or concerns regarding CDI. Following each session, the primary investigator would provide feedback, such as “you did a great job using labeled praises; let’s continue working on reflective statements and behavior descriptions.” Corrective statements such as these were held constant across training sessions. Participants were asked to continue reviewing the training manual in between observation days on their own time.

**Bug-in-the-Ear Feedback.** Each participant implemented CDI with a client while receiving prompt feedback from the primary investigator through a bug-in-the-ear device. The primary investigator commented on the desirable behaviors (e.g., PRIDE skills) and ignored the undesirable ones (e.g., questions). However, when a participant continued to make the same mistake, such as delivering unlabeled praises, the primary investigator would prompt the participant to make a correction. For example, if the participant said “Good job,” the primary investigator would say, “Good job for what?” The investigator

consistently delivered labeled praises (e.g., “That was a good behavior description”). If the participant needed additional prompting (i.e. if they were idle for more than 30 sec), the primary investigator would engage in direct commands, such as “Tell the client what he/she is doing that you like.” The primary investigator simultaneously collected data and coached the participant.

## Results

Figure 1 shows the occurrences of PRIDE skills across both participants. During baseline for Katniss, there was no vocal activity from the participant. Therefore, the participant transitioned to the Training/Modeling phase after three sessions. The number of PRIDE skills exhibited by Devan was also consistently low; none of the skills occurred more than twice per session during baseline.

During the Training/Modeling phase, there was a noticeable increase in the PRIDE skills exhibited by Katniss. The number of labeled praises ranged from 0 to 2 occurrences until session 9 when the number increased to 6 occurrences before reaching stability at a slightly lower number (3-4 occurrences). Behavior descriptions rarely occurred at the onset of the Training/Modeling phase until session 9 when the number increased to 6 occurrences. Behavior descriptions declined slightly, but remained relatively stable throughout the remainder of the phase. The number of reflective statements remained consistently low throughout the phase, ranging from 0-3 occurrences per session.

Labeled praises exhibited by Devan sharply increased to a number of 6 occurrences before sharply declining to 1 occurrence. Behavior descriptions also made a sharp increase to 7 occurrences before gradually declining. Reflective statements also substantially increased to 7 occurrences and continued to increase.

During the BIE feedback, the number of labeled praises exhibited by Katniss maintained relatively stable compared to the training/modeling phase, ranging from 1 to 5 responses per session. At the onset of the BIE feedback phase, reflective statements steadily declined but eventually stabilized at 2 responses per session for the remainder of



the phase. Behavior descriptions also initially declined at the onset of the BIE feedback phase before stabilizing for the remainder of the phase.

Reflective statements exhibited by Devan substantially increased to a number of 19 occurrences in the first session of BIE feedback, followed by a noticeable decrease to a number of 13 in the second session of BIE feedback. Reflective statements remained consistent (10-13 occurrences) throughout the remainder of the phase. Devan's use of labeled praise and behavior descriptions remained relatively consistent to the numbers observed in the Training/Modeling phase, although there was a slight upward trend for labeled praise at the end of the phase. Behavior descriptions ranged from 3 to 5, while labeled praises ranged from 3 to 7 occurrences per session.

Figure 2 shows the occurrences of the target behaviors exhibited by the participants. As with the PRIDE skills, Katniss did not engage in any of the target behaviors during baseline. To the contrary, Devan engaged in all of the target behaviors with questions having the highest number of occurrence (14 occurred in one session), and there was an upward trend of questions at the end of baseline. Negative talk was initially high during the first session (4 occurred), but noticeably declined and reached stability at a low number (between 0 and 1 occurrences). Direct commands occurred at a moderate frequency (4 and 5 occurrences, respectively) for two of the six baseline sessions before becoming stable at a number of 0 occurrences. The number of indirect commands remained consistently low in that no more than 2 occurred in any session. Unlabeled praises were highly variable in that the number of occurrences fluctuated between 0 and 7 occurrences. There was an upward trend of unlabeled praises at the end of baseline.

At the onset of the training/modeling phase, there was a slight upward trend of questions asked for Katniss. However, the number of questions eventually reached a stable number of 0 occurrences. Unlabeled praises remained relatively stable, ranging from 0 to 3 occurrences. Other than questions and unlabeled praises, no other target behaviors occurred during the modeling and training phase. The number of questions exhibited by Devan substantially decreased from baseline in that no more than 6 occurred in any of the sessions. Indirect commands, unlabeled praises, and negative talk remained consistently low throughout the phase in that no more than 1 unlabeled praise, no more than 1 negative talk, and no more than 2 indirect commands occurred. Direct commands slightly increased from baseline.

During the BIE feedback phase, the only target behavior exhibited by Katniss was unlabeled praise. However, it only occurred during three sessions of the phase, ranging from 1 to 4 occurrences. Devan's use of unlabeled praise, direct, and indirect commands remained relatively consistent to the Modeling/Training phase in that they all ranged from 0 to 3 occurrences per session. The number of questions varied from 1 to 5 occurrences. There were no observed occurrences of negative talk.

The scores on the Social Validity Form (see Appendix C) indicate that Katniss agreed that the training procedures were appropriate and easy to comprehend, and the training she received was useful, important, and beneficial because she gave all statements on the form a 5. However, Devan gave a rating of 2 for ease of reading and understanding the written materials, a 3 for the importance of learning techniques such as these, and a 3 for the statement that she had learned many beneficial skills. Devan's

scores indicate that she did not feel the training manual was sufficient for training, nor did she feel the skills were important and/or beneficial, contrary to Katniss.

## **Discussion**

Although an abundance of staff training technology has become available, there is still a prevalent concern among researchers and practitioners in regards to properly training paraprofessionals in therapeutic techniques (Parsons & Reid, 1995). Modeling has been shown to be an effective antecedent intervention in training direct-care staff in that it is cost effective and the procedures are well maintained even in the absence of the supervisor (Parsons & Reid, 1995; Wallace et al., 1973). Feedback has also been shown to be an effective training method in the acquisition and maintenance in a variety of settings (Roscoe et al., 2006). More specifically, prompt feedback has been shown to be more effective than delayed feedback in increasing desirable behaviors (Stumphauer, 1971; Price et al., 2002), because it makes the discriminative stimuli more salient by reducing the time between the behavior and feedback (Scheeler & Lee, 2002). The BIE device has been used to provide live feedback to trainees during actual training sessions, and has been shown to be effective because it allows desirable behaviors to be reinforced just seconds after the occurrence (Gallant et al., 1991; Giebelhaus, 1994). The purpose of this study was to examine the effects of manual instructions and modeling versus BIE feedback while training two undergraduate practicum students in child-directed interaction. The experimental design was a multi-faceted procedure that consisted of three phases: baseline, modeling/training, and BIE feedback.

Katniss did not exhibit any PRIDE skills or target behaviors during baseline, so she was moved into the Training/Modeling phase after three training sessions due to the stability in the data (Parsonson, 2003). The Training/Modeling phase had an effect for Katniss as her use of PRIDE skills noticeably increased. With the exception of one

session during the phase, she engaged in 2-7 behavior descriptions per training session. Her use of labeled praises also increased and ranged from 0-6 occurrences during the phase. Reflective statements remained consistently low throughout the phase and only occurred during three of the sessions.

Also during the Training/Modeling phase, her use of unlabeled praises and questions also increased, which is not surprising as they are both common occurrences during interactions between children and adults. For example, it is not uncommon for an adult to say “good job” to a child during play. Thus, the increase in unlabeled praises is not necessarily surprising because although it is a target behavior, unlabeled praise is still interacting with a child in a positive manner. The frequency of unlabeled praises remained relatively stable throughout the phase, whereas labeled praises only occurred once in one session prior to the sharp increase during session 9. Because Katniss was essentially mute during baseline, it would make sense that her unlabeled praises would have manifested before labeled because they are easier to implement in that they require less vocalization. As the phase continued, the sessions in which there were several occurrences of unlabeled praises were the same sessions in which there were very little labeled praises. On the other hand, the sessions in which the frequency of labeled praises increased, unlabeled praises decreased. It is also not atypical for an adult to ask “what are you going to draw?” when the child pulls out markers and paper. Therefore, the increase in questions could have also been a result of Katniss merely becoming more comfortable with interacting with the child, thus she resorted to common behaviors (i.e. use of unlabeled praises and questions) during the sessions.

During BIE feedback, Katniss' use of PRIDE skills became more stable than in the Training/Modeling phase in that the frequency of each skill did not vary a large amount from one session to another. The only target behavior that occurred throughout the phase was unlabeled praises, although they remained consistently low with the exception of one session in which six unlabeled praises occurred. The fact that her use of PRIDE skills stabilized may indicate that the BIE feedback served as a mechanism for "fine-tuning" her skills. One could also argue that the BIE device resulted in her simply waiting for instructions. However, there were several occasions in which the primary investigator would make a suggestion, such as "this would be a good time to reflect what the child is saying" that resulted in Katniss clamming up and not saying anything. There were also occasions in which Katniss would say "good job" and the primary investigator would say "good job for what", which also resulted in Katniss not saying anything to correct her errors. Perhaps the feedback provided was aversive and essentially punished Katniss' use of PRIDE skills.

Devan rarely exhibited any PRIDE skills during baseline, whereas there was a noticeable amount of target behaviors, with questions and unlabeled praises having the highest frequency. Again, this may be a result of Devan resorting to common habits that adults generally engage in while interacting with children. Data for Devan also suggest that there was an effect when she moved from baseline to the Training/Modeling phase in that there was a noticeable increase in PRIDE skills in the latter. Furthermore, although there was an upward trend in questions at the end of baseline, the occurrences of questions substantially declined at the onset of the Training/Modeling phase. There was also a substantial decrease in the overall target behaviors exhibited by Devan during the

Training/Modeling phase. Due to the lack of time to complete the study, Devan was moved into the BIE Feedback phase after three data points, so it is unclear as to what the data would have looked like if we continued in the phase.

During the BIE Feedback phase, Devan's behavior descriptions and labeled praises remained relatively stable as seen with Katniss. However, Devan had a substantial increase in reflective statements at the onset, which is not surprising as there was an upward trend at during the Training/Modeling phase. Also during the BIE Feedback phase, the target behaviors remained consistently low, with the exception of questions which remained consistent with the frequency shown in the Training/Modeling phase. The large increase in reflective statements is not surprising because the client was very vocal with Devan, and allowed for many opportunities for Devan to reflect. Also, Devan had a habit of exhibiting an inflection at the end of her sentences, which sounded like questions. For example, one on occasion the client said "I'm driving" to which Devan replied "you're driving?" The primary investigator would quickly say "watch your inflections at the end" or "that was a question", prompting Devan to practice her reflective statements. Unlike Katniss, Devan was receptive to the feedback and would correct her mistakes on the spot, which most likely led to the high frequency of reflective statements as that was the PRIDE skill she struggled with the most.

The fact that there was a greater effect during the modeling and training phase than in the BIE feedback phase, lends support to the study done by Wallace et al. (1973) that suggests modeling combined with praise is an effective antecedent intervention compared to other antecedent procedures for training direct-care staff. Furthermore, Bandura (1969) suggests that a trainee's imitation of a model is increased when the

model is similar to the trainee. Because the primary investigator was only a few years older and was also female, the modeling may have had a greater effect than the BIE feedback as a result of the similarities between the primary investigator and the two participants. Furthermore, praise and feedback were delivered following each session during the training/modeling phase, which would not offer support for the literature (Giebelhaus, 1994; Scheeler & Lee, 2002) that suggests that prompt feedback is more effective than delayed feedback in skill acquisition. Instead, the results for support for the findings of the study conducted by O'Reilly et al. (1992) that found that immediate feedback was more effective for some participants, while delayed feedback resulted in more rapid skill acquisition for one participant. Although that particular participant had the greatest performance with delayed feedback, the immediate feedback still resulted in criterion performance of the target behaviors.

Although the BIE feedback did not result in a higher number of the PRIDE skills exhibited by the participants in the current study, the data were more stable during this phase than the training/modeling phase. Although Devan exhibited a high number of reflective statements during the BIE feedback phase (over 10 occurrences per session), the data showed little variation, with the exception of the high number during session 10. Thus, the BIE feedback may have served as a method of “fine-tuning” Devan and Katniss’ CDI skills, resulting in more stable and predictable data. In essence, modeling may be a cost effective method to initially train individuals in CDI (i.e. multiple individuals can be trained simultaneously), while BIE may serve as a mechanism for “fine tuning” CDI skills. BIE feedback may only need to be used for individuals who do



not reach criterion levels through modeling and other training procedures, or who have highly variable data.

There were several limitations to the current study. Although the participants were not being compared to each other in the study, their differences in academic level, personality, and experience working with the research team, may have accounted for the differences in the data. Katniss had never met the primary investigator prior to the onset of the study, while Devan had a working relationship with the research team. Thus, Katniss' inactivity in the beginning the study may have been a result of the novel environment and individuals. Just as it is important to establish a solid rapport with a child in order to receive more compliance, the same may be true for supervisors and trainees. The only time the two interacted was during training sessions, so there was little opportunity for them to become acquainted with one another. Furthermore, any corrective feedback provided to Katniss may have been deemed aversive than if they had more of a working relationship. The primary investigator was also more hesitant to provide Katniss with feedback and instructions than to Devan because of the lack of rapport built with Katniss.

Furthermore, Katniss always came to the clinic for the first 30 min of the client's assessment when two occupational therapists (OTs), a speech and language pathologist, a clinical psychologist, and various graduate students were in the room while she was asked to interact with the client. Having multiple individuals present may have resulted in Katniss withholding from interacting with the client. She also came on a separate day and interacted with one of the OT's clients in which only one OT, the client, and primary

investigator were present. On those observation days, there was a noticeable increase in vocalizations exhibited by Katniss. Furthermore, the primary investigator and Katniss

Devan had had more experience in the coding of CDI as she was a senior, compared to Katniss who was a sophomore. Devan also had more experience working with children in general, and had known the primary investigator for over a year prior to the onset of the study. These factors may have contributed to the fact that Devan was more interactive with the clients, and that she was more receptive to the feedback provided. There was also less of an age difference between Devan and the primary investigator, which may have resulted in a more comfortable atmosphere.

Both participants had previous training in the coding of CDI and would collect data at a local elementary school as part of a TCIT program. Although the previous exposure to CDI may have been a confounding variable, the baseline data for both participants suggests that simply knowing how to observe and record CDI is not necessarily conducive to successfully implementing it.

Another limitation to the study was the fact that multiple clients were used for the study that differed in age, gender, disabilities, and diagnoses. There was a total of six different clients that were used for the study; 2 female and 4 male. Two clients were non-verbal, which made it difficult for the participants to engage in reflective statements, for example. Some of the children seemed highly receptive to the CDI while others were not (e.g. some would actively ignore the participant). The clients' receptiveness to the participant most likely played a large role in whether the participant engaged in the PRIDE skills; the more receptive the client, the more interactive the participant. In addition, the participants were always shadowing an OT and were advised not to engage

in CDI if a child was not complying with other adults. For example, if the OT asked the client to do something and he/she resisted, the participant would not deliver reflective statements, behavior descriptions, or labeled praises in order to refrain from reinforcing noncompliance. Therefore, if a client was non-compliant for the majority of the 5-minute training session, it interfered with the participants' implementation of CDI.

The lack of time to complete the study was also a limitation. The original thesis that the primary investigator was going to complete had to be terminated due to the lack of participants, which resulted in the primary investigator having to complete the current study in only a semester. Therefore, there was insufficient time to recruit more participants and insufficient time to examine maintenance and other combinations of training procedures. Devan moved more quickly through the study than Katniss (i.e. she had less data points for the two interventions) because her schedule only allowed for her to come to the clinic on one of the two weekly data collection days. There were also several client cancellations and a holiday break that prevented more data to be collected on Devan. In addition, the primary investigator did not have a substantial amount of time to practice coaching prior to the study and had had no previous training in coaching. Therefore, the feedback delivered via the BIE device may not have been directive and/or frequent enough to yield accurate results. On the other hand, the primary investigator may have provided feedback too frequently to the point in which the participants merely waited for instructions. No data was taken on the primary investigator's delivery of feedback.

The close relationship between reflective statements and questions (i.e. the only difference between the two is the inflection at the end of the statement) resulted in some

disagreement between the primary investigator and secondary investigator in terms of IOA. Generally, interval by interval IOA results in a high percentage of agreement because it accounts for both the occurrence and non-occurrence of behaviors per interval. For example, interval by interval IOA would have been 100% across all behaviors when observing Katniss during baseline, because both investigators agreed that no behaviors occurred. However, the fact reflective statements was the only behavior to score below 96%, suggests that there may have been confusion between what should have been coded as a question versus a reflective statement. The fact that interval by interval IOA for questions was 97% may merely indicate that statements such as “what are you doing” and “are you going to play” were easier to identify and resulted in more agreement. However, if a child said “play with me” and the participant said “play with you” with a slight inflection at the end, one observer may have coded it was a reflective statement, while the other coded it was a question.

It is also important to note that scored-interval IOA is very conservative in that it takes only the intervals in which someone was scored by at least one observer, and divides the number of intervals in which both observers agreed by the total number of intervals. On several occasions, both observers recorded the same behavior (e.g. direct commands), but scored them in different intervals, which would lower the IOA. Although negative talk, direct commands, and indirect commands, had the lowest IOA, these were the least occurring behaviors. This low score suggests that those few times these behaviors did occur, the observers most likely scored them in different intervals.

Further investigation is needed to compare the efficacy of modeling and manual training to BIE feedback in regards to training paraprofessionals in the implementation of

CDI. A future study comparing these two methods of training would benefit from having more participants with/or without previous experience in coding CDI, and may require that participants receive more intensive training through the manual (e.g. take a quiz after each lesson), rather than relying on participants to review the procedures and ask questions when needed. Future investigators may also want to separate manual training from modeling to assess the effects of instructional training versus modeling versus BIE feedback, and perhaps counterbalance the three. Future studies should also place emphasis on developing a rapport with the supervisor and trainees prior to training. Rapport may result in trainees being more receptive to corrective feedback. Future investigation is also needed to assess which method(s) have the greatest effect on maintenance of skills. These modifications may yield more accurate results regarding the most effective and time efficient method of training practicum students in CDI.

## Appendix A

### PCIT/TCIT Behavior Definitions (adapted from DPICS)

#### PARENT/TEACHER BEHAVIORS

**NEGATIVE TALK (NTA)** is a verbal expression of disapproval of the child or the child's attributes, activities, products, or choices. Negative talk also includes sassy, sarcastic, rude, or impudent speech.

**DIRECT COMMAND (DC)** is a declarative statements that contain an order or direction for a vocal or motor behavior to be performed and indicate that the child is to perform this behavior.

**INDIRECT COMMAND (IC)** is a suggestion for a vocal or motor behavior to be performed that is implied or stated in question form.

**LABELED PRAISE (LP)** provides a positive evaluation of a specific behavior, activity, or product of the child.

**UNLABELED PRAISE (UP)** provides a positive evaluation of the child, an attribute of the child, or a nonspecific activity, behavior, or product of the child.

**QUESTION (QU)** is a verbal inquiry that is distinguishable from a declarative statements by having a rising inflection at the end and/or by having the sentence structure of a question. Questions request an answer but do not suggest that a behavior is to be performed by the child. There are two types of questions in the DPICS, but in TCIT, Information Questions are combined with Descriptive Questions to create a composite Question Category (QU).

**REFLECTIVE STATEMENT (RF)** is a declarative phrase or statement that has the same meaning as a preceding child verbalization. The reflection may paraphrase or elaborate on the child's verbalization but may not change the meaning of the child's statement or interpret unstated ideas.

**BEHAVIORAL DESCRIPTION (BD)** is a non-evaluative, declarative sentences or phrases in which the subject is the other person and the verb describes that person's ongoing or immediately completed (< 5 sec.) observable verbal or nonverbal behavior.

## Appendix B

### Assessment of Social Validity

Name \_\_\_\_\_

Date: \_\_\_\_\_

Questions for Participants to Answer	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
<b>Appropriateness of Procedures</b>	5	4	3	2	1
1. The written materials were easy to read and understand.					
2. My coach understood and communicated procedures and techniques effectively.					
<b>Social Significance of Goals</b>	5	4	3	2	1
4. I would recommend a similar training to other practicum students.					
5. It is important to learn techniques such as these to teach children new skills.					
<b>Social Importance of the Effects</b>	5	4	3	2	1
6. I learned many beneficial skills during this training.					
7. I would like the opportunity to use these skills to assist in therapeutic activities.					





Table 1  
Inter-observer agreement (IOA) across target behaviors and PRIDE skills

Behavior	Interval by Interval		Scored-Interval (Occurrence)	
	Mean	Range	Mean	Range
Labeled Praise	99%	97-100%	77%	0-100%
Reflective Statements	100%	100%	100%	100%
Behavior Descriptions	98.5%	93-100%	80.5%	33-100%
Negative Talk	98.5%	90-100%	40%	40%
Direct Commands	98.5%	90-100%	40%	40%
Indirect Commands	98.5%	93-100%	50%	50%
Unlabeled Praise	99%	97-100%	72%	0-100%
Questions	98%	87-100%	50%	20-100%

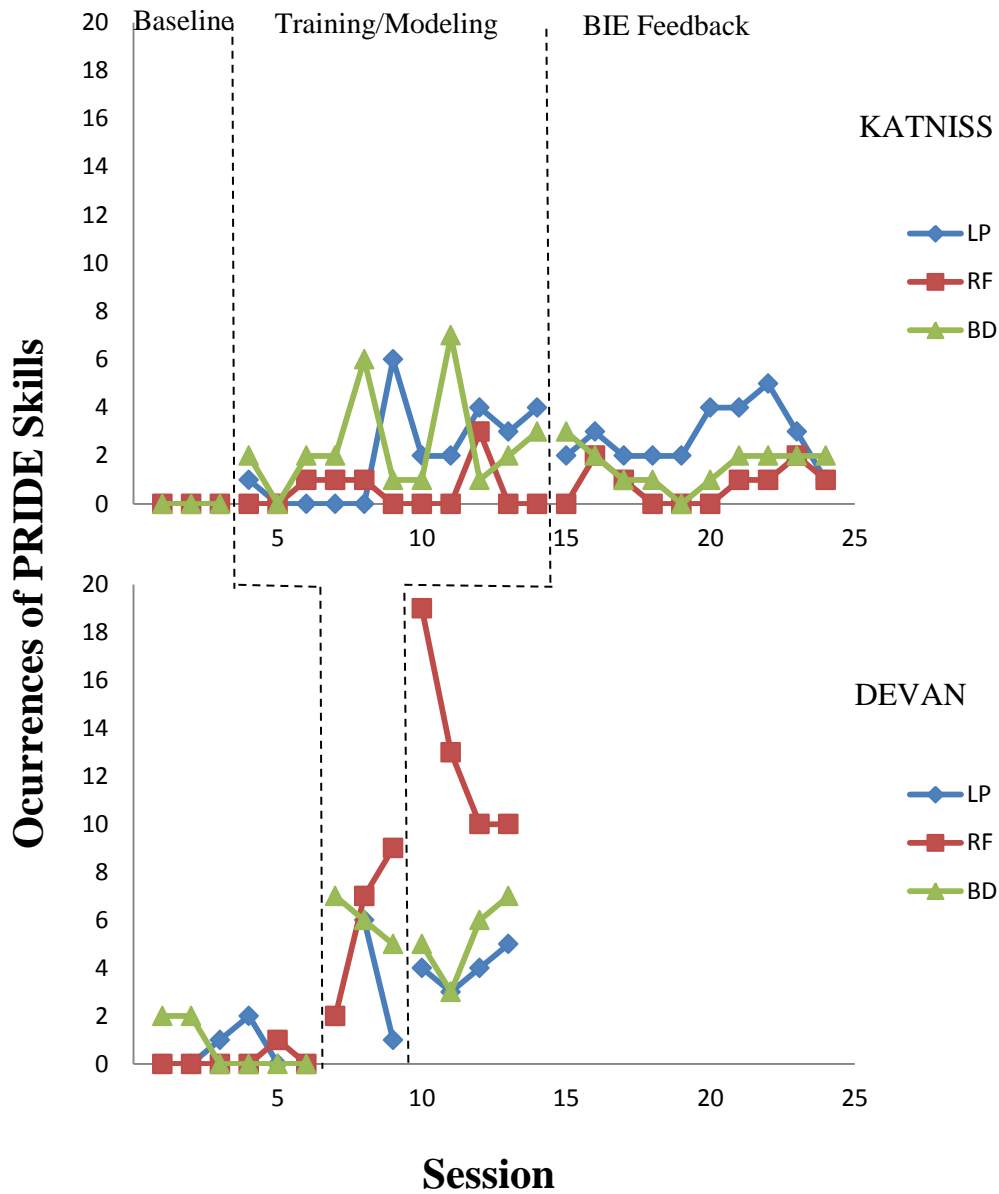


Figure 1. Occurrences of PRIDE skills (labeled praise, reflective statements, and behavior descriptions) during baseline, training and modeling, and bug-in-the ear feedback across two participants. The y-axis represents the number of intervals in which each behavior occurred during a 5-minute session. The x-axis represents 5-minute sessions, broken down into 10-second intervals.

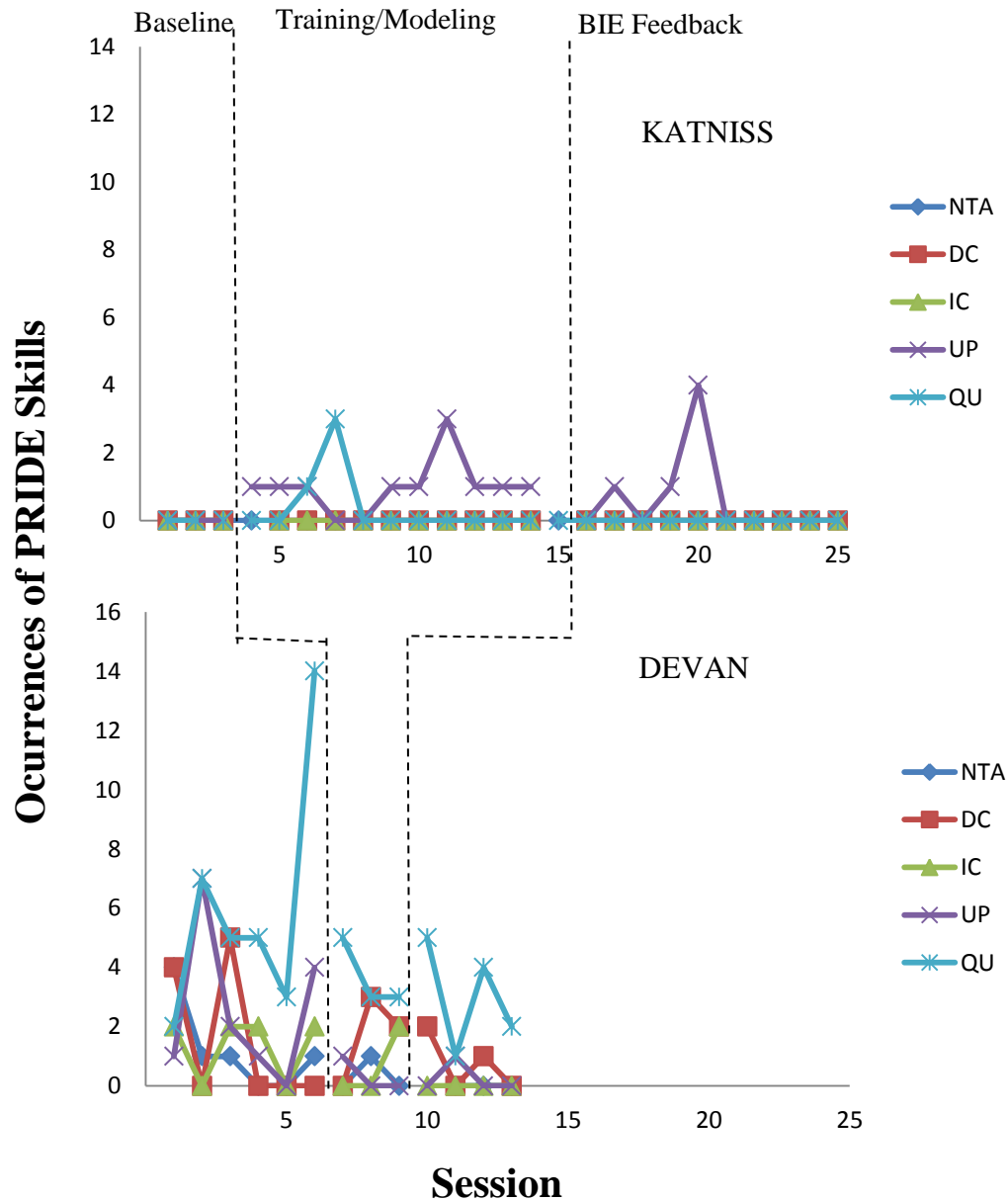


Figure 2. Occurrences of target behaviors (negative talk, direct commands, indirect commands, unlabeled praises, and questions) during baseline, training and modeling, and bug-in-the ear feedback across two participants. The y-axis represents the number of intervals in which each behavior occurred during a 5-minute session. The x-axis represents 5-minute sessions, broken down into 10-second intervals.

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