IDENTIFYING LEARN UNITS IN A NATURALISTIC TRAINING PROGRAM FOR CHILDREN WITH AUTISM AND THEIR FAMILIES

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Behavior analysts have proposed a primary measure, the “learn unit,” to evaluate educational effectiveness. Past research has indicated this is a useful approach. The benefits of “learn units” may also apply to family interventions in autism. The current analysis evaluated the rates of learn units in a naturalistic parent-training program to determine if (1) definitions of learn units previously described in the literature can be reliably applied to family interventions and (2) an increased number of learn units correlate with increased child responding and attainment of child and family goals. Results from the current analysis demonstrated that the rate of learn units increased from baseline to training for all parent-child dyads and the percent of correct child responses increased for all children. Teaching parents the components of effective education may increase the quantity and quality of interventions for children diagnosed with autism.
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INTRODUCTION

The purpose of teaching is to produce meaningful skill acquisition. Stated in behavioral terms, the point of education is that, “a teacher arranges contingencies under which the student acquires behavior which will be useful to him under other contingencies later on” (Skinner, 1974, p. 184). The definition offered by Skinner implies that teaching is a responsive interaction between teacher and student that results in meaningful outcomes. Therefore, a primary measure of “teaching behavior” would need to include both teacher and student behavior.

Many researchers have attempted to develop a primary measure of teaching. These efforts began by focusing on intervening variables such as teacher personality and have in the last few decades moved toward more observable units such as “engaged” or “on task” (see Greer, 1991). Since the early 1980s there have been two major lines of research focusing on the development of a method to measure teaching. These lines of research are based on the concepts of observable units and the idea that teaching is a responsive interaction between teacher and student. The two most prominent approaches include viewing the teaching interaction in terms of “opportunity to respond” and “learn units.” Each will be described here in some detail.

Opportunity to Respond

The Juniper Gardens Children’s Project utilizes an eco-behavioral approach to measuring teaching. Among other features, the eco-behavioral approach emphasizes the role antecedents’ play in the acquisition and maintenance of behavior (Greenwood, Delquadri, & Hall, 1984). The Code for Instructional Structure and Student Academic
Response (CISSAR) (Greenwood, & Delquadri, 1988) was developed as a means for recording individual student behavior and temporally related environment events. The system primarily addresses questions concerning classroom instruction and student academic responses (Greenwood, & Delquadri, 1988).

Greenwood, Delquadri, & Hall (1984) define opportunity to respond as “the interaction between: (a) teacher formulated instructional antecedent stimuli (the materials presented, prompts, questions asked, signals to respond, etc.), and (b) their success in establishing the academic responding desired or implied by the materials.” Care-giving, parenting, and instruction consist of the contingencies that opportunity to respond describes. (Greenwood, Hart, Walker, & Risley, 1994). This observation system and unit of measurement allow the determination of instructional contexts that either control or fail to control preferred student responses that occur as a result of the instructional contexts. Determining these effective instructional contexts would provide the opportunity to use empirical evidence when designing instruction (Greenwood, Delquadri, & Hall, 1984).

Initial studies using CISSAR indicated that both opportunities to respond and student responses were essential components of effective instruction (Greenwood, Delquadri, & Hall, 1984). There are two critical components of an opportunity to respond. The first component is an analysis of environmental antecedent events that are consistently correlated with student responses. They include instructional tactics such as presenting information, asking questions, and providing corrections. The second critical component is active student responding. Active student responding is critical because it confirms that an opportunity occurred. Active student responding can
be defined as observable responses made in response to an instructional antecedent (Heward, 1994). This could include, but is not limited to, writing, oral reading, academic talk, and asking and answering questions (Greenwood, Delquadri, & Hall, 1984).

Results from studies using the CISSAR observation system indicate that students who receive more opportunities to respond not only respond more, but they give more correct responses thereby increasing the “effectiveness” of instruction. (Greenwood, Delquadri, & Hall, 1994; Greenwood, Dinwiddle, Terry, Wade, Stanley, Thibadeau, & Delquadri, 1984; Greenwood, 1991; Greenwood, Horton, & Utley, 2002)

Learn Units

At the Keller School, Greer and colleagues developed a system-wide application of behavior analysis to entire schools called CABAS ® (Comprehensive Application of Behavior Analysis to Schools) in order to increase rates of student achievement and improve the skills of teachers (Greer, 1997). CABAS ® uses a teacher training and observation procedure called the Teacher Performance Accuracy Measure (TPRA) (Ross, Singer-Dudek, & Greer, 2005). The TPRA allows measurement of teacher behaviors previously established as effective and the student correct and incorrect responses at the same time.

The learn unit is a unit of measurement that simultaneously tracks the occurrence of antecedents, behaviors, and consequences for both teachers and students during a teaching interaction (Greer, 1994). Learn units constantly change as a result of interactions between student and teacher (Bahadourian, Tam, Greer, & Rousseau, 2006; Ingham & Greer, 1992) and are unique in that they incorporate interlocking three-term contingencies for both student and teacher (Greer, 1994).
The interlocking component of the learn units means that the behavior of the student affects the behavior of the teacher and that the behavior of the teacher affects the behavior of the student. The current or past performance of the student controls the teacher presented instructional antecedents. This teacher presentation then sets the occasion for a student response which controls the consequence provided by the teacher (Greer, 1994). Thus, the student learns through this contingency by how the teacher arranges the environment (Greer, 2002). The teacher behaviors interlock with the student behaviors because the teacher learns how to respond next based on how the student responds (Greer, 2002). The behavior of the teacher is measured by the accuracy of the learn unit presentations and the behavior of the student is measured by their response to the learn unit presentations (Greer, 2008). It is noteworthy that no distinction in the measurement unit is made between correct and incorrect student responses within the learn unit.

For example, student attending behavior is an $S^D$ for the teacher to present an instructional stimulus. The presentation of the instructional stimulus is the teacher’s response to the previous $S^D$ (student attending) and an $S^D$ for the student to respond. The student response functions as a consequence for the previous teacher response (presentation of an instructional stimulus) and as an $S^D$ for the next teacher behavior, the responsive consequence for the student’s response (Greer, 2002).

Greer (2008) states that according to research, there are six critical components to a learn unit that must be present for a learn unit to be effective. These components include an unambiguous antecedent presentation (Albers & Greer, 1991), opportunities for students to respond (Greenwood, Hart, Walker, & Risley, 1994; Heward, 1994), and
responsive consequences for student responses (Albers & Greer, 1991; Greenwood, Hart, Walker, Risley, 1994) including corrections and reinforcement operations (Albers & Greer, 1991; Ingham & Greer, 1992), and the students observation of the SD during correction procedures. Greer and colleagues emphasize that fast and frequent presentations of learn units will result in correct student responses and achieved objectives (Ingham & Greer, 1992; Greer, McCorkle, & Williams, 1989; Selinski, Greer, & Lodhi, 1991).

Results from studies using CABAS ® and the TPRA observation procedure demonstrate that there is a positive relationship between the number of teacher-presented learn units and the achievement of student goals (Greer, McCorkle, & Williams, 1989; Albers & Greer, 1991; Lam, & Greer, 1991; Selinske, Greer, & Lodhi, 1991; Ingham & Greer, 1992; Bahadourian, Tam, Greer, & Rousseau, 2006). For example, Selinke, Greer, & Lodhi (1991) applied CABAS ® in a school for children with multiple disabilities and collected data for two years. Their analysis revealed an increased number of trials taught, correct trials, and achieved student objectives after CABAS ® and the TPRA package were implemented. Follow-up data showed that these results were maintained and that the package was socially valid one year later.

According to Greer (1994), there are also at least four different types of learn units. A learn unit may be learner-controlled such as with a programmed textbook. Learners go through the material at their own pace and are presented with learn units at a rate they control. A learn unit can also be controlled by a teacher such as massed or dispersed learn units. Massed learn units occur when they are teacher-presented repeatedly to one student and dispersed learn units occur when a teacher alternates
benefit or cost. The fourth type of possible learn units are captured or incidental learn units. These “learn units for targeted objectives are captured in natural settings or settings that are created to stimulate natural ones” (Greer, 1994, p. 168), however, Greer points out that captured learn units are often difficult to record (1994).

Benefits, Autism, and Parent Training

Certainly, a primary measure of education is beneficial for a number of reasons. The development of a primary measure “would lead to better research, better teacher training, more accurate measures of teacher and school effectiveness, and ways to determine the cost and benefits of educations” (Greer, 1994, p.161). In order for education to be effective, it is critical that the time spent learning be maximized. This means increasing the number of correct student responses in the least amount of time (Bahadourian, Tam, Greer, & Rousseau, 2006). In general, the development of a measure of education is important because it will allow teachers to ensure that students are achieving their goals in a timely, effective manner. It will also allow administrators to ensure that teachers are providing the critical components of instruction, antecedent stimuli and responsive consequences.

For children who have, or are at risk for, developmental delays such as autism, maximizing learning time and positive outcomes are especially important. Research has shown for children with autism that every moment of intervention is critical and should be spent effectively (Green, 1996). For example, the children in the intensive behavior analytic treatment (IBT) group from the Howard et al. (2005) comparison study
“had 50-100 learning opportunities per hour presented via discrete trial, incidental teaching, and other behavior analytic procedures” (Howard, et al., 2005, p.366).

Results from this study showed that the children in the IBT group outperformed the children from the other groups on almost all follow-up measures (Howard, et al., 2005). The substantial number of learning opportunities was offered as a possible variable that accounts for the marked and startling differences between the experimental groups.

Although the reason is unclear, more children than ever are being diagnosed with some form of autism spectrum disorder (Center for Disease Control and Prevention). For many families affected by autism, existing services are not sufficient to maintain the intensive ongoing support that is needed (e.g. Marcus, Kunce, & Schopler, 2005; Symon, 2005). Parent training is one means of enhancing the quality of interventions available to families affected by autism. Research shows that parent training is an effective means of supplementing the quantity and availability of interventions for children with autism (e.g. Alpert, & Kaiser, 1992; Schreibman, & Koegel, R.L., 2005; McClannahan, Krantz, & McGee, 1982; Laski, Charlop, & Schreibman, 1988; Lovaas, 1987). Research also indicates that parents have been successfully taught intervention techniques that allowed them to effectively teach their children a variety of skills (e.g. Ingersoll, & Dvortcsak, 2006; Kaiser, Hancock, Nietfeld, 2000; McClannahan, Krantz, & McGee, 1982; Alpert, & Kaiser, 1992).

The proven benefits of using opportunity to respond and learn units indicates that these measures may be useful for parent training with children who have autism. It would provide the parent trainer a means of knowing if the parent had learned the desired skills of presenting antecedent instructional stimuli and responsive
consequences. It would also provide a means of determining if the children were achieving their goals. However, research has focused on teachers and students in classroom settings. There is a lack of research utilizing these measurement systems with parents and their children with autism during naturalistic teaching interactions.

Ensuring parent and child goal achievement is important for several reasons. During early childhood parents are the primary change agents in the lives of their children. Parents interact with their children during all daily activities, including play and family routines. Research shows that interventions which occur in the natural environment of children are effective and functional (e.g. Kaiser, Hancock, & Nietfeld, 2000). Furthermore it has long been recognized that interventions with young children and their families can produce dramatic and important changes (Ramey & Ramey, 1998). Developing measures of learn units for both classroom and naturalistic teaching arrangements would be beneficial for both the evaluation of progress in individual children and families and also for the evaluation of comparative effects of various approaches to instructions and program development.

The Family Connections Project (FCP) is a naturalistic parent training program for families and their toddlers with autism designed to increase desirable parent and child interactions in the natural environment. A major component of FCP is training the parent on how to teach specific skills to their child. Parents are taught to arrange learning opportunities, to provide responsive models, and to provide responsive consequences based on the responding of the child. This is similar to the majority of parent-training programs in that the program is designed to essentially teach the three-
term contingency or learn unit. Therefore, the development of an observation system to measure both parent and child behavior would benefit the family and FCP.

The purpose of the current analysis was to evaluate the rates of learn units within the FCP training program to determine (1) if adapted learn unit definitions previously described in the literature can be reliably extended to a naturalistic parent training program and (2) if an increased number of learn units correlate with increased child responding and attainment of child and family goals.
METHOD

Participants

A total of four parent-child dyads participated in this study. The children were all between the ages of 14 and 25 months. Three of the children were male and one was female. All children were independently diagnosed with a form of Autism Spectrum Disorder. All Parents were all between the ages of 32 and 36 years old. In addition to the parent-child dyads, four parent trainers also participated in the study. The parent trainers included the director of the Family Connections Project and three female graduate students.

Setting and Materials

All parent-child dyads attended sessions two times a week at the University of North Texas in the Family Connections Project (FCP) playroom. The playroom was 12.4 ft. by 8.8 ft. and decorated in a manner intended to create a natural, comfortable play environment for the parent and the child. The room contained colorful carpet, a variety of pillows, child-orientated decorations, a large cabinet filled with toys, a child-size table and chairs, a book shelf with books and toys, and a mini DVD player. Several empty shelves and clear magazine holders were mounted to the wall above child reach but within a child’s field of vision. There were a variety of toys appropriate for toddlers made available to parents throughout the duration of the session. One wall of the playroom contained a 4.8 ft. by 3.9 ft. two-way mirror used for observation.

Assessments were also conducted in the home of each parent-child dyad. Each of the children lived in an apartment or in a one-family dwelling in a middle class
neighborhood. Each home had a variety of play spaces and age-appropriate toys.

Recording materials used during the study included an 8mm Sony Mini DV Handycam digital camera, Sony 60-minute cassette tapes, recordable CDs, USB drives, lap top computers, timers, data sheets, and pencils. The digital camera was used to tape assessments both at home and in the playroom. The lap top computers were used to transfer the videos from the cassette tapes to the CDs. The recordable CDs and USB drives were used to make multiple copies of the assessment videos for data collection. During data collection, observers used the lap top computers to watch the assessment while recording data, using the timers, data sheets, and pencils.

Procedures

The FCP program consisted of an intake interview, assessment procedures, parent training across parent and child skills, and a transition meeting. Table 1 presents the general sequence of the services provided to each family. First, a general overview of the FCP parent-training program is provided and then the specific procedures in the present analysis are described.

Video assessments were conducted in the home of each family and in the FCP playroom. However, all training was conducted in the FCP playroom. During the intake interview, the family met with the supervisor and parent trainer to discuss goals for the intervention. Goals were chosen based on baseline assessments and the individual preferences of each family and were guided by research addressing the needs of preschoolers and toddlers with autism (e.g. Alpert & Kaiser, 1992; Koegel, et al., 1987; Hart & Risley, 1975; McGee, Morrier, & Daly, 1999; Noonan & McCormick, 2006;
Schreibman & Koegel, 2005; Symon, 2005; Warren, Yoder, Gazdag, Kim, & Jones, 1993). In order to provide the parents with a context for goal selection the parent trainer reviewed the FCP scope and sequence guide (see Appendix C) with them. The FCP scope and sequence guide lists master goal domains such as communication and social skills. The guide also provides a series of possible component skills for each of those goal domains.

All sessions began with an assessment, during which the parent was encouraged to access any of the materials and toys located within the playroom. At the onset of the assessment before the timer began, the parent was instructed to interact with their child in a typical manner. This could include, but was not limited to, playing a game, watching a video, eating a snack, or tickling. The parent trainer did not interact with the parent or child during the assessment period. The assessment began when the parent trainer and data analyst left the playroom and the video assessor started recording. The video assessor started a timer at the beginning of the assessment and turned it off at the end of the assessment.

Initial sessions were conducted in order to assess the current skill level of the parent and child before training. These initial sessions consisted of at least one assessment and rapport building between the parent trainer, data analyst, and the parent and child. Each initial session was one hour long. After the assessment was complete, the parent trainer and data analyst re-entered the playroom. During initial sessions, no feedback was given to the parent about the assessment; instead each initial session was spent with the parent trainer and data analyst building rapport with
the parent and child. This could include, but is not limited to, engaging in preferred activities with the child or discussing daily life with the parent.

Each parent training session was also one-hour long. During training phases the parent trainer and data analyst re-entered the playroom after the assessment and provided the parent with verbal feedback, reviewing current graphs from the assessments. Performance benchmarks were determined according to the specific child goals and individual reinforcer preferences. The performance benchmarks were generally between two and three responses per minute. For the rest of each training session the parent trainer provided a combination of opportunities, verbal instructions, models, and feedback to the parent. The training sessions could also include the parent trainer providing specific verbal instructions, and a rationale for the current procedures.

Each training session focused on teaching the parent the steps necessary to be successful in teaching a specific skill to their child. For example, if communicative attending was the first child goal, the parent trainer would begin by providing a description of the behavior and the procedure and model for the parent. During the modeling, the parent trainer would demonstrate how to shape communicative attending by providing differential reinforcement contingent on the child responding. At first the parent trainer would provide access to the reinforcer when the child turned his head in the direction of the trainer when access to the reinforcer was removed. Gradually, the parent trainer would provide access to the reinforcer for closer and closer approximations to the target skill of looking at the trainer to gain access to a reinforcer. The parent trainer would then observe the parent working with the child on the same skill and provide immediate verbal feedback to the parent. The parent may have also
received the graphs from data collected during the assessment on both his or her behavior and the child’s. In addition, data from the assessments was graphed, and decisions were made about the intervention based on these graphs and direct observation.

Table 2 presents the assessment information for each specific family. The first row of the table shows each of the assessment conditions that were conducted (not all conditions are presented in the current analysis). The second row of the table shows the duration of assessments that were conducted in each of the settings.

Measures

All recorded parent and child behaviors are outlined and briefly defined in Table 3. The first four rows describe the parent behaviors, and the second 10 rows describe the child behaviors that were counted. See Appendix A for the complete FCP Observation Protocol.

An example of a data sheet is provided in Table 4. The observer began recording in the first upper left hand cell of the grid. Once the parent either creates (creat) or capitalizes (capt) on an event in the environment, the data collector would record the minute and then circle either creat or capt depending on what the parent did. The data collector would then record whether or not the parent provided a responsive model by circling either M+ for a responsive model or M- for a non-responsive model. Then the child behavior is recorded. The child specific goals are listed in column called child response. If the child responded with communicative attending, the data collector would circle ca. If the child responded with a gestural request, the data collector would
circle \textit{gr} and if the child responded with a vocal request, the data collector would circle \textit{vr}. If the child either did not respond or responded with a behavior not included in child-specific goals, the data collector would circle \textit{other}. A \textit{C+} would be circled if the parent provided a responsive consequence and \textit{C-} would be circled if the parent provided an unresponsive consequence. If the parent provides no consequence for the child behavior then \textit{N} is circled. Finally, \textit{E+} is circle when, after delivering the consequence, the parent expands on what the child was doing. If after the child responds the parent does not provide an expansion, then \textit{E-} is circled.

Data Collection Procedures

All data were collected by graduate students enrolled at the University of North Texas in the Department of Behavior Analysis as part of an ongoing research project. The three data collectors were all female between 23 and 27 years of age. Before data collection began, each data collector was given a copy of the observation code which contained definitions, examples, and non-examples for all the behaviors that were to be recorded. Training for the data collectors consisted of watching video clips, discussing examples and non-examples of each behavior for all parent-child dyads that participated in the study, and practicing recording behavior on the appropriate data sheet with the FCP parent trainer.

Learn Unit and Successful Learn Unit Calculations

The purpose of the present analysis was to expand definitions from previous literature to measure opportunity to respond and learn units in a naturalistic parent
training and to compare child goal progress to the occurrence of learn units and teach units. Learn units and successful learn units were not the analytic unit used to make decisions during the parent training program. This was a reanalysis. The addition of the successful learn unit was made in order to discriminate between correct and incorrect child responding. The calculations for learn units consisted of counting each opportunity the child had to respond, if delivered, a responsive model, and delivery of a responsive consequence (Greenwood, Hart, Walker, & Risley, 1994; Greer, 1994). This means that every completed line on the data sheet is counted as a teach unit. A successful learn unit consists of an opportunity to respond, if delivered, a responsive model, a correct or target approximation to the current child goal response, and delivery of a responsive consequence (Greenwood, Hart, Walker, & Risley, 1994; Greer, 1994). This means that each line on the data sheet where the child responds correctly is counted as a Learn Unit.

Design

A multiple baseline across parent participants with an embedded multiple baseline across child goals was implemented (Kazdin, 1973). Each baseline was staggered across parent participants ranging from one to three assessments. Child goals were also staggered for each family.

Interobserver Agreement

Interobserver agreement was calculated for 30% of each condition of the intervention and for each parent and child behavior that was recorded. Interobserver
agreement was calculated by dividing the smaller number of instances of the behavior by the larger number of instances of the behavior and then multiplying by 100. The formula was agreements/disagreements plus agreements multiplied by 100.
RESULTS

Interobserver Agreement

Interobserver agreement for each parent-child dyad is presented in Table 5. For all measures, the overall average IOA was 94.0%. The top section of the figure shows the IOA for each of the parent behaviors that were counted. The middle section of the figure shows the IOA for each of the child behaviors that were counted. The bottom section of the table is the average IOA for each parent-child dyad.

Figure 1

Figure 1 shows the rate per minute of learn units and successful learn units presented by the parent during baseline and parent training for each parent-child dyad. The first phase represents assessments taken during baseline and the second phase represents assessments taken during parent training. This graph shows rates of learn units and successful learn units increased from baseline to parent training for all parent-child dyads. The grey goal band represents the performance benchmarks of 2 to 3 goals responses per minute. Overall, parents provided between 0 and 2.2 learn units with an average of 0.7 learn units per minute and between 0 and 0.6 successful learn units with an average of 0.3 successful learn units per minute during baseline. After parent training, parents provided an average of 4.7 learn units per minute and an average of 4.0 successful learn units per minute.

The top panel of Figure 1 shows that during baseline Jennifer presented Tyler with 2.2 learn units and 0.6 successful learn units per minute. During parent training learn units ranged from 2.5 to 13.0 per minute and successful learn units ranged from
2.0 to 13.0 per minute with an average of 5.7 learn units and 4.7 successful learn units presented per minute. Overall, this demonstrates an average increase of 3.5 learn units and 4.1 successful learn units per minute for Tyler from baseline to parent training.

The second panel of Figure 1 shows that during baseline Jennifer presented Will with 0.2 learn units and 0.2 successful learn units per minute during baseline. During parent training learn units ranged from 0.5 to 12 per minute and successful learn units ranged from 0.5 to 11.5 per minute with an average of 5.4 learn units and 4.7 successful learn units per minute. Overall, this demonstrates an average increase of 5.2 learn units and 4.5 successful learn units per minute for Will from baseline to parent training.

The third panel of Figure 1 shows that during baseline Cory did not present Sunny with any learn units or successful learn units. During parent training learn units ranged from 0 to 13 per minute and successful learn units ranged from 0 to 13 per minute with an average of 4.6 learn units and 4.3 successful learn units per minute. Overall, this demonstrates an average increase of 4.6 learn units and 4.3 successful learn units per minute for Sunny from baseline to parent training.

The bottom panel of Figure 1 shows that during baseline Katie presented Daniel with an average of 0.3 learn units and 0.3 successful learn units per minute. During parent training learn units ranged from 1 to 5.6 per minute and successful learn units ranged from 0.9 to 3.8 per minute with an average of 3.1 learn units and 2.3 successful learn units per minute. Overall, this demonstrates an average increase of 2.8 learn units and 2.0 successful learn units per minute for Daniel from baseline to parent training.
Figure 2

Figure 2 shows the percent of learn units that resulted in a correct child goal response during baseline and parent training for each parent-child dyad on the left ordinate. The number of learn units is also shown in Figure 2 on the right ordinate. The first phase represents assessments taken during baseline and the second phase represents assessments taken during parent training.

Overall, this graph shows that on average during baseline 50.0% of learn units resulted in a correct child goal response and between 0 and 2.2 learn units were being presented per minute. After parent training an average of 85.4% of learn units resulted in a correct child goal response and an average of 4.7 learn units were being presented. Indicating an increase in the percent of correct child goal responses from baseline to parent training for all parent-child dyads when the number of learn units per minute increased.

The top panel of Figure 2 shows that during baseline when Tyler was presented with 2.2 learn units per minute, 33.3% of learn units resulted in a correct child goal response. After parent training when Tyler was presented with an average of 5.7 learn units per minute the percent of learn units resulting in correct child goal responses ranged from 58.3% to 100% and averaged 84.6%. This demonstrates an average increase of 51.3% of correct child goal responses from baseline to parent training for Tyler.

The second panel of Figure 2 shows that during baseline when Will was presented with 0.2 learn units per minute, 100% of learn units resulted in a correct child goal. This is equal to one learn unit and one correct child goal response during
baseline. After parent training when Will was presented with an average of 5.4 learn units per minute the percent of learn units resulting in correct child goal responses ranged from 72.7% to 100% and averaged 90.3%.

The third panel of Figure 2 shows that during baseline when Sunny was not presented with any learn units she emitted no correct child goal responses. After parent training when Sunny was presented with an average of 4.6 learn units per minute the percent of teach units resulting in correct child goal responses ranged from 50% to 100% and averaged 80.6%. This demonstrates an average increase of 80.6% of learn units resulting in correct child goal responses from baseline to parent training for Sunny.

The bottom panel of Figure 2 shows that during baseline when Daniel was presented with an average of 0.3 learn units per minute, an average 66.7% of learn units resulted in correct child goal responses. After parent training when Daniel was presented with an average of 3.1 teach units per minute the percent of learn units resulting in correct child goal responses ranged from 52.2% to 100% and averaged 86.0%. This demonstrated an average increase of 19.3% of learn units resulting in correct child goal responses from baseline to parent training for Daniel.
DISCUSSION

The first goal of the current analysis was to determine if definitions taken from previous research on opportunity to respond and learn units could be expanded and reliably applied to a naturalistic parent-training program for young children diagnosed with autism. The definition of opportunity to respond includes antecedent instructional stimuli and child responding (Greenwood, Hart, Walker, & Risley, 1984) and the definition of learn unit includes antecedent stimuli, child responding, and responsive consequences (Greer, 1994).

The current analysis included both antecedent stimuli and responsive consequences, but expanded previous efforts by distinguishing between units with child correct and incorrect responses. The “successful learn unit” definition used in the current analysis included correct child responses and the “learn unit” definition used in the current analysis included correct and incorrect child responses. This allowed us to discriminate between a teaching interaction where the child responded with a correct or approximate child-specific goal behavior resulting in a successful learn unit and a teaching interaction where the child either did not respond or responded with a behavior not included in the child-specific goal responses. Although both groups present child correct responses in relation to the number of opportunities to respond they do not differentiate between units or teaching interactions in which the child responds correctly and units where the child either does not respond or responds incorrectly.

Greer (1994) also states that captured or incidental learn units are often difficult to record. The current observation system recorded learn units and successful learn units that occurred in the natural environment. Perhaps, this was due to the
specifications of the instructional stimuli required by naturalistic teaching procedures. That is, this particular training program established clear parameters for counting environmental arrangements, either creating or capitalizing on events, and delivering responsive consequences.

The results presented in Figure 1 demonstrate that all parents learned to present their children with learn units and many of these learn units were successful. These results are important because they demonstrated to the parent-trainer that the parent had learned the targeted skills of creating and capitalizing environmental events, providing responsive models, and providing responsive consequences, allowing the parent-trainer to analyze the effectiveness of the parent-training program. During baseline all parents were presenting very low rates of, if any, learn units and almost no successful learn units to their children. Once parent-training began, there was increase in the presentation of learn units and a majority of these were successful learn units. This was true of all families.

The variability present in the rate of learn units and successful learn units for all parents could be the result of several factors. The introduction of new child-goals appeared to effect responding. For example, when the parent-trainer introduced techniques to teach request “up” the rate of learn units and successful learn units presented by Cooper decreased. This may be because just as Sunny was learning the new skill to request “up” Cooper was also learning to present learn units for that specific skill. Furthermore, after introducing a new child goal the rate of learn units may be higher than the rate of successful learn units because the child has not yet learned to emit an approximation or correct response. For example, when the parent-training
introduced the child goal of communicative attending for Daniel, the rate of learn units being presented by Katie was higher than then the rate of successful learn units because Daniel was not consistently emitting an approximation or correct response. As he learned to vocalize and Katie learned to shape behavior successful learn units increased. Shaping involves accepting closer and closer approximations to a target behavior (Cooper, Heron, & Heward, 2007). As the parents were learning the skill of shaping the rate of successful learn units increased. The parents were learning to accept closer approximations, instead of waiting for the child to emit the final target behavior before delivering a reinforcer.

For all parents there appears to be an overall increase and then decrease in the rate of learn unit and successful learn unit presentation. For example, during the parent-training intervention the rate of learn unit and successful learn unit presentations increased to as high as 13 learn units and 13 successful learn units per minute for Jennifer and Tyler, 12 learn units and 11.5 successful learn units per minute for Jennifer and Will, and 13 learn units and 13 successful learn units per minute for Cooper and Sunny. This is a very high number of teaching interactions to occur in one minute and most likely does not reflect a natural rate of teaching interactions appropriate for the skills and environment. It may also be unreasonable to except parents to continue this rate of teaching interactions throughout the day.

By the end of the parent-training intervention all parents were providing a lower rate of learn units and successful learn units. The last assessment for each parent shows the rate of learn units to be between 2.3 and 4.5 per minute and the rate of successful learn units to be between 1.2 and 2.5 per minute. This rate of presentation
appears to be effective for goal attainment and might reflect a more natural number of teaching interactions for young children and their parents. It is also important to note that this lower rate of learn unit presentations is similar to the rate reported in the Howard et al. (2005) study. They reported that children who made the most progress received between 50 and 100 learning opportunities per hour. Converting the rate per minute to rate per hour shows during the last assessments that the parents were presenting between 70 and 150 learn units per hour, which is within the range reported by Howard, et al. (2005). Since this is one of the first analyses in this context future investigations may address performance benchmarks for useful rates of learn units and successful learn units.

The rate of teaching interactions should also reflect the specific skill being targeted and the reinforcers utilized. For example, one of Sunny’s child-specific goals was crawling. Completing a crawl cycle can take significantly longer than, for example, a vocal request. A behavior that takes longer to complete will limit the rate of learn unit and successful learn unit presentations because the parent will not be able to present a new one until the child has completed the behavior and received a consequence. The opposite may be also true for skills that do not have a long duration. The rate of learn unit and successful learn unit presentations may be higher for skills such as a vocal request which can have a very short duration. The reinforcers that are selected can have a similar effect based on their consumption time. A toy with a short consumption time, such as a flashing light, will allow for higher presentations of learn units and successful learn units than a toy with a longer consumption time, such as watching a clip of a movie or playing with a marble roll.
Previous research utilizing opportunity to respond and learn units indicates that increases in both units are correlated with increased correct student responses and achieved student goals (e.g. Greenwood, Delquadri, & Hall, 1994; Greenwood, Horton, & Utley, 2002; Greer, McCorkle, & Williams, 1989; Albers & Greer, 1991). The second goal of the current analysis was to determine if, similar to previous research, an increased number of learn units is correlated with increased child responding and attainment of child and family goals.

The results presented in Figure 2 demonstrate that, similar to previous research, an increased number of learn units and successful learn units corresponds with increased child responding and correct responding. These results are important because they allowed both the parent-trainer and the parents to know that the children had learned the specific-child goals that had been selected. These results also demonstrated to the parent-trainer that the parent was successfully using the critical components of effective teaching.

During baseline when very few, if any, learn units and successful learn units were presented, the children were emitting very few, if any, goal responses with the exceptions of Will and Daniel. During baseline assessments Will was presented with one learning opportunity and emitted one goal response of a material contacted. Also, during Daniel’s second and third baseline assessments he was presented with learning opportunities and emitted the goal response of gestural requesting.

Once parent-training begins and the number of learn units and successful learn units increase, the percent of correct child responding also increases. The increased correct child responding is maintained across the parent-training intervention. Even
when a new child-specific skill is introduced there is very little change seen in the percent of correct child responding.

Ensuring that the parents of children with autism have learned the skills necessary for presenting learn units and successful learn units helps guarantee that intervention time is maximized and contributes to the effort of expanding the availability of interventions for families affected by autism. As stated earlier, it is critically important that learning time be well spent for children with autism (e.g. Green, 1996; Howard, et al., 2005). Because parents are engaged with their young children during all daily activities, teaching parents the skills necessary for effective teaching will greatly increase the time young children with autism spend learning. One limitation of this study is that only assessments taken in the FCP playroom were analyzed. In the future it will important to determine if these skills generalized to home and community settings.

In conclusion, this analysis demonstrated the definition of a learn unit could be reliably expanded to apply to different contexts and with different responses such as a naturalistic parent-training program for families with children diagnosed with autism. The application of this system of measurement provides parent-trainers with skills to teach parents, based on empirical evidence, which will increase the effectiveness of the teaching interactions they have with their children, and at the same time allow parent-trainers to determine if their intervention is effective. Giving parents the skills to effectively teach their young children with autism will increase the quantity and quality of intervention for these children during a critical time in their education.
Figure 1. Learn units and successful learn units.
Figure 2. Learn units resulting in successful learn units.
Table 1

*Family Connections Project Sequence of Sessions*

<table>
<thead>
<tr>
<th>Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>20</td>
</tr>
</tbody>
</table>
### Table 2

**Participant Assessment Information**

<table>
<thead>
<tr>
<th></th>
<th>Tyler</th>
<th>Will</th>
<th>Sunny</th>
<th>Daniel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment Conditions</strong></td>
<td>FCP playroom</td>
<td>FCP playroom</td>
<td>FCP playroom</td>
<td>FCP playroom</td>
</tr>
<tr>
<td>Play alone at home</td>
<td>Play alone at home</td>
<td>Play alone at home</td>
<td>Play alone at home</td>
<td>Play alone at home</td>
</tr>
<tr>
<td>Snack-time at home</td>
<td>Snack-time at home</td>
<td>Snack-time at home</td>
<td>Snack-time at home</td>
<td>Snack-time at home</td>
</tr>
<tr>
<td>Play with mom at home</td>
<td>Play with mom at home</td>
<td>Play with mom at home</td>
<td>Play with mom at home</td>
<td>Play with mom at home</td>
</tr>
<tr>
<td>Play with twin at home</td>
<td>Play with twin at home</td>
<td>Play with twin at home</td>
<td>Play with dad at home</td>
<td>Play with dad at home</td>
</tr>
<tr>
<td>Play with mom and twin at home</td>
<td>Play with mom and twin at home</td>
<td>Play with mom and twin at home</td>
<td>Play with mom and dad at home</td>
<td>Play with mom and dad at home</td>
</tr>
<tr>
<td>Play with mom, twin, and brother at home</td>
<td>Play with mom, twin, and brother at home</td>
<td>Play with mom, twin, and brother at home</td>
<td>Play with mom and dad at home</td>
<td>Play with mom and dad at home</td>
</tr>
<tr>
<td><strong>Assessment Durations</strong></td>
<td>2-5 min in FCP playroom</td>
<td>2-5 min in FCP playroom</td>
<td>1-5 min in FCP playroom</td>
<td>10 min in FCP playroom</td>
</tr>
<tr>
<td>5 min at home</td>
<td>5 min at home</td>
<td>5 min at home</td>
<td>5 min at home</td>
<td>10 min at home</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3

**Brief Behavior Definitions**

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Brief Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arranging Learn Opportunities</strong> (parents)</td>
<td>Teacher creates and/or capitalizes on a teaching opportunity by controlling or withholding access to events in the environment. The teacher creates or contrives a teaching opportunity by arranging the environment to promote the child's interest in events that the teacher can control access to.</td>
</tr>
<tr>
<td><strong>Responsive Model</strong> (parents)</td>
<td>An appropriate adjustment of a model when compared with a previous model delivery and dependent on child responding.</td>
</tr>
<tr>
<td><strong>Responsive Consequence</strong> (parents)</td>
<td>Teacher adjusts reinforcer delivery based on closer approximation, previous child responding, and apparent desirability of event being delivered.</td>
</tr>
<tr>
<td><strong>Expansion</strong> (parents)</td>
<td>Parent accepts a child initiation and then parent immediately adds/participates in an additional sequence within the same pattern, activity, or vocalization while delivering access. Delivering access includes providing materials/activity related to a vocalization that was inaccessible prior to the initiation; or providing continued access to materials/activity that the child was engaged with at the time a non-vocal play sequence was initiated.</td>
</tr>
<tr>
<td><strong>Gestural Request</strong> (Tyler, Will, Daniel)</td>
<td>Non-vocal gestures (pictures/gestures/signs) directed to another that ask for an item, specify an action to be completed by other, request information, permission, or attention.</td>
</tr>
<tr>
<td><strong>Communicative Attending</strong> (Tyler, Will, Sunny, Daniel)</td>
<td>The child's head movement in the direction of an adult, following removal of a preferred item or to gain access to an inaccessible item or event. An inaccessible item or event may be the attention of the adult (i.e. the parent delivers attention in the form of vocalizations or item/event delivery following the child's head movement in the direction of the parent, delivers a food item, activates a toy, grabs a toy off of a shelf, opens a cabinet that was locked, etc.)</td>
</tr>
<tr>
<td><strong>Vocal Request</strong> (Tyler, Will, Sunny, Daniel)</td>
<td>Spoken sounds, words, phrases, or complete sentences directed to another that ask for an item, directs another to engage in a specified activity, specifies an action to be completed by other, request information, permission, or attention. Onset begins with 1st sound and offset happens after 1 second has passed. Access to item/activity does not have to be delivered to be counted as a vocal request.</td>
</tr>
<tr>
<td><strong>Request “up”</strong> (Sunny)</td>
<td>When physical contact is removed by a pause in the preferred activity (tickling or being set down after being picked up), the child raises both arms in an upward direction toward the parent within 5 seconds after removal of social attention. Child's arms must be raised for at least 1 whole second (i.e. if child raises arms and quickly drops them [arm flapping] this would not be scored as a request “up.” If child raises arms a portion of all the way up and then raises them all the way up, only one request “up” is scored. Request “up” may be scored simultaneously with communicative eye contact.</td>
</tr>
<tr>
<td><strong>Crawl Components</strong> (Sunny)</td>
<td>Child is elevated 3 sec. on forearms, hands, knees, forearms and knees, hands and knees, or lying on stomach with either arms or legs extended. Extended time engaged in a crawl component is scored as multiple crawl components (i.e. child elevated on forearms and knees for 9 seconds is scored as 3 crawl components).</td>
</tr>
<tr>
<td><strong>Crawl Cycles</strong></td>
<td>Child is engaged in a crawl component or is in a stationary position and moves at least 1 arm and/or 1 leg forward (simultaneously or (Sunny) alternating), resulting in the child’s entire body moving forward.</td>
</tr>
</tbody>
</table>
Table 3 *(continued).*

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Brief Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Object Imitation</strong></td>
<td>The child reciprocates an action of the teacher or peer with the same or similar object within 5 seconds of the action being presented. A response will be counted as an approximation if the child either partially performs the same action or attempts to perform the action with the same or similar object.</td>
</tr>
<tr>
<td>(Tyler and Will)</td>
<td></td>
</tr>
<tr>
<td><strong>Motor Imitation</strong></td>
<td>The child reciprocates a motor action by imitating the action of the teacher or peer within 5 seconds of the action being presented. A response will be counted as an approximation if the child either partially performs the same action or attempts to perform the action with the same body parts.</td>
</tr>
<tr>
<td>(Tyler and Will)</td>
<td></td>
</tr>
<tr>
<td><strong>Reciprocal Imitation</strong></td>
<td>Is defined as the child reciprocating a play action by imitating the play action of the teacher of peer within 5 seconds of the play action being presented and engaging in the play action for at least 2 “turns”. A turn is defined as the teacher of peer performing the action and the child imitating the action.</td>
</tr>
<tr>
<td>(Tyler and Will)</td>
<td></td>
</tr>
<tr>
<td><strong>Materials Contacted</strong></td>
<td>Each different stimulus item that is considered a conventional play material that is physically contacted by the child (e.g., on floor, on table in the child’s view and reach) and within view.</td>
</tr>
<tr>
<td>(Tyler and Will)</td>
<td></td>
</tr>
</tbody>
</table>
Table 4

Data Sheet Example

Parent and Child Intervention Goals

**Scoring Instructions**: Upon the parent creating or capitalizes on an opportunity, mark the corresponding minute in which the opportunity occurred. Following the opportunity arrangement (creat/capt), mark whether or not a responsive model was delivered. Next record the child’s response by circling the specific behavior that occurred or other. Then record whether a responsive consequence was delivered and whether an expansion was delivered. Once you come to the end of the line move down to the line below it. Continue in this sequence until the end of the clip. Total the number of each behavior at the bottom of the data sheet. Multiple copies of this data sheet may be needed. In the event that multiple data sheets are needed, record the totals on the first data sheet and then staple them together.

<table>
<thead>
<tr>
<th>min</th>
<th>opp</th>
<th>RM</th>
<th>response</th>
<th>RC</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>creat.</td>
<td>capt.</td>
<td>M+</td>
<td>M-</td>
<td>ca</td>
<td>gr</td>
</tr>
</tbody>
</table>

**Totals**: Opportunity Arrange:_______
Responsive Model:_______
Responsive Conseq:_______
Expansion:_______

<table>
<thead>
<tr>
<th>min</th>
<th>opp</th>
<th>RM</th>
<th>response</th>
<th>RC</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>creat.</td>
<td>capt.</td>
<td>M+</td>
<td>M-</td>
<td>ca</td>
<td>gr</td>
</tr>
</tbody>
</table>

Comm. Attending:___________
Gestural Request:___________
Vocal Request:___________
### Table 5

**Interobserver Agreement**

<table>
<thead>
<tr>
<th></th>
<th>Tyler</th>
<th>Will</th>
<th>Sunny</th>
<th>Daniel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opportunity Arrangement</strong></td>
<td>94.1%</td>
<td>95.7%</td>
<td>92.2%</td>
<td>95.2%</td>
</tr>
<tr>
<td><strong>Responsive Model</strong></td>
<td>93.5%</td>
<td>95.2%</td>
<td>87.2%</td>
<td>95%</td>
</tr>
<tr>
<td><strong>Responsive Consequence</strong></td>
<td>94.3%</td>
<td>92.2%</td>
<td>96.4%</td>
<td>90%</td>
</tr>
<tr>
<td><strong>Expansion</strong></td>
<td>92.4%</td>
<td>97.7%</td>
<td>100%</td>
<td>87%</td>
</tr>
<tr>
<td><strong>Communicative Attending</strong></td>
<td>87.3%</td>
<td>85%</td>
<td>92.2%</td>
<td>89.3%</td>
</tr>
<tr>
<td><strong>Gestural Request</strong></td>
<td>90.4%</td>
<td>85%</td>
<td>n/a</td>
<td>92.4%</td>
</tr>
<tr>
<td><strong>Vocal Request</strong></td>
<td>91.2%</td>
<td>94.2%</td>
<td>100%</td>
<td>91.7%</td>
</tr>
<tr>
<td><strong>Request “up”</strong></td>
<td>n/a</td>
<td>n/a</td>
<td>92.8%</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Crawl Component</strong></td>
<td>n/a</td>
<td>n/a</td>
<td>92.1%</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Crawl Cycle</strong></td>
<td>n/a</td>
<td>n/a</td>
<td>98%</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Object Imitation</strong></td>
<td>99.2%</td>
<td>100%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Motor Imitation</strong></td>
<td>100%</td>
<td>100%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Reciprocal Imitation</strong></td>
<td>100%</td>
<td>100%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Materials Contacted</strong></td>
<td>100%</td>
<td>100%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Overall Average</strong></td>
<td>94.8%</td>
<td>95.0%</td>
<td>94.5%</td>
<td>91.5%</td>
</tr>
</tbody>
</table>
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  Vocal Request

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  Gestural Request
  Communicative Attending
  Vocal Request
FCP Scoring Instructions

Text in Grey: These definitions have not reached interobserver agreement. Do NOT score them at this time.

Converting to rate/min:
After viewing a video and tallying the total number of occurrences of each behavior (event recording data sheet), divide the total by the number of minutes of the tape to convert the raw data to rate/min. (e.g. if 10 occurrences of encouraging statements occurred in a 2 min assessment clip, complete the calculation 10 divided by 2 = 5; therefore, 5 encouraging statements per/min). Write the rate/min calculation (5 rpm) right next to the raw data score on the data sheet and circle it.

Converting to percent of intervals:
After viewing a video and tallying the total number of intervals (interval recording data sheet) in which each behavior occurred, divide the total number of intervals in the video (see interval guide on each data sheet) by the total number of intervals in which the behavior occurred and multiply by 100 to convert the raw data to percentage of intervals (e.g. if cooperative play occurred in 17 intervals in a 5 min clip [30 intervals], complete the calculation 17 divided by 30 = .56666 (.57) X 100= cooperative play occurred in 57% of intervals. Make sure to round each decimal to the nearest hundredths place value. Write the percentage of intervals (57%) right next to the raw data score on the data sheet and circle it.

Interval Scoring Instructions:
Score an “X” through the entire interval cell if the child (social play, activity engagement, &/or social connections) or parent (parent affect &/or social connections) is not on the tape at all during the 10 s interval OR if the view is blurred or obstructed in some way in which the child and/or parent is not able to be clearly seen.

Special Circumstances per Data Sheet:

PARENT INTERACTION GOALS:
If there is more than 1 data sheet required for a single assessment clip, fill out all of the information on the top of both data sheets and label the data sheets 1 of 3, 2 of 3, 3 of 3, etc. Please paperclip all of the data sheets together (do not staple).

PARENT AFFECT:
Score this data sheet with the sound on mute

CHILD VERBAL BEHAVIOR:
Score a cumulative of each of the vocal behaviors on this data sheet when one or more children are present in an assessment if each individual child’s vocal behaviors cannot be discriminated from the other

MATERIALS CONTACT:
Each time a child receives access to a toy/material, food, or a social activity contingent on a specific IFSP goal write down the name of the toy/material, food, or social activity in the appropriate category. (we want to know how many different things are contacted)

**Training Protocol**

**Step 1: Review FCP observation code** – trainer and trainee review all relevant behavior definitions and discuss examples and non-examples.

**Step 2: Review examples of FCP tapes** – trainer and trainee watch selected clips of FCP and discuss the clips while looking at the observation code. (The trainer should select clips, before training session, that will provide examples for all children and parents working on a variety of skills, both at the beginning of intervention and at the end)

**Step 3: Quiz** – trainer will ask the trainee a number of questions in order to determine their familiarity with the FCP observation code. (The trainer should develop these question prior to training session. The questions should be an expansion of the examples discussed earlier, for example you could describe a scenario and ask the trainee how they would score it.)

**Step 4: Watch clips and score with feedback** – trainer and trainee will watch clips and score them using the appropriate data sheet at the same time. While scoring the clips the trainer will provide the trainee with immediate feedback.

**Step 5: Independent score** – the trainee will score clips independent of the trainer. After the trainee has scored a few (3 or 4) clips the trainer will check the IOA. If there are areas that need improvement start back at step 1 of training protocol. If the IOA is good, the trainee should continue scoring with frequent IOA checks.

**General Behavior Definitions**

**PARENT INTERACTION GOALS**

(event recording)

**Arranging Learning Opportunities (crea./capt.)**
Teacher creates and/or capitalizing on a teaching opportunity by controlling or withholding access to events in the environment. The teacher creates or contrives a teaching opportunity by arranging the environment to promote the child’s interest in events that the teacher can control access to.
**Examples** include but are not limited to: parent presenting events to the child while maintaining control; parent placing preferred materials out of reach; parent giving inadequate food/drink portions to the child; parent offering choices; parent setting up events that require assistance from the teacher; parent setting up a block or an aversive event; parent asking a question or making a comment.

**Non-examples** include but are not limited to: parent giving item to child non-contingently; parent giving entire container of desired food item to child (french fries, gold fish); all desired toys accessible to child; parent saying "hey honey do you want this?" and then giving it to him.

**Responsive Model Delivery (M+/M-)**
An appropriate adjustment of a model when compared with a previous model delivery.

**Examples** include but are not limited to; parent did not originally deliver a vocal model, but later delivers a vocal model, it would be considered a responsive model because it was adjusted compared to the first model (lack of vocal model); parent waits 2 seconds to delivery the next model when the previous model delivery occurred within 1 second of no response, it would be considered a responsive model because it was adjusted compared to the first model (shorter latency); parent slowly moves toy upward toward his face to model where the child should look when working on eye contact; parent adjusts placement of a toy (moves it closer or farther away) when child stops crawling towards it

**Non-examples** include but are not limited to: parent didn't originally deliver a vocal model and later still doesn't deliver a vocal model; parent waits 2 seconds originally and later waits 2 seconds again; giving the same model--parent says "ball" and then says "ball" again without breaking the word down.

**Responsive Consequence Delivery (C+/C-)**
Teacher adjusts reinforcer delivery based on closer approximation, previous responding, and apparent desirability of event being delivered.

**Examples** include but are not limited to: child delivers bubbles when child says, “buh” following a vocal model “buh;” parent gives child juice following an instance of communicative eye contact when juice was removed.

**Non-examples** include but are not limited to: parent gives item to child when child turns away; parent gives item to child when child begins to whine/tantrum; child reaches for item, gives eye contact, and parent does not give item to child.

**Expansion of Child Initiations (E+/E-)**: Parent accepts a child initiation and then parent immediately adds/participates in and additional sequence within the same pattern, activity, or vocalization while delivering access. Delivering access includes providing materials/activity related to a vocalization that was inaccessible prior to the initiation; or providing continued access to materials/activity that the child was engaged with at the time a non-vocal play sequence was initiated.
Examples include but are not limited to the child saying “vvv” in the presence of the tv, mom says “video,” and provides access to a video. Child is looking at a book and touches a flap, mom lifts flap up and the child continues to look at the book.

Non-examples include but are not limited to the child saying “mmm” in the presence of the tv, mom says “video” but does not deliver access. Child is looking at a book, says “du,” mom says “duck” and the child continues to look at the book.

Response (approx.):
The child engages or attempts to engage in the target behavior, specified in the opportunity arrangement. SEE CHILD SPECIFIC BEHAVIOR DEFINITIONS!

Examples include but are not limited to: the child moves his head in the directions of the parent’s head when an opportunity for eye contact is set up; the child says “buh” following the vocal model “ball;” the child touches his mouth and his nose with an open hand following an opportunity for motor imitation of touching nose.

Response (other):
The child engages in a behavior other than that specified by the opportunity arrangement.

Examples include but are not limited to: the child says “eat” when an opportunity for eye contact was set up; the child touches his head when an opportunity for object imitation with a drum was set up; the child sits still when an opportunity for functional communication was set up.

**ACTIVITY ENGAGEMENT**
(interval recording)

**Harmful Play (H)**
Child is engaged in manipulation of materials or actions that do or could result in obvious harmful physical consequences to self or other people or animals.

Examples include but are not limited to: Poking objects into electricity socket; pinching, slapping, scratching, biting, hitting, or kicking others; dropping or throwing objects in the direction of others; banging one's body parts with objects or banging body parts on objects; using objects in inappropriate ways such as poking a pencil in eye.

Non-examples include but are not limited to: patting someone on the back lightly while saying “good job;” throwing a basketball in the direction of a basketball hoop; mouthing toy food; clapping hands.
**Simple Play (S)**
Child makes contact with materials and physically doing something with materials that is not according to conventional use, is not pretend play and does not appear to be a component of a conventional activity or play sequence.

*Play examples* include but are not limited to: Banging materials together; picking up a toy car and shaking it; continuously digging through materials; twirling dolls clothes hanger; waving spoons in front of eyes; mouthing blocks; sliding door back and forth at church; kicking a pillow.

*Play non-examples* include but are not limited to: banging on a drum; picking up a toy and shaking it while stating they are a monster and are attacking the toy; twirling a baton. Routine and Outing examples include but are not limited to: child twirls a fork in front of his face at a restaurant; child repeatedly places wood chips through the hole of a fence at the park. Routine and Outing non-examples include but are not limited to: child throws balls in the ball pit at McDonalds; child slides down the slide head first at the park; child chases a peer around the swing set at the park.

**Conventional Play (C)**
Child makes contact with materials according to conventional use or engages in an activity according to conventional actions related to the activity.

*Play examples* include but are not limited to: Driving a truck; stirring with a play spoon in a play pot; squeezing balloon of blood pressure meter; turning knob on toy stove; pushing cars; putting together or taking apart legos; putting clothes on doll hanger; drawing with a marker; putting a puzzle together; eating at meal time; playing on outdoor equipment at McDonalds; pushing grocery cart at the store; brushing teeth; playing tickle game; playing patty cake-patty cake; singing with someone.

*Play non-examples* include but are not limited to: climbing on shelves; jumping off of a trampoline and slapping the wall; chewing/biting on play food.

**Pretend Play (P)**
Child verbalizes (gesture, vocal, signs) the imaginative function and/or uses movements to indicate presence of absent object or to indicate a pretend use of an object or takes on a role in relation to the object or another person. Child's actions are also scored as pretend when supported by adult's or peer's vocalizations or verbalizations if they occur while or immediately after (e.g., up to 5 sec) the adult's or peer's vocalizations/verbalizations.

*Examples* include but are not limited to: Making a toy dinosaur talk; stirring a block in a bowl with a spoon; saying "I'm the mama, you be sister"; moving a toy fire extinguisher while making water noises; peer says "This is the doghouse" and child crawls under the table; on top of the climber and says “We are ready for take off”; hands mom the tooth brush and says “You be the dentist".
Non-examples include but are not limited to: child saying “I hate you;” child banging one's body parts with objects; child putting object into electricity sockets.

INSTRUCTIONS AND CHOICES
(event recording)

Parent Instructions Given
The parent explicitly directs the child, vocally or nonvocally (gestures such as pointing) to engage or to stop engaging in a specified activity. Statements that would be considered questions are not scored as instructions. In addition, labeling actions that the child is already engaged in is not scored as an instruction.

Examples include but are not limited to: parent says “go over there;” parent says “come here;” parent says, “hey, go play with mommy;” parent says “give me that;” parent says “put in” while pointing to a hole in a shape sorter that the child is not engaged with; parent says, “Johnny, look;” parent says, “Johnny come here;” parent says “Johnny;” parent saying “hey, go jump on the bed;” parent saying “come on Johnny;” parent saying “do this” while putting a shape in a shape sorter; parent says “lets play with something else;” parent says, “on top” while pointing to the top of a block; parent says “Johnny, look;” parent moves pointer finger to gesture to come here; parent points with pointer finger toward the door; parent puts both hands up with palms facing outward indicating to stop; parent saying “right here” while pointing to where a puzzle piece goes; parent saying “come on, give me five;” parent says “hey. hey. hey, over here (3 instructions given);

Non-examples include but are not limited to parent saying “hey, can you come here?;” parent saying “can you go over there for a second please?;” parent saying “you going to give me five?;” parent saying “yeah, give me five” while the child gives the parent five; parent saying “you going to run?;” parent saying “Johnny, can you look?;” parent saying “on top” while pointing to the top of a block while the child puts a bean on top of the block.

Child Instructions Followed
The child engages in or engages in an approximation to (makes an attempt) to do the activity or task specified in an instruction within 5 sec. of the instruction being given.

Examples include but are not limited to child putting a toy away following an instruction to do so; child walking over to individual following an instruction to do so; child saying “thank you” following an instruction to do so; child looking following an instruction to look.

Non-examples include but are not limited to: child saying “bye” following another individual saying “bye;” child handing an item to an individual following an instruction
for the child to throw the item in the trash can; child putting a toy away following the phrase “honey, can you put this is the cupboard please?”

**Parent Choices Offered**
Parent offers the child choices (vocally or nonvocally) to pick rewards, and/or to do activities, and/or to go any places before, during, and after the teaching session. Each time the parent re-presents a choice given earlier in the assessment, another instance of choice offered is tallied.

*Example* include but are not limited to: Parent holds up two items and says, "which one?"; Parent places two items on the floor and says, "pick one;" Parent says, "Do you want to play outside or in your room?;" parent holds up a cracker in one hand and juice in the other hand an presents them to the child (1 choice), the child walks away and when he returns, the parent picks the items back up and re-presents the cracker and the juice (1 choice).

*Non-examples* include but are not limited to: Child picks between two toys, parent is on the other side of the room; Parent says, "lets go outside."

**CHILD IMITATION SKILLS**
*(event recording)*

**Parent Cue**

**Parent Play Action**

**Object Imitation**
The child reciprocates an action of the teacher or peer with the same or similar object within 5 seconds of the action being presented. A response will be counted as an approximation if the child either partially performs the same action or attempts to perform the action with the same or similar object.

*Examples* include but are not limited to while playing with the bead toy the parent moves a bead and the child moves a different bead; Parent says “do this” and bangs a hammer and then child bangs it; Playing with shape sorter and parent puts shape in and child places another shape in the wrong hole.

*Non-examples* include but are not limited to child imitating a motor imitation such as tickling, jumping, clapping etc.; child playing with blocks and mom stacks them and 9 sec later child stacks them; child is playing with animals and blocks and parent puts block on animal and child grabs the animal

**Action Imitation**
Chained Imitation

Vocal Sound Imitation

Vocal Word Imitation

Motor Imitation – No IOA (do not score) AJ reviewed
The child reciprocates a motor action by imitating the action of the teacher or peer within 5 seconds of the action being presented. A response will be counted as an approximation if the child either partially performs the same action or attempts to perform the action with the same body parts.

Examples include but are not limited to the parent says “do this” and claps hands and the child immediately claps their hands; While singing if your happy and you know it the parent stomps feet then the child stomps feet; The parent turns around and the child twists their body; Parent tickles the child and the child touches moms stomach.

Non-examples include but are no limited to the child performs an action of the parent after 5 sec; the child imitates a play action, with an object such as, banging a hammer; Parent tickles the child and the child touches moms stomach with their feet.

General Imitation-No IOA (do not score)
The child reciprocates a motor action or action with an object by imitating the action of the teacher or peer with the same or similar body parts or the same or similar object within 5 seconds of the action being presented. A response will be counted as an approximation if the child either partially performs the same action or attempts to perform the action with the same body parts or the same or similar object.

Examples include but are not limited to parent says “do this” and claps hands and the child immediately claps their hands; While singing if your happy and you know it the parent stomps feet then the child stomps feet; The parent turns around and the child twists their body; Parent tickles the child and the child touches moms stomach; while playing with the bead toy the parent moves a bead and the child moves a different bead; Parent says “do this” and bangs a hammer and then child bangs it; Playing with shape sorter and parent puts shape in and child places another shape in the wrong hole.

Non-examples include but are not limited to child performs an action of the parent after 5 sec; the child imitates a play action, with an object such as, banging a hammer; Parent tickles the child and the child touches moms stomach with their feet; child imitating a motor imitation such as tickling, jumping, clapping etc.; child playing with blocks and mom stacks them and 9 sec later child stacks them; child is playing with animals and blocks and parent puts block on animal and child grabs the animal.
SOCIAL PLAY
(interval recording)

Solitary Play (S)
Child uses play materials independently. The child is not in proximity to others and no social interaction occurs (no initiations, responses, verbal exchanges, or interactions occur).

Examples include but are not limited to: child has back toward mom and is stacking blocks while mom watches; Child looking at a book and is two feet away from parent who is building with blocks; child is looking at a book and sibling, one foot away, has back turned to child and is building with legos.

Non-examples include but are not limited to: child facing peer sitting 1 ft. away while one plays with legos and the other colors a picture; child is sitting at table across from peers and says he does not want to play with them; child is popping bubbles while mom is blowing them.

Physical Proximity (X)
Child’s body parts are within approximately 1 foot of other’s body parts and child is not engaged in a similar activity. Not engaged can include engaging in another activity and/or looking away from the activity of another person.

Examples include but are not limited to: Child facing peer sitting two feet away, legs and arms within 12 inches of peer's legs; child is standing next to mom while he looks at a book and mom takes off her coat; child sitting at table eating snack and sibling at the same table reading a book; dad is holding a light toy in front of the child’s face and the child is looking away.

Non-examples include but are not limited to: child is sitting on floor manipulating materials and peer walks behind child within 1 foot child sitting on floor playing a board game with a peer; child sitting at circle time listening to a story; child playing with a car toy on the floor and peers are playing with blocks behind him 2 ft. away.

Parallel Play (P)
Child is engaged in activities similar to another's, using common or similar materials and is within approximately 1 foot of other’s body parts; no eye contact (looking at one another's faces and/or eyes) or social reciprocations occur. (initiations may occur)

Examples include but are not limited to: Children sitting around a train track; child pushes train back and forth on one side of track and other child walks a toy animal down train track; children both sitting on floor playing with blocks; parent is pushing car into toy garage and child is putting figurines into another car on the other side of the toy garage; parent is touching the same toy as the child and says, “yeah, it’s a ball,” but the child does not look in the direction of the parent or make any verbalizations to the parent and does not accept any initiations from the parent.

Non-examples include but are not limited to children sitting at table eating snack talking...
about what they will do at recess; child is sitting on the floor reading a book and peers are sitting next to him playing with cars; child and peers are playing with cars while child has back to peers.

**Cooperative Play (C)**
Child is engaged in an organized play activity and exchanges, initiations, reciprocations, or interactions occur within that activity or theme.

*Examples* include but are not limited to: Children sitting around a train track; child pushes train back and forth on one side of track and hands a train to peer who takes it; children push a train back and forth to each other; child is pushing a train, peer says "I like your Thomas"; parent puts dolls in bed and child says “He is tired”; sibling hands child a dish of play food and says ”here is your dinner", child takes the dish and pretends to eat.

*Non-examples* include but are not limited to: children sitting at table eating snack, not talking to one another; child gives coat to peer or adult while waiting to go outside; child and parent are both playing with trains at the table, not looking at one another or talking to one another.

**Tantrums, Crying (T)**
Child engages in vocalizations such as yells, whines, or screams which may or may not be accompanied by physically retreating or protesting.

*Examples* include but are not limited to: the child starts crying while playing with blocks; child vocalizes while protesting; child cries while trying to get past a parent.

*Non-examples* include but are not limited to: child is given a goldfish and he screams while throwing it back at the person; child gets excited and vocalizes when being tickled; child sings extremely loudly.

**CHILD MOVEMENT**
(event recording)

**Approach**
Anytime the child moves toward the teacher within 1 foot proximity.

*Examples* include but are not limited to: Moving toward the teacher within 1 foot proximity and requesting “bubbles;” child is already in 3 foot proximity to parent and then moves within 1 foot; child stands up and gives parent a hug.

*Non-examples* include but are not limited to: child moving toward the teacher within 3 feet proximity and saying, “hi;” child yelling at the parent from across the room; child passes by the parent on his way to run out the door.
**Retreat**
Anytime the child moves 2 or more feet away from the teacher following the presentation of an event. Score a retreat whether or not the parent follows the child after the retreat occurs.

*Examples* include but are not limited to: the child walks away from the parent when the parent offers the child a cookie; the child falls to the floor and crawls away when the parent approaches the child to pick him up; the child runs away from the parent when the parent hands him a block.

*Non-examples* include but are not limited to: child flops to the floor when the parent tries to pick him up (not 2 ft. away); child turns his back on the parent when she hands him a cookie; child walks away when the parent bends down to pick up a piece of paper that she dropped.

**Decline of Child Initiation – No IOA (do not score) AJ reviewed**
Parent declines child initiation by protesting or ignoring a request, comment, gesture, or sound from the child within 3 s of a child initiation.

*Examples* include but are not limited to: child brings mom bottle and mom does not take the bottle; child asks mom to turn on the radio and parent says “no, not now;” child pulls moms hand but mom does not move.

*Non-examples* include but are not limited to: child grabs mom’s hand and points to toy, mom reaches for wrong toy

**Acceptance of Child Initiation – No IOA (do not score) AJ reviewed**
Parent accepts child initiation by complying with a request by commenting, or making sounds to the child and/or physically giving or taking an item, touching, or gesturing to the child within 3 s of a child initiation.

*Examples* include but are not limited to: Parent takes the car after child gives it to them; saying "Hi!" after child says “hey mom;” parent holds a toy out to child after child says “can I have that toy?” parent waves "bye" at a child after child says “see you later”; parent says "Do it like this" after child says “I don’t know how to work this toy”; parent offers a toy to child after child says, “I need something to play with;” parent pats, hugs, kisses, or takes the hand of child after child pats, hugs, kisses, or puts hand out toward child; parent says “eeeee ba ba” after the child says “eeeee ba ba”; parent signs “drink” to child after child says “lets get something to drink;”

*Non-examples* include but are not limited to: parent walks up to child, looks at him, and then turns around and walks away; parent picks up a cracker that the child dropped and throws it in the trash; parent ignores child initiation
CHILD VERBAL BEHAVIOR
(event recording)

**Vocalization**
Sounds emitted by child that are not words; score episodes. ONSET occurs when first sound is produced; score OFFSET when 1 second pause occurs following emission of last sound; OFFSET also occurs if word is produced in following vocals. Crying and/or laughing are not scored as vocalizations.

*Examples* include but are not limited to: Child is singing syllables and then says "Hi Mommy" (score 1 episode of vocals and one 2 word vocal); “bbbbb (2 second pause) bbbb (score as two vocals); "bah bah bah (2 second pause) Dah bah bah" (score 2 vocal episodes); ooowweee (score as one vocal episode); child makes a noise immediately before he begins to cry (score as 1 vocalization).

*Non-examples* include but are not limited to: reaching for an item; crying; laughing; kicking feet against an item; child making a “raspberry” sound with lips; child saying “lets go!” (score as 2 words)

**Word (1,2,3,4)**

1 word
One word/sign/picture (singular formed utterance, sign, or picture exchange) emitted by child. Include approximations that are similar to words/signs.

*Examples* include but are not limited to: "Bah!" and points to ball (1 word); "Look"; "Mine"; “Go” "Daddy".

*Non-examples* include but are not limited to: Do NOT score "Puh" for 'sister', "Mmm" for 'pizza' (score as vocals).

2 word
Two words/signs/pictures emitted consecutively and without pauses of more than 3 seconds. Include approximations that are similar to words/signs.

*Examples* include but are not limited to: "Want milk"; "Hi . . .(1 sec) Mommy!" “Give ball; “Blue teddy”; “Fast car”.

*Non-examples* include but are not limited to: child says “mama” and then 3 seconds later says “give,” (score as 2 different 1 word).

3 word
Three words/signs/pictures emitted consecutively without pauses of more than 3 seconds between words; ONSET occurs when first word is produced; OFFSET occurs if more than 3 seconds elapse after third word. Include approximations that are similar to words/signs.
Examples include but are not limited to: “Go really fast”; “I love it”; "Oh no . . . (3 second pause) . . . There he goes” (scored as a 2 word vocal and a 3 word vocal)

4+ word
Four or more words/signs/pictures emitted consecutively and without pauses of more than 3 seconds between words. Include approximations that are similar to words/signs.

Examples include but are not limited to: "I want blow big bubbles!"; “Hi Darcy and Joe”; Hey, that is my car”; “Can I get a candy bar?”, "Make me a birthday cake . . . (4 sec) . . . Let's eat that cake" (score as two 4+ word vocals)

Request:
Spoken sounds, words, phrases, complete sentences, or non-vocal communication (pictures/gestures/signs) directed to another that ask for an item, directs another to engage in a specified activity, specifies an action to be completed by other, request information, permission, or attention. Onset begins with 1st sound or 1st movement and offset happens after 1 second has passed. Access to item/activity does not have to be delivered to be counted as a request.

Examples include but are not limited to: saying "give" while hand extended towards toy; "more" while looking at candy in presence of teacher; "truck please" while reaching towards a truck peer is holding; "Look at me!" to parent; "Can you help?" while handing closed container to sibling; "Do this!" while demonstrating an action; "Now you say 'ready set go' " while in chase stance; child says “go over there;” child says “come here;” child says “give me that;” child makes a noise while demonstrating a non-vocal request such as communicative eye contact or reaching; child says “ba” while looking at the parent’s face who has just removed access to an item; child says “ba” while reaching towards the parent or an item the parent is controlling access to; child says “ba” while pulling parent’s arm toward an activity/item; child says “ba ba ba” while reaching for his bottle (1 occurrence); child says “ba ba ba” while reaching for his bottle (1 occurrence), 2 seconds pass and child says “ba ba ba” again while still reaching for his bottle (2nd occurrence); or child moves pointer finger to gesture to come here; child points with pointer finger toward the door; child puts both hands up with palms facing outward indication to stop.

Nonexamples include but are not limited to: child says, “stop!” child grabs an item; child stomps feet on the ground while listening to music; saying “NO!” when mom says it’s time to go (scored as a protest); child pounding fists on table after getting frustrated; child opening mouth wide while reaching for the juice in mom’s hand; child grabs an item in parent’s hand; child is spinning in circles while saying “ahhhh baaaaahhh” repeatedly; child says “duck” while pointing to a picture of a duck in a book.

Protest
Spoken sounds, words, phrases, complete sentences, or non-vocal communication (pictures/gestures/signs) directed to another indicating break, offset of activity, displeasure or discomfort.
Examples include but are not limited to: "I'm gonna throw up!"; "I don't wanna play that"; saying "No!" when peer takes child's toy; saying “I don’t want that!” pushing toys away; arching back and lying on floor; pushing away from mom; and pounding on the ground.

Non-examples include but are not limited to: Child says “I want ball.” (score as vocal request), child says "no" in response to question (e.g., responding "No" to question "Is he a girl?" or "Do you want to play that?") (score as comments) or including "no" in a sentence (e.g., "No let's watch Blue's Clues (score as request) or "No he's a boy" (score as comment); child points to an item (score as a request); child says, “give me bear” (score as a request)

Commenting
Verbalizations (pictures/gestures/signs/spoken words, phrases, or complete sentences) directed to another that include descriptions and replies to social questions.

Examples include but are not limited to: "She has red hair" in response to "What color is her hair?"; "It's a red truck"; "My big car"; "Yummy ice cream"; “that is a beautiful bike”; “airplane” and pointing to plane in the sky; “blue ball” and pointing to the ball in the book”; “I’m four”.

Non-examples include but not limited to: child saying, “can you help me?;” child singing a song during circle time; child drawing a picture and handing it to his peer.

Question
Verbalizations (pictures/gestures/signs/spoken words, phrases, or complete sentences) directed to another in question form (contain wh- words, raised inflection at the end of the utterance) that request assistance, information, or receipt of some tangible.

Examples include but are not limited to: “Where did he go?”; "Would you help me?"; "Who's that?"; "What's your name?"; “Can you do this?”

Non-examples include but are not limited to: “lets’s go;” “give me,” “I want the car,” “stop it!”

Child Smiles – No IOA (do not score) AJ reviewed
The child assumes a facial expression indicating pleasure, favor, or amusement, characterized by an upturning of the corners of the mouth.

Examples include but are not limited to: the child is playing with a car truck and his facial expression changes by his eyes being raised and the turning of his lips; child is being tickled and giggles while corners of the mouth turn up; corners of child’s mouth turn up as child is bounced on the trampoline;
Non-examples include but are not limited to: corners of the mouth turn up and eyes squint as child starts to cry; eyes close and turning of lips as a tantrum begins.

**Vocal Protest:** - No IOA (do not score) AJ reviewed
Spoken sounds, words, phrases, or complete sentences directed to another indicating break, offset of activity, displeasure or discomfort.

*Examples* include but are not limited to: "I'm gonna throw up!"; "I don't wanna play that"; saying "No!" when peer takes child's toy; Do NOT score "no" in response to question (e.g., responding "No" to question "Is he a girl?" or "Do you want to play that?" (score as comments) or including "no" in a sentence (e.g., "No let's watch Blue's Clues (score as request) or "No he's a boy" (score as comment).

Non-examples include but are not limited to: pounding on the ground (score as non-vocal protest); pushing toys away (score as non-vocal protest). Child says “I want ball.” (score as vocal request). Parent says lets play a game and child says “no”

**Non-Vocal Protest:** - No IOA (do not score) AJ reviewed
Non-vocal verbalizations (pictures/gestures/signs/) directed to another indicating break, offset of activity, displeasure or discomfort.

*Examples* include but are not limited to: pushing toys away; arching back and lying on floor when parent offers an activity; pushing away from mom.

Non-examples include but are not limited to: child says, “I don’t want that!” (score as vocal protest); child points to an item (score as non-vocal request); child says, “give me bear” (score as vocal request).

**PARENT VERBAL BEHAVIOR**
(event recording)

**Encouraging Statements to Child**
Parent offers support and creates optimism by vocally stating positive and encouraging comments to and/or about the child concerning the child’s progress toward specific goals, participation in activities, and regular routines.

*Examples* include but are not limited to: parent tells child, “you almost got it” while child crawls toward an object; parent tells the child, “keep going, you’re almost there” when the child is finishing a matching exercise.

**Corrective Statements to Child**
Parent gives a statement to the child to change behaviors or indicates behavior was incorrect by vocally stating negative comments and discouraging statements to and/or about the child.
concerning the child’s progress toward specific goals, participation in activities, and regular routines.

Examples include but are not limited to: child climbs on top of the table and parent states, “no, you need to get down now;” child is beginning to fuss and parent says “be quiet.”

**Linguistic Mapping** – No IOA (do not score) AJ reviewed
The child engages in an action or a vocalization and the parent puts words to the event. A consequence such as delivery of an inaccessible item or continued access to an item does not need to, but may occur to be considered linguistic mapping. (Does not fit with non-example, do we want this to differ from expansion by no consequence delivery, in which case how do we account for continued access to materials?)

Examples include child looking at a book and says “bbb,” and parent says, “book;” child smiles and claps, and parent says “Yea, you’re happy;” child is rolling marbles across the floor and parent says, “you’re rolling marbles.”

Non-examples include child reaching for bubbles and parent says, “bubbles” and hands them to the child; child is playing with cars and parent says, “Are you having fun?”

**Positive Statements/Questions Regarding Child/Self to Other Adults or to Self – No IOA (do not score) AJ reviewed**
Positive comment about child and or/child progress to other children and/or adults, including the video audience.

Examples include but are not limited to: parent says “when we were blowing bubbles yesterday, he made a noise like “pop” when trying to pop the bubbles.” “He did so great last night at dinner.” “Grandma said that she could really tell a difference.”

Non-examples include but are not limited parent saying, “I don’t know what I’m doing;”

**Unfavorable Statements/Questions Regarding Child/Self to Other Adults or to Self – No IOA (do not score) AJ reviewed**
Negative comment about child and or/child progress to other children and/or adults, including the video audience.

Examples include but are not limited to parent states “child would not eat his snack!” “we only got 3 hours of sleep because he was crying all night”

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**PARENT AFFECT**
(interval recording)

**Parent Smiles (S)**
The parent assumes a facial expression indicating pleasure, favor, or amusement, characterized by an upturning of the corners of the mouth.

55
Examples include but are not limited to: the parent smiles and shows her teeth when she says, “great job playing with the balls!” the parent laughs and smiles while playing tickles; the parent’s mouth turns upward while saying, “you did it!”

Non-examples include but are not limited to: the parent’s facial expression and voice tone look and sound content; parent watches child and it appears to be a pleasant interaction.

**Parent Appropriate Touches (T)**

Parent initiates or reciprocates physical contact with child for 1 or more seconds to encourage, support, or assist child.

*Examples* include but are not limited to; touching; patting; kissing; caressing; massaging; tickling, giving high fives; child gives mom a hug and mom scratches his back; child gives mom a hug and mom holds the hug for a few seconds; child asks to be picked up and mom picks him up; mom picks up child and holds him; mom takes child’s hands and helps him open a container.

*Non-examples* include but are not limited to: parent grabs the child’s hand and pulls him toward the door; parent hits the outside of the child’s hand when he reaches to turn on the video; child puts hands on moms stomach; child grabs mom’s hand while she is holding a cracker.

**Grimace (G)**

Parent assumes a facial expression indicating disapproval/dissatisfaction or disgust. Characterized by stretching of mouth backwards or forward (pucker of lips), crunching upward of cheeks and nose.

*Examples* include but are not limited to: the parent puckers lips outward while the child is playing alone; or the child is retreating from the parent; parent crunches her cheeks and nose upward when the child is not engaging with the parent.

*Non-examples* include but are not limited to: the parent making silly faces with the child; the parent crunches her face after a favorable event accompanied with a smile.

**Eye Roll (E)**

Parent rolls eyes by raising eye brows and diverting eyes from child, usually following an undesirable event.

*Examples* include but are not limited to: the parent tries to give the child a toy and the child retreats the parent then rolls her eyes.

*Non-examples* include but are not limited to: parent raises her eye brows in excitement when playing with the child.

**Smirk (M)**
Parent assumes a facial expression indicating un-sureness, self consciousness, doubting, characterized by an upturning of one side of the mouth, usually accompanied with a sigh, or “uh”.

_Examples_ include but are not limited to: parent while watching the child play with a toy gives a half smile and her eyebrows and eyes constrict inwards; parent is looking for materials and assumes a half smile facial expression; parent sighs with a half smile and raising of her eyebrows when child is retreating.

_Non-examples_ include but are not limited to: parent while watching the child play gives a half smile but it is a smile of approval or contentment.

**SOCIAL CONNECTIONS**
(interval recording)

Any social response made by the parent or child that is reciprocated. A social connection is one or more successive turns between the child and parent. The actions of the parent and the child must take place within 5 sec of one another, with the exception of routine care (e.g. diapering) and mutual play (e.g. reading a book to child). Social responses and reciprocations include but are not limited to looking, gesturing, vocalizing, singing, patting, kissing, smiling, cuddling, handing materials, receiving materials.

_Examples_ include but are not limited to the parent looks at the child while at the table playing with cars and the child looks up at the face of the parent; while sitting on floor next to each other playing with cause and effect toys the child looks up at the parent then back at the toy and the parent turns the toy on; child and parent are sliding objects across the floor and child looks up at parent and parent says, “here comes another one!;” parent is helping the child jump on the trampoline and the child is laughing; parent pats child on back and child turns head toward the parent; child looks toward a toy and parent begins to play with the toy.

_Non-examples_ include but are not limited to the child is in corner playing with the cars and parent is at table 4 ft away playing with cars and the child looks at the parent but parent does not respond in any way to the child; child and parent are sitting next to each other playing with two different activities and the child looks at parent but parent does not respond; while sitting next to each other playing with the beads the child looks at the door when he hears a noise and parent just continues to manipulate the materials; while watching a movie, the parent looks at child and child does not look at the parent.

**Joint Attention – No IOA (do not score)** AJ reviewed
Child points or looks at a toy, object, or event and turns to the parent, teacher, sibling or peer, makes eye contact, then immediately looks or points again at the toy, object, or event. An object of event can include people, activities, sounds, etc.

*Examples* include but are not limited to: the child looking at blocks, then turning and making eye contact with the teacher and immediately looking again at the blocks; the child watches the door shut, looks and makes eye contact with mom and then looks back at the door.

*Non-examples* include but are not limited to: child playing with toy looks up at teacher but does not make eye contact, and then looks back at the toy; child looks at object, makes eye contact with teacher but then does not look back at object.

**Initiation Joint Attention-No IOA (do not score)**

Child requests, comments, protests, or makes sounds at other person and/or physically gives or takes items, touches, or gestures to other.

*Examples* include but are not limited to: Looks at other person and says "car"; tapping peer on shoulder; saying "Hi!" holding a toy out to peer; waving "bye" at a parent; saying "Do it like this"; offering a toy; patting, hugging, kissing, or taking hand of other person; following a sibling around the room; signs "drink" to parent; child says, "hey look at this;" child looks at item and then looks at parent and then looks back at item; child says "hey mom, isn’t this cool;" child throws toy on the ground and then looks at parent; child says “hello” to another individual.

*Non-examples* include but are not limited to: child walks up to peer, looks at him, and then turns around and walks away; child picks up a cracker that a peer dropped, puts it in his mouth and eats it; child begins to cry when a toy breaks; child laughs at song on the TV.

**Response Joint Attention**

Verbalizations (pictures/gestures/signs/spoken words, phrases, or complete sentences) directed to another in response and on topic to other's question, comment, or nonverbal behavior, such as point or shift in eye gaze (social referencing) within 3 s of a parent initiation.

*Examples* include but are not limited to: Peer waves and child waves back; peer smiles and child smiles at peer; peer says "Hi" and child says "Hi"; peer says "What's your name?" and child says "Tommy"; peer says "Do you like to watch movies?" and child says "Uh huh I like Veggie Tales"; parent says “What a pretty picture and child says “It’s a dog”; responding to "I like pizza" with comments or expansions "I like macaroni!", "That's cool!", "Me too!" or smiling and nodding; responding to initiations appropriately; peer says "Everybody come over here!" and child comes and stands beside peer; sibling tells a joke and child laughs; peer says "Make your car go like this" and child imitates or follows peer's direction, demonstrating directed action; peer says "Don't do that!" while child is driving car on peer's track, and child moves car away; saying "Hi!" after parent says “hey sweety;” child holds a toy out to parent after parent says “can I have that toy;"
Child waves "bye" at a parent after parent says “see you in a few hours”; child says "Do it like this" after parent says “I don’t know how to work this toy”; child offers a toy to parent after parent says, “I need something to play with;” child pats, hugs, kisses, or takes the hand of other person after parent pats, hugs, kisses, or puts hand out toward child; child follows a sibling around the room after sibling says, “follow me;” child signs “drink” to parent; after parent says “lets get something to drink;” child looks where the parent is pointing; child looks where the parent looks; child points where the parent points; child points to where the parent looks.

Non-examples include but are not limited to: child walks up to peer, looks at him, and then turns around and walks away; child picks up a cracker that a peer dropped, puts it in his mouth and eats it; child picks up toy that parent put in front of him and walks away with it; child looks at the toy chest while parent rummages through it.

PARENT AND CHILD INTERACTION SKILLS

Materials Contacted – No IOA (do not score) AJ reviewed
Each different stimulus item that is considered a conventional play material that is physically contacted by the child (e.g., on floor, on table in child's view and reach) and within view. Only count materials contacted within the same class of materials 1 time. Score another instance if child is absent from materials for 10 or more seconds and then comes back to them. For example, If a child is playing with a doll and dressing her with doll clothes, you would score 1 for the doll and 1 for the clothes, no matter how many clothes items are contacted. Also, if a child is playing with a piggy bank and coins, you would score 1 for the piggy bank and 1 for the coins, no matter how many coins are contacted. If the child leaves the piggy bank and then returns 2 minutes later, score 1 again for the bank and the coins.

Examples of materials contacted include but are not limited to: Touching blocks, building with manipulatives, moving figurines, holding dolls, pushing vehicles, jumping on the trampoline, holding a pillow, dipping hands into the bean bin, moving props for play themes such as play food and utensils, puppets, stove, sink, and cupboards.

Non-examples include but are not limited to touching other individuals with their body parts; touching any food items; touching a door knob or cabinet to open or close the door; brushing the side of the table while passing by to access other materials. Two hands on the same material is scored as 1 materials contacted; Two hands on different materials is scored as 2 materials contacted.

Contingent Materials Contacted
Each time the child receives access to a toy/material, food, or social activities contingent on a specific IFSP goal. Toys/materials include any stimulus item, watching T.V. or DVDs, and
listening to music. Food includes any edible food or drink items. Social includes any toys/materials that include interacting with another person.

*Examples* include, but are not limited to: child says, “eeee” and parent hands child a cookie; parent turns off the T.V., child looks in the direction of the parent and the parent turns the T.V. back on; the parent is tickling the child and stops, the child says “tick” and the parent continues tickling the child.

*Non-examples* include, but are not limited to: parent hands the child a cookie without the child saying “eeee”; the parent turns on the T.V. and leaves the room; while working on eye contact parent removes access to a toy duck, the child never looks at the parent and the parent gives the child the duck.

**Themes No IOA (do not score) AJ reviewed**
Child engages in two or more sequences of pretend play actions directed to the same set of materials or makes a verbal statement about an activity or event that is happening or is about to happen, an imaginary location, or a situation that the child is in. Also score play theme when adult or peer makes verbalizations that are preceded or followed by related conventional or pretend play actions by the child. (This part is confusing, so you would score 1 for play action by the peer and then 1 for the adult talking about it?) Score play theme if child engages in conventional play action that is preceded by or followed by a related verbalization. ONSET: child starts interacting with a new set of materials (touches object) or when child, peer, or adult starts verbalizing about activity, event, or location or situation, or child uses conventional or pretend actions related to verbalization. OFFSET: Child stops interacting with materials, starts verbalizing about a different activity or event, or 30 seconds elapses without child verbalizing or engaging in conventional or pretend play actions preceded by related verbalizations.

*Examples* include but are not limited to: Holding a doll verbalizing about a birthday party (theme 1) and then saying, "Let's put out the fire!" (theme 2). Child is playing with cars, first the cars are having a race, then they are delivering cargo; Child is playing with the house, first he/she is rearranging the furniture, then having a tea party.

*Non-examples* include but are not limited to: child playing with toy food and saying “this is boring;” child coloring and says, “lets go play outside;” child puts crayon in a bucket and then moves on to another toy.

**Social Referencing - No IOA (do not score)**
The child points or looks at an object and immediately turns to the parent, then looks or points again at the object. Any instance of social referencing will also be scored as ‘initiation joint attention.’

*Examples* include but are not limited to: child looks at a radio, looks at mom, and then back at the radio; child points to a book, turns to mom, and then points to the book again.

*Non-examples* include but are not limited to: child looks at a toy while mom is holding it; child looks at a toy and then at mom; child points to a toy while looking at mom.
**Verbal Exchanges in Cooperative Play - No IOA (do not score)**
Child verbalizes during cooperative play or while playing with same materials. While engaged in common use of materials or activity, child initiates and/or responds.

*Examples* include but are not limited to: While racing cars on floor, peer says "I'm going fast" and child says "Wait for me!"; in Duck Duck Goose game, parent says "Can't catch me" and child says, "I'm gonna get you!"; while jumping on the trampoline together, child says, "look how high I can jump!"

*Non-examples* include but are not limited to: peer says “lets race cars” and the child does not respond.

**Counting - No IOA (do not score)**
Parent counts (vocally or non-vocally) occurrences of child responding.

*Examples* include but are not limited to: parent tally’s with writing utensil on a sheet of paper; parent clicks with golf counter; parent marks on a data sheet; parent marks a dot on a graph.

*Nonexamples* include but are not limited to: parent says, “I think he did it about 5 times today;” parent writes the number 9 on the whiteboard and says, “he must have done it at least 9 times, don’t ya think?”

**Duration of Eye Contact – No IOA (do not score)**
The cumulative time the child spends looking at the eyes of an adult, or in the direction of the face of an adult. This includes instances of both communicative eye contact and eye gaze.

*Examples* include but are not limited to: child orients face towards parent's face; child gazes at parent's face; child give parent direct eye contact; child looks at toy and then at parent's face.

*Non-examples* include but are not limited to: child looks at the toy the parent is holding; child looks at parents chest, legs, arms; child looks up towards the ceiling; child looks at toy and pulls parent over to get toy.

**Reinforcer Sampling – No IOA (do not score)**
Presenting a child with an item, event or activity and then assessing the reinforcing properties of those items, events, or activities (including both previously used and novel reinforcers).

Examples include but are not limited to

Non-example include but are not limited to
Child Goal Behavior Definitions

**GENERAL POOL**

**Gestural Request:**
Non-vocal gestures (pictures/gestures/signs) directed to another that ask for an item, specify an action to be completed by other, request information, permission, or attention.

*Examples* include but are not limited to: child moves pointer finger to gesture to come over here; child points with pointer finger toward the door; child puts both hands up with palms facing outward indication to stop; child reaches toward parent for an item with one hand.

*Nonexamples* include but are not limited to: child says, “stop!” child grabs an item; child stomps feet on the ground while listening to music; when a parent withholds access to an item and child looks at the item (If child looks in the direction of the adult’s face, an instance of communicative eye contact is scored.)

**Communicative Attending**
The child’s head movement in the direction of an adult, following removal of a preferred item or to gain access to an inaccessible item or event. An inaccessible item or event may be the attention of the adult (i.e. the parent delivers attention in the form of vocalizations or item/event delivery following the child’s head movement in the direction of the parent, delivers a food item, activates a toy, grabs a toy off of a shelf, opens a cabinet that was locked, etc.)

*Examples* include but are not limited to child looks at mom when she takes a toy away to fix it; child raises head towards mom while she is holding a piece of something he is playing with; child looks or turns head towards parent when a toy is stuck or will not work properly; child looks up towards a shelf and then looks at mom while he points to a toy on the shelf; child looks up towards mom and raises both arms and says “up;” child looks up towards mom and reaches to her when she has juice in her hand; child head and eyes are in the direction of the toy when the parent holds it up right next to their face.

*Non-examples and non-observables* include but are not limited to: child turns toward parent after removal of a preferred item but does not move head in the direction of the adults face; child turns body in the direction of an adult and walks past them; child head turns upwards but their back is turned and the direction of the head is turned away from the parent; child’s back is turned toward the parent while the parent holds a chip in their hand.

*Note:* this is a generous definition because it is technologically difficult to observe glances and/or eye contact with video recording procedures

**Vocal Request:**
Spoken sounds, words, phrases, or complete sentences directed to another that ask for an item, directs another to engage in a specified activity, specifies an action to be completed by other, request information, permission, or attention. Onset begins with 1st sound and offset happens
after 1 second has passed. Access to item/activity does not have to be delivered to be counted as a vocal request.

*Examples* include but are not limited to: saying "give" while hand extended towards toy; "more" while looking at candy in presence of teacher; "truck please" while reaching towards a truck peer is holding; "Look at me!" to parent; "Can you help?" while handing closed container to sibling; "Do this!" while demonstrating an action; "Now you say 'ready set go' " while in chase stance; child says “go over there;” child says “come here;” child says “give me that;” child makes a noise while demonstrating a non-vocal request such as communicative eye contact or reaching; child says “ba” while looking at the parent’s face who has just removed access to an item; child says “ba” while reaching towards the parent or an item the parent is controlling access to; child says “ba” while pulling parent’s arm toward an activity/item; child says “ba ba ba” while reaching for his bottle (1 occurrence); child says “ba ba ba” while reaching for his bottle (1 occurrence), 2 seconds pass and child says “ba ba ba” again while still reaching for his bottle (2nd occurrence).

*Non-examples* include but are not limited to child saying “NO!” when mom says it’s time to go (scored as vocal protest); child pounding fists on table after getting frustrated; child opening mouth wide while reaching for the juice in mom’s hand; child grabs an item in parent’s hand; child is spinning in circles while saying “ahhhh baaaaahhh” repeatedly; child says “duck” while pointing to a picture of a duck in a book;

**Crawl Components:**
Child is elevated 3 sec. on forearms, hands, knees, forearms and knees, hands and knees, or lying on stomach with either arms or legs extended. Extended time engaged in a crawl component is scored as multiple crawl components (i.e. child elevated on forearms and knees for 9 seconds is scored as 3 crawl components).

*Examples* include but are not limited to child is lying with upper body on dad’s knee and elevates herself onto her hands for 3 or more seconds; child is elevated on forearms while legs are resting on the floor for 3 or more seconds.

*Non-examples* include but are not limited to child is lying on their stomach with arms and legs extended to the child’s sides resting on the floor; child places hands on shelf and pulls themselves upward to view a toy for 2 seconds; child lifts arms upward and parent pulls child up; child is sitting on bottom and is rocking back and forth.

**Crawl Cycles:**
Child is engaged in a crawl component or is in a stationary position and moves at least 1 arm and/or 1 leg forward (simultaneously or alternating), resulting in the child’s entire body moving forward.

*Examples* include but are not limited to an army crawl (arm and leg move forward but are still very close to floor or surface); child moves arm forward and then immediately moves
leg forward but knee is not touching the ground (bottom is facing toward ceiling and foot is on floor); child simultaneously moves right arm and left leg and pulls body forward

Non-examples include but are not limited to child sitting on their bottom on the floor and reaches their left arm and grabs a block; child is lying on stomach and moving arms in a “swimming movement” but body never moves forward; child is log rolling across the room.

Child Specific Behavior Definition

*SUNNY*

**Request “Up”**
When physical contact is removed by a pause in the preferred activity (tickling or being set down after being picked up), the child raises both arms in an upward direction toward the parent within 5 seconds after removal of social attention. Child’s arms must be raised for at least 1 whole second (i.e. if child raises arms and quickly drops them [arm flapping] this would not be scored as a request “up.” If child raises arms a portion of all the way up and then raises them all the way up, only one request “up” is scored. Request “up” may be scored simultaneously with communicative eye contact

Examples include, but are not limited to: parent stops tickling and child immediately raises both arms in the direction of parent; parent is holding child, sets her on the ground and she raises both arms toward the parent; social attention is removed, parent touches child’s arm as a prompt and child then raises both arms toward the parent; social attention is removed, parent pulls child’s hands in an upward direction as a prompt and child then raises both arms upward.

Non-examples include, but are not limited to: child raising one in an upward direction; child putting arms out to her side; child raising both in the direction of the parent 10 seconds after the removal of social attention; child lifting both arms while reaching for a toy that the parent is holding.

**Communicative Eye Contact**
When a preferred item is removed by taking away possession, moving item out of physical area (e.g. moves a toy out of view or holds spoon with food away from mouth), or altering the physical state of the object (e.g. turns light or sound off) child orientates her head in the direction of the adult within 2 seconds of removal. As long as the child’s head moves in the direction of the adult (scorer may only see the back of the child’s head) communicative eye contact is scored.

Examples include, but are not limited to: child is facing the adult, the adult turns off toy and child turns head in the direction of the adult; child is interacting with a toy, the adult moves the toy out of view and the child turns head in the direction of the adult; the adult
turns the sound off on a toy the child is playing with and the child turns her body and head in the direction of the adult.

*Non-examples* include, but are not limited to: adult turns the sound off and the child turns head in the direction of the toy; child is facing adult, the adult turns off a toy and the child turns body in the direction of a different toy; adult moves toy out of view and child does not move her head or body in a different direction.

**Vocal Request:**
Spoken sounds, words, phrases, or complete sentences directed to another that ask for an item, directs another to engage in a specified activity, specifies an action to be completed by other, request information, permission, or attention. Onset begins with 1st sound and offset happens after 1 second has passed. Access to item/activity does not have to be delivered to be counted as a vocal request.

*Examples* include but are not limited to: saying "give" while hand extended towards toy; "more" while looking at candy in presence of teacher; "truck please" while reaching towards a truck peer is holding; "Look at me!" to parent; "Can you help?" while handing closed container to sibling; "Do this!" while demonstrating an action; "Now you say 'ready set go' " while in chase stance; child says “go over there;” child says “come here;” child says “give me that;” child makes a noise while demonstrating a non-vocal request such as communicative eye contact or reaching; child says “ba” while looking at the parent’s face who has just removed access to an item; child says “ba” while reaching towards the parent or an item the parent is controlling access to; child says “ba” while pulling parent’s arm toward an activity/item; child says “ba ba ba” while reaching for his bottle (1 occurrence); child says “ba ba ba” while reaching for his bottle (1 occurrence), 2 seconds pass and child says “ba ba ba” again while still reaching for his bottle (2nd occurrence).

*Non-examples* include but are not limited to: child saying “NO!” when mom says it’s time to go (scored as vocal protest); child pounding fists on table after getting frustrated; child opening mouth wide while reaching for the juice in mom’s hand; child grabs an item in parent’s hand; child is spinning in circles while saying “ahhhh baaaaahhh” repeatedly; child says “duck” while pointing to a picture of a duck in a book

*Approximations* include but are not limited to: Sunshine emits any vocalization (excluding raspberries and grunts) while engaging in a gestural request or communicative attending

**Crawl Components:**
Child is elevated 3 sec. on forearms, hands, knees, forearms and knees, hands and knees, or lying on stomach with either arms or legs extended. Extended time engaged in a crawl component is scored as multiple crawl components (i.e. child elevated on forearms and knees for 9 seconds is scored as 3 crawl components).
*Examples* include but are not limited to child is lying with upper body on dad’s knee and elevates herself onto her hands for 3 or more seconds; child is elevated on forearms while legs are resting on the floor for 3 or more seconds.

*Non-examples* include but are not limited to child is lying on their stomach with arms and legs extended to the child’s sides resting on the floor; child places hands on shelf and pulls themselves upward to view a toy for 2 seconds; child lifts arms upward and parent pulls child up; child is sitting on bottom and is rocking back and forth.

*Approximations* include but are not limited to Sunny lying on belly stretching arms and legs outward (airplane), Sunny lying on belly with legs resting on the floor and elevated on both hands, Sunny elevated on knees and hands while rocking back and forth.

**Crawl Cycles:**
Child is engaged in a crawl component or is in a stationary position and moves at least 1 arm and/or 1 leg forward (simultaneously or alternating), resulting in the child’s entire body moving forward.

*Examples* include but are not limited to an army crawl (arm and leg move forward but are still very close to floor or surface); child moves arm forward and then immediately moves leg forward but knee is not touching the ground (bottom is facing toward ceiling and foot is on floor); child simultaneously moves right arm and left leg and pulls body forward.

*Non-examples* include but are not limited to child sitting on their bottom on the floor and reaches their left arm and grabs a block; child is lying on stomach and moving arms in a “swimming movement” but body never moves forward; child is log rolling across the room.

*Approximations* include but are not limited to arms rotating in a forward motion while pulling the body forward but dragging her legs, 1 arm moving forward while pulling the body forward and 1 leg is dragging.

**TYLER and WILL**

**Gestural Request:**
Non-vocal gestures (pictures/gestures/signs) directed to another that ask for an item, specify an action to be completed by other, request information, permission, or attention.

*Examples* include but are not limited to: Child laying on the floor with one arm up while mom is withholding access to a bean bag; Mom has food and child reaches for her hand; Mom turns off video and child reaches at the remote; Mom says “stop” and stops tickling and child reaches both hands at mom;
Nonexamples include but are not limited to: Mom stops tickling child and child looks at mom; Child grabs item and gives it to mom; child grabs moms hand an holds it; child grabs item out of moms hand which she was not withholding

Approximations include but are not limited to Will or Read extending 1 or both hands and/or arms toward mom or toward an item that is out of reach

Communicative Attending
The child’s head movement in the direction of an adult, following removal of a preferred item or to gain access to an inaccessible item or event. An inaccessible item or event may be the attention of the adult (i.e. the parent delivers attention in the form of vocalizations or item/event delivery following the child’s head movement in the direction of the parent, delivers a food item, activates a toy, grabs a toy off of a shelf, opens a cabinet that was locked, etc.)

Examples include but are not limited to child looks at mom when she is withholding access to food; child raises head towards mom while she is holding a bean bag; child looks or turns head towards mom after she says “stop” and stops tickling him; child looks up at mom when she has removed a toy; child moves head in the direction of moms face when she has food; child head and eyes are in the direction of the toy when the parent holds it up right next to their face

Non-examples and non-observables include but are not limited to: child turns toward parent after removal of a toy but does not move head in the direction of the adults face; child turns body in the direction of an adult and walks past them; child head turns upwards but their back is turned and the direction of the head is turned away from the parent; child’s back is turned toward the parent while the parent holds food in their hand

Approximations include but are not limited to Mark or Read facing mom while saying “eeeee” when an item is withheld, Mark or Read grabbing mom’s hand while facing her, Mark or Read moving their head in the direction of Mom’s head while she stands with a cracker in her hand; Mark or Read moving their eyes in the direction of mom's face but head is not facing her

Note: this is a generous definition because it is technologically difficult to observe glances and/or eye contact with video recording procedures

Vocal Request:
Spoken sounds, words, phrases, or complete sentences directed to another that ask for an item, directs another to engage in a specified activity, specifies an action to be completed by other, request information, permission, or attention. Onset begins with 1st sound and offset happens after 1 second has passed. Access to item/activity does not have to be delivered to be counted as a vocal request.

Examples include but are not limited to saying "eat" while hand extended towards moms hand while she has food; "Ba" while mom is withholding a bean bag; “Video” when
mom stops the movie; Handing container of food to mom and saying “EEE”; child makes a noise while demonstrating a non-vocal request such as communicative eye contact or reaching;

*Non-examples* include but are not limited to child turning circles and babbling; child pulling moms hand, which has food in it, and placing mouth on her hand; child grabs an item in parent’s hand;

*Approximations* include but are not limited to any vocalization while engaging in a gestural request or communicative attending, such as “eeeeeee,” or “baba” for bop; child produces same number of syllables as mom modeled; child produces any sound or syllable that is within the word for the item

**Object Imitation**
The child reciprocates an action of the teacher or peer with the same or similar object within 5 seconds of the action being presented. A response will be counted as an approximation if the child either partially performs the same action or attempts to perform the action with the same or similar object.

*Examples* include but are not limited to while playing with the bead toy the parent moves a bead and the child moves a different bead; Parent says “do this” and bangs a hammer and then child bangs it; Playing with shape sorter and parent puts shape in and child places another shape in the wrong hole.

*Non-examples* include but are not limited to child imitating a motor imitation such as tickling, jumping, clapping etc.; child playing with blocks and mom stacks them and 9 sec later child stacks them; child is playing with animals and blocks and parent puts block on animal and child grabs the animal

**Motor Imitation – No IOA (do not score) AJ reviewed**
The child reciprocates a motor action by imitating the action of the teacher or peer within 5 seconds of the action being presented. A response will be counted as an approximation if the child either partially performs the same action or attempts to perform the action with the same body parts.

*Examples* include but are not limited to the parent says “do this” and claps hands and the child immediately claps their hands; While singing if your happy and you know it the parent stomps feet then the child stomps feet; The parent turns around and the child twists their body; Parent tickles the child and the child touches moms stomach.

*Non-examples* include but are not limited to the child performs an action of the parent after 5 sec; the child imitates a play action, with an object such as, banging a hammer; Parent tickles the child and the child touches moms stomach with their feet.

**Reciprocal Imitation-** (adapted from Brulefert & Baudonniere, 1982)
Is defined as the child reciprocating a play action by imitating the play action of the teacher of peer within 5 seconds of the play action being presented and engaging in the play action for at least 2 “turns”. A turn is defined as the teacher or peer performing the action and the child imitation the action.

*Examples* include but are not limited to a play action presented by the teacher or peer (e.g., tickles, jumping, etc) where teacher tickles child, after a second the child tickles the adult, then after 3 seconds the adult tickles the child, lastly the child tickles the adult again following 4 seconds.

*Non-examples* include but are not limited to the imitation of any other behavior not related to the play action or that when the duration of the play action is longer than 5 seconds.

**Materials Contacted – No IOA (do not score) AJ reviewed**
Each different stimulus item that is considered a conventional play material that is physically contacted by the child (e.g., on floor, on table in child's view and reach) and within view.

*Examples* of materials contacted include but are not limited to: Touching blocks, building with manipulatives, moving figurines, holding dolls, pushing vehicles, jumping on the trampoline, holding a pillow, dipping hands into the bean bin, moving props for play themes such as play food and utensils, puppets, stove, sink, and cupboards.

*Non-examples* include but are not limited to touching other individuals with their body parts; touching any food items; touching a door knob or cabinet to open or close the door; brushing the side of the table while passing by to access other materials. Two hands on the same material is scored as 1 materials contacted; Two hands on different materials is scored as 2 materials contacted.

**DANIEL**

**Gestural Request:**
Non-vocal gestures (pictures/gestures/signs) directed to another that ask for an item, specify an action to be completed by other, request information, permission, or attention.

*Examples* include but are not limited to: child grabs moms hand to pull her to come here; Child reaches for a car while mom has it next to her face; Child grabs moms hand and pushes it towards an inaccessible item; child reaches for a duck that mom has in her hand; Child places moms hand on an item after trying to open it and was unsuccessful.

*Nonexamples* include but are not limited to: Child picks item up off floor that is next to mom; child gives an item to mom; Child grabs moms hand and holds it;
Approximations include but are not limited to extending 1 or both hands and/or arms toward mom or toward an item that is out of reach or in mom’s hands; pushing moms hand toward an item

Communicative Attending
The child’s head movement in the direction of an adult, following removal of a preferred item or to gain access to an inaccessible item or event. An inaccessible item or event may be the attention of the adult (i.e. the parent delivers attention in the form of vocalizations or item/event delivery following the child’s head movement in the direction of the parent, delivers a food item, activates a toy, grabs a toy off of a shelf, opens a cabinet that was locked, etc.)

Examples include but are not limited to child looks at mom when she is holding a toy next to her face; child raises head towards mom while she is tossing magnets across the floor; child turns head towards mom when mom is withholding access to a shape; child looks up towards a shelf and then looks at mom while grabbing her hand and pushing it towards an item; child head and eyes are in the direction of the toy when the parent holds it up right next to their face; Child is looking at mom out of the corner of his eyes but head is not turned toward mom.

Non-examples and non-observables include but are not limited to: child turns toward parent after removal of a preferred item but does not move head in the direction of the adults face; child turns body in the direction of an adult and walks past them; child head turns upwards but their back is turned and the direction of the head is turned away from the parent; child’s back is turned toward the parent while the parent holds a car in their hand

Approximations include but are not limited to Daniel facing mom while saying “cu” when a toy car is withheld, Daniel grabbing mom’s hand while facing her, Daniel moving his head in the direction of Mom’s head while she stands with a ball in her hand

Note: this is a generous definition because it is technologically difficult to observe glances and/or eye contact with video recording procedures

Vocal Request:
Spoken sounds, words, phrases, or complete sentences directed to another that ask for an item, directs another to engage in a specified activity, specifies an action to be completed by other, request information, permission, or attention. Onset begins with 1st sound and offset happens after 1 second has passed. Access to item/activity does not have to be delivered to be counted as a vocal request.

Examples include but are not limited to: saying “ca” while hand extended towards a car; child makes a noise while demonstrating a non-vocal request such as communicative attending or reaching; child says “ba” while looking at the parent’s face who has the ball; child says “g” while pulling parent’s arm toward the door;
Non-examples include but are not limited to child saying “car” as he is dropping it into a can; when mom says it’s time to go (scored as vocal protest); child opening mouth wide while reaching for the juice in mom’s hand; child grabs an item in parent’s hand; child is spinning in circles while saying “ahhh baaaaahhh” repeatedly; child says “duck” while pointing to a picture of a duck in a book;

Approximations include but are not limited to any vocalization while engaging in a gestural request or communicative attending, such as “chee,” “cuh,” “duh,” buh,” and “go.”; child produces same number of syllables as mom modeled; child produces any sound or syllable that is within the word for the item.

ANUSHKA

Gestural Request
Non-vocal gestures (pictures/gestures/signs) directed to another that ask for an item, specify an action to be completed by other, request information, permission, or attention.

Examples include but are not limited to

Non-examples include but are not limited to

Approximations include but are not limited to

Communicative Attending
The child’s head movement in the direction of an adult, following removal of a preferred item or to gain access to an inaccessible item or event, or altering the physical state of the object (e.g. turns light or sound off). An inaccessible item or event may be the attention of the adult (i.e. the parent delivers attention in the form of vocalizations or item/event delivery following the child’s head movement in the direction of the parent, delivers a food item, activates a toy, grabs a toy off of a shelf, opens a cabinet that was locked, etc.) As long as the child’s head moves in the direction of the adult (scorer may only see the back of the child’s head) communicative eye contact is scored.

Examples include but are not limited to

Non-examples include but are not limited to

Approximations include but are not limited to

Vocal Request
Spoken sounds, words, phrases, or complete sentences directed to another that ask for an item, directs another to engage in a specified activity, specifies an action to be completed by other, request information, permission, or attention. Onset begins with 1st sound and offset happens
after 1 second has passed. Access to item/activity does not have to be delivered to be counted as a vocal request.

*Examples* include but are not limited to

*Non-examples* include but are not limited to

*Approximations* include but are not limited to
APPENDIX B

FAMILY CONNECTIONS PROJECT MISSION
The Family Connections Project

The primary mission of the Family Connections Project (FCP) is to enhance the quality of relationships within families who have toddlers with autism. Parents are taught to identify and arrange opportunities to interact with their children in ways that will increase motivation and social responsivity. Initial training involves identifying high preference events and arranging those events to optimize functional interactions, social engagement and play skills. By teaching parents to create and arrange motivating conditions, children are able to learn increasingly complex skills throughout everyday family routines and activities. Subsequent parent training emphasizes the selection of goals that will optimize quality of family life, procedures to teach desired goals, and, finally, techniques for monitoring treatment progress.

North Texas Autism Project

The North Texas Autism Project (NTAP) is a service-learning project in the Department of Behavior Analysis in the College of Public Affairs and Community Service at the University of North Texas. The Department of Behavior Analysis offers degree programs in Behavior Analysis and specialty training in the behavioral interventions in autism. NTAP was created in response to a growing local and national need for qualified providers of behavior analytic services for children with autism. The mission of NTAP is to provide applied community service-learning experiences for graduate students in the Department of Behavior Analysis, to provide direct interventions, and to produce pragmatic research. The Family Connections Project is one of the primary service-learning activities of NTAP.

FCP Eligibility

Parents and their toddlers with autism or PDD are eligible for services. Toddlers should be between 12 to 18 months at the onset of services. A majority of the parent training will take place on the campus of UNT in the Family Connections Playroom.

FCP Training Opportunities

In order to receive the full benefit of the training program, parents are asked to participate in one full training sequence (one hour training sessions, two times a week for 10 weeks: a total of 20 training sessions). Shahla Rosales, Ph.D., BCBA, a behavior analyst with over 25 years of experience working with young children and their families supervises all training sequences. Experienced professionals with Bachelor’s degrees that are pursuing advanced training in Applied Behavior Analysis conduct individual sessions with parents and their toddlers.

FCP Training Format

The first three to four sessions involve a thorough assessment of child skills and parental goals in each of the FCP skill areas. Assessments take place at home and in the FCP playroom. During this time, the parent trainer will also spend time working directly with the toddler in order to build rapport and to determine optimal teaching procedures. Following the assessment period, each of the training sessions will include instructions, demonstrations and practice of optimal teaching procedures. As the families make progress, intervention will focus on problem solving and integrating new skills into the ecology of the home. Parents will be provided with practical feedback and have ample opportunity to have input into the training process.

FCP Fees for Services

There is a $____ fee for each 20 session training sequence. Parents may contract additional 6 session sequences if qualified interventionists are available.

FCP Applications

Dr. S. Rosales, SRosales@pacs.unt.edu
Department of Behavior Analysis,
PO Box 310919,
Denton Texas, 76205

* Created as a component of the Family Connections Project at the University of North Texas *
APPENDIX C

SCOPE AND SEQUENCE TODDLER MONITORING AND PLANNING GUIDE
**Family Connections Project**  
North Texas Autism Project, Department of Behavior Analysis  
University of North Texas  

**IFSP Scope and Sequence Toddler Monitoring & Planning Guide**

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**Overarching master goal: To increase responsivity, enjoyment and benefit from the social environment**

<table>
<thead>
<tr>
<th>Early Interests and Activities</th>
<th>master goal: enjoys playing with a wide range of activities alone &amp; with others</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>sampling</strong></td>
<td>scanning</td>
</tr>
<tr>
<td><strong>selection</strong></td>
<td>gaze</td>
</tr>
<tr>
<td><strong>manipulation</strong></td>
<td>simple</td>
</tr>
<tr>
<td><strong>diversity</strong></td>
<td>rate w/in class of presenting selections</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Early Communication</th>
<th>master goal: communicates own likes, dislikes, interests; responds to communications of others</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>functional</strong></td>
<td>signal</td>
</tr>
<tr>
<td><strong>eye contact</strong></td>
<td>gaze</td>
</tr>
<tr>
<td><strong>gestures</strong></td>
<td>movement</td>
</tr>
<tr>
<td><strong>vocalizations</strong></td>
<td>babble</td>
</tr>
<tr>
<td><strong>responsivity</strong></td>
<td>smiles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Early Social</th>
<th>master goal: enjoys sharing activities with others &amp; develops attachments to widening circle of people</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>reciprocity</strong></td>
<td>access to interests</td>
</tr>
<tr>
<td><strong>motor imitation</strong></td>
<td>diversity/rate</td>
</tr>
<tr>
<td><strong>vocal imitation</strong></td>
<td>diversity/rate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Early Movement</th>
<th>master goal: able to control own access to physical environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>locomotion</strong></td>
<td>sit</td>
</tr>
<tr>
<td><strong>fine motor</strong></td>
<td>hand to hand</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Early Problem Solving</th>
<th>master goal: able to encounter novel &amp; varying conditions with success &amp; comfort</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>cause-effect</strong></td>
<td>experiment w/ objects</td>
</tr>
<tr>
<td><strong>flexibility</strong></td>
<td>accommodates changes without distress; makes transitions without distress and with eagerness</td>
</tr>
<tr>
<td><strong>agility</strong></td>
<td>switches from one activity to another; engages in activities in different ways; learning rate increases with successive exposures</td>
</tr>
</tbody>
</table>

---

**Probable Sequences (must be individualized and must work with splinter skills) ----------------->**

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*references: Greenwood, Carta & Walker; Mundy & Crowson; Lewy & Dawson; Sears & Sears; Leaf & McEachin; Messinger & Mundy*
APPENDIX D

FAMILY CONNECTIONS PROJECT PARENT JOB AID
The FCP Home Helper Sheet

The Teaching DANCE

____ Decide
Is this a good moment for a teaching interaction?
What skill will you teach?

____ Arrange
Are you sampling, setting a goal, arranging, leveling and waiting?

____ Now!
Are you looking for responses on the goal band?

Are you responding *immediately* by presenting the desired activity or event?
Are you pairing the event with delighted, brief and specific praise?
Are you *adjusting your responding*?
Is what you are doing effective?
Should you continue? Should you change?

____ Count
Are you counting in standardized ways over time?

____ Enjoy!
Are you having fun?
Are you keeping the DANCE short and sweet?
Are you shifting to other activities while your child is still happy?
Are you alternating teaching and play activities?

AGENDA
_________________________________
_________________________________
_________________________________
_________________________________

**Be sure to write your questions on the backside of this sheet**

Date: _____ Child ________________
Parents _________________________
Trainer _________________________
Timing ______ min
Counting schedule:

Skill:

Teaching Tips:

* Created as a component of the Family Connections Project at the University of North Texas *
APPENDIX E

OUTLINE OF FAMILY CONNECTIONS PROJECT PARENT TEACHING STRATEGIES
The Family Connections Project

The Teaching D.A.N.C.E.

This is a teaching strategy that incorporates the principles of operant conditioning in a developmentally suitable way for a toddler and her parents. The parent takes advantage of the toddler’s interests to establish communication “dialogues” and build new skills. The keys are to start with the child’s current interests and skills and to gently shape new and more complex ways of responding to the social and physical environment.

**Decide**

Is this a good moment for a teaching interaction?
Is your child alert? Interested in the presented activities?
Do you have time? Are you free from other distractions?
What skill will you teach?

**Arrange**

Did you sample activities and events: offer choices until you see a “spark”?
Did you arrange the desired events so you that you can control access?
Did you level yourself to your child’s position?
Did you state the goal?
Did you wait for small movements towards the larger goals?

**Now!**

Did you responding *immediately* by presenting the desired activity or event?
Did you pairing the event with delighted, brief and *specific praise*?
Did you adjusting your responding (models and event delivery):
   Is what you are doing effective?
   Is your child happy?
   Is your child moving in the right direction?
   Should you continue? Should you change?

**Count**

Have you determined a time period to sample progress?
Did you define the desired responses –what you want to teach?
Did you count occurrences of each desired response?
Did you chart the responses in real time in a standardized format?

**Enjoy!**

Are you having fun?
Are you keeping the DANCE short and sweet?
Are you shifting to other activities while your child is still happy?
Are you alternating teaching and play activities?

* Created as a component of the Family Connections Project at the University of North Texas *
APPENDIX F

PARTICIPANT INFORMED CONSENT FORM
University of North Texas Institutional Review Board

Informed Consent Form

Before agreeing to you and your child’s participate in this research study, it is important that you read and understand the following explanation of the purpose and benefits of the study and how it will be conducted.

Title of Study:

Identifying a learn unit: Direct observation and social validity issues in autism parent training programs

Principal Investigator:

Amanda Besner, University of North Texas, Department of Behavior Analysis

Purpose of the Study: You and your child are being asked to participate in a research study in which the purpose is to determine if a learn unit can be reliably and consistently measured in a naturalistic setting with parents as the primary change agents. In academic settings an increased number of learns units has been shown to increase correct student responses. It follows that measurement of learn units in naturalistic settings may be useful. A learn unit is defined as a three-term contingency. This contingency consists of a teacher response referred to as an antecedent, a student response referred to as the behavior, and another teacher response referred to as the consequence. The three components of the contingency are linked together because each component is affected by the other components. This means that for example the response of the student should affect the consequence provided by the teacher. The behaviors of interest will be counted by graduate students involved in the parent training program and analyzed in order to answer the two experimental questions. The first question is; can a learn unit be reliably and consistently measured in a naturalistic parent training program? The second question is; are an increased number of learn units related to favorable child responding? In addition to this independent observers not involved in the parent training program will view video tapes of different parent/child interactions and rate the quality of the interactions. The video tapes will include both high and low learn unit interactions.

Study Procedures:

You and your child will be asked to engage in typical assessments and intervention sessions that will take about 1 hour a day, 2 days a week for 8-12 weeks. All procedures are embedded within the services provided by The Family Connections Project. These procedures include a 10 minute video-taped assessment probe of you and your child interacting and the intervention sessions that involve modeling, role-playing, practicing and receiving feedback. Therefore, the scheduling, content, and procedures of the parent training sessions offered by The Family Connections are identical to those for clients who are not involved in the study. The only difference lies within
the data analysis that takes place. Your participation in The Family Connections Project is in no way affected by your consent.

Voluntary Participation:

Participation in this research study is voluntary. Refusal to participate or a decision to discontinue participation will not involve a penalty or loss of benefits to which you are otherwise entitled.

Foreseeable Risks:

No foreseeable risks are involved in this study. Previous clinical and research reports have identified no harm and substantial benefit from participation in the training associated with this study.

Benefits to the Subjects or Others:

This study is not expected to be of any direct benefit to the participants; however, the results of the study may benefit future caregiver-child pairs receiving parent training services. In addition to the expected benefit of other parent/child groups, the results of the study may also add directly to the knowledge of other service providers delivering parent training services to families with children with autism and other populations. Participants will, however, continue to receive the benefits of The Family Connections Project.

Procedures for Maintaining Confidentiality of Research Records:

All records including signed consent forms and video tapes will be kept in a locked filing cabinet in Dr. Shahla Ala’i-Rosales’ office in Chilton Hall Rm. 360. No documents will be posted on the internet and any electronic copies will be given to the family immediately upon completion of the study. All research participants will be given a pseudonym that will be used when referring to that participant’s data and will be maintained throughout the course of research. Following the research study, all personally identifiable data will be marked with the participant’s pseudonym and will remain in The Family Connections Project records for up to 3 calendar years. Because of the extensive data collection involved in the research study, a team of graduate students may at any time during study view the participants’ records. All of these graduate students are staff of The Family Connections Project. Personally identifiable data will not be disclosed to anyone outside of The Family Connections Project Research Team. The confidentiality of the participants’ personal information will be maintained in the master’s thesis defense and in any public dissemination, such as appearance in academic journals and/or academic conferences.

Questions about the Study

If you have any questions about the study, you may contact Amanda Besner at [email protected] or (608) 354-8956 or the faculty advisor, Dr. Shahla Ala’i Rosales at [email protected] or (940) 369-7454.
Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants’ Rights: Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Amanda Besner has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You have been told you will receive a copy of this form.

__________________________________________________________
Printed Name of Participant

____________________________________  ____________
Signature of Participant                                     Date

For the Principal Investigator or Designee: I certify that I have reviewed the contents of this form with the participant signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

________________________________________  ______
Signature of Principal Investigator or Designee   Date
REFERENCES


