

Case Study- Speech and Language Delay

Eric G., 3 years, Speech and Language Delay

Submitted by: Traci A. Tyler, MS, OTR/L
Cary, Illinois
May 2005

Name: Eric G.
Gender: Male
DOB: 11-26-2001
Chronological Age: 3 years
Clinical Diagnosis: Speech and Language Delay

BACKGROUND INFORMATION:

Eric G. is a mostly healthy, 3-year-old male. He lives at home with his biological parents, two sisters and a guinea pig in a suburb of Chicago. Eric was born at 38 1/2 weeks gestation weighing 6 lb 12 oz via vaginal delivery. Prenatal history was significant for bed rest beginning at 30 weeks gestation secondary to low amniotic fluid and high blood pressure. Postnatal history was mostly unremarkable. Eric was discharged home with his mother. Early medical history is significant for RSV resulting in a reactive airway. During the winter months, Eric received daily nebulizer treatments. Medical history is significant for chronic ear infections. Eric has had 25 known ear infections impacting both ears. PE Tubes were placed in June 2003. Eric has had 8 ear infections after the PE Tubes were placed. There are no concerns with hearing or vision.

Eric participates in regular medical follow up with a variety of professionals including pediatrician, occupational therapist and speech language pathologist. Eric began participating in Early Intervention services with occupational and speech language therapy in June 2004 after parents referred him secondary to concerns with speech and language development. Eric has no known diagnoses; however, he has documented delays within the fine motor and speech language domain. Fine motor delays include immature grasps and decreased strength and coordination in bilateral hands. Speech language delays include phonological difficulties. Other areas of concern include low frustration tolerance, sensorimotor processing and attention to new tasks.

Eric consumed breast milk for the first nine months of life. Eric consumed a mostly balanced diet with the exception of vegetables. Foods consumed include cereals, yogurt, fruit, crackers, pretzels and sometimes chicken. Eric does not like vegetables. He takes ½ Flintstone Complete vitamin daily.

Eric participates in most activities of daily living with adult supervision without much distress including oral hygiene, grooming and bathing. However, Eric is reluctant to having his ears examined by a doctor or cleaned by a parent. He tolerates wearing a hat on his head for the amount of time that it takes to go between the house and car or car to store. Eric achieves expected amounts of sleep on a daily basis. He follows predictable sleep patterns. Eric has met most developmental milestones including cognition, motor, adaptive domains within expected time frames. Speech and language has developed following atypical patterns whereas it was initially delayed by slow development of sounds. He does not pronounce beginning and ending consonants.

Eric is a happy, strong willed and loving young boy who is self directed in his play. He can become easily frustrated especially when introduced to new activities. Through therapy he has developed an adaptability to change; whereas, he responds to circles of communication given by

either the parent or therapist. He follows multi-step directions that incorporate sensorimotor play within a functional base. He enjoys children music.

Parents have expressed significant concerns with behaviors including social maturity, perseveration, frustration tolerance, avoidance behavior and interaction with peers. There are no concerns with motor development. Concerns with speech and language include articulation, fluency, word finding, expressive language, receptive language and letter recognition.

TREATMENT:

Between May 2004 and November 2004, credentialed providers of Part C Early Intervention Program within the State of Illinois evaluated Eric. It was determined that he qualified for services secondary to speech language and fine motor delays. He participated in home-based occupational therapy and speech language therapy one time per week for 60 minutes. He also attended a transitional playgroup offered by the Pioneer Center one time per week for 90 minutes.

In early November 2004, Eric was evaluated by the local school district and determined that placement within an Early Childhood Program following his third birthday was appropriate. Currently, he attends an Early Childhood Education Program four (4) days per week for 2 ½ hours in the morning. He receives 240 minutes per month of occupational therapy and speech language therapy. Minutes are received in a combination of one on one, group and consultation.

He participates in dual transportation to and from school whereas he rides the bus to school and returns home in the family vehicle. Thus far, Eric enjoys the Early Childhood Program and looks forward to school each day.

Eric participates in private, home-based occupational therapy services one time per month for 60 minutes on a consultative basis.

PROGRAM IMPLEMENTATION:

In September 2004, Eric was introduced to a new, audio environment by incorporating Music for Babies™ into his daily routine.

Eric had been participating in home-based occupational therapy services with this provider when The Listening Program® was discussed with the family. Eric's mother and TLP Authorized Provider (in training) were unsure of compliance. Eric has had a history of chronic ear infections and demonstrates excessive sensitivity in and around his ears. Eric also has a tendency to control things that he encounters. He needs to feel as if he controls interactions and activities. Therefore, it was determined that Eric would benefit from participating in an introductory listening program in order to prepare for the The Listening Program.

It was determined that Eric would be introduced to musical sounds by first playing Music for Babies at low/moderate volume through stereo speakers in the family room throughout the day using all four CDs. The speakers in the family room are wired as a home theatre system. The CDs were played in a stereo mode whereas music was emitted from all four speakers when Eric engaged in play in the middle of the room with his toys. It was easy to re-arrange the play area to optimize listening. The family played each CD in its entirety during the following activities: Mealtime (Peaceful Baby), Play (Playful Baby and Cheerful Baby) and Sleep/Naptime (Sleepy Baby).

Music for Babies was used to provide daily auditory support along with Eric's sensory diet facilitating his ability to regulate and modulate his sensory system. Eric participated in a variety of activities including therapy during the playing of each CD. Initially, when Eric heard the "sounds" he would look at the television set expecting to see a television show or movie, show signs of

confusion and exhibit a temper tantrum due to frustration when there was no picture on the television. Soon he learned that television shows for the exception of Sesame Street were a thing of the past and that sounds from the living room were his CDs. Per parent report, Eric quickly demonstrated enjoyment of each CD. He demonstrated an increased level of calmness and decreased need for movement. After initial introductions, Eric began requesting specific songs by uttering various sounds such as "coo coo, coo coo."

From the introduction through the present, Eric has refused to listen to Sleepy Baby during sleep/naptime. Eric has always been a good sleeper and follows a specific routine for sleep and naptime. While he has shown an enjoyment for the music during waking periods, he refused the addition of Sleepy Baby to his given routine. Per parent report during the first listening, he listened to each song played on the CD and fought falling asleep by tossing, turning and repeatedly getting out of bed. He became very upset when the CD finished playing. The CD disrupted his expected sleep pattern; therefore, the use of Sleepy Baby during nap/sleep time was discontinued immediately.

Based on clinical findings using the Infant/Toddler Sensory Profile, Eric demonstrates decreased sensory sensitivities. In terms of auditory awareness, Eric has a tendency to tune out sounds around him including his name. Intermittently he requires pairing of senses to respond (e.g. being tapped on the shoulder while his name is being called) to specific requests. Therefore, it is probable that Eric's arousal level was heightened by listening to Sleepy Baby; therefore, making it difficult for him to achieve a calm state allowing for sleep.

It should be noted that Eric's older sister, who experiences anxiety in her daily life, thoroughly enjoys Sleepy Baby and requires it to be played when she retires for the evening. Parent reports that she has shown improvements in her ability to deal with daily events.

In October 2004, Eric was introduced to headphones by having them present in the room. The headphones were always within view. At times, the headphones were sitting next to the therapist, sitting next to Eric, worn by therapist or merely lying on the sofa and/or table. Eric showed signs of distress when the headphones were present. He would relocate himself in the play area whereas he could not visually see the headphones. If the therapist donned the headphones, Eric would flee the room. The family applied the same visual presence during the same time period and experienced the same results. The passive introduction of the headphones was discontinued mid-October 2004.

In mid October 2004, preparatory listening began by using TLP Speech and Language Kids 1 for stereo speakers. This CD was chosen for three reasons: (1) the family wants Eric to be able to use verbal language so that his needs and wants can be understood; (2) his age since the open air speaker delivery is ideal for young listeners and; (3) Eric cannot yet tolerate wearing headphones.

The recommended individualized listening schedule was to play one (1) module of TLP Speech and Language Kids 1 for stereo speakers in the background at low/moderate volume, one (1) time in the morning during Play. Following this recommendation it will take four (4) days to listen to the CD in its entirety. This schedule is recommended for two weeks. In addition, daily auditory support will continue by using Music for Babies as described above.

Eric was unable to localize the sounds as he does with Music for Babies. He became frustrated, expressed dislike for the music and kept requesting Cheerful Baby. Eric began exhibiting an increase in tantrums that presented by throwing himself on the floor and hitting his mother. Preparatory listening using TLP Speech and Language Kids 1 for stereo speakers was discontinued after eight days.

In November 2004, preparatory listening began again by using Full Spectrum- Prelude 1 for spatial stereo/ speakers due to its development as a gentle introduction to The Listening Program. This CD was chosen for five reasons: (1) the use of TLP Speech and Language Kids 1 for stereo speakers was not tolerated by Eric; (2) the Full Spectrum- Prelude 1 was developed as a gentle introduction to The Listening Program; (3) his age since the open air speaker delivery is ideal for young listeners; (4) Eric cannot yet tolerate wearing headphones and; (5) ability to work toward meeting the family goal of enhancing understandability of Eric's verbal language.

The recommended individualized listening schedule was to play one (1) module of Full Spectrum- Prelude 1 and 2 for spatial stereo/ speakers in the background at low/moderate volume, one (1) time in the morning during Play. Following this recommendation it will take four (4) days to listen to the CD in its entirety. This schedule is recommended for two weeks. In addition, daily auditory support will continue by using Music for Babies as described above.

Upon presenting the above recommendation to the family, the family requested a listening schedule that included listening to the CD in the entirety because they had become accustomed to this type of listening schedule with Music for Babies. This therapist took the opportunity to re-discuss The Listening Program. It was explained that The Listening Program is a Music-Based Auditory Stimulation method that is used to train the auditory skills needed to effectively listen, learn and communicate. These CD's, Full Spectrum- Prelude 1 and 2 for spatial stereo/ speakers were designed to provide a rich and full listening experience that is different than Music For Babies. This type of listening will challenge Eric's auditory system and more than likely cause fatigue to his system; therefore, we do not want to over stimulate his system with too much sound stimulation at once. We want the muscles in his ears to have an opportunity to work, listen and process the sounds that he his hearing.

So, in an effort to meet the requests of the family and maximize the potential of using the Full Spectrum- Prelude 1 and 2 for spatial stereo/ speakers the recommended individualized listening schedule was to play two (2) modules of Full Spectrum- Prelude 1 in open air in the background at low/moderate volume, one (1) time in the evening during Mealtime. It was felt that Eric and family would be able to complete a family dinner within 30 minutes and have family conversations with this musical accompaniment. Following this recommendation it will take two (2) days to listen to Prelude 1 in its entirety. Each CD, Prelude 1 and 2, should be alternated after each listening of all four (4) modules in effort to maintain variety. This schedule is recommended for two weeks. In addition, daily auditory support will continue by using Music for Babies as described above.

During weeks three through the present, the family has expressed great interest in listening to the Full Spectrum- Prelude 1 and 2 for spatial stereo/ speakers. Eric did not show sensitivity to the B tracks; therefore, the family was able to listen to two (2) modules consisting of Tracks A, B and C. They have thoroughly enjoyed listening to them during Mealtime. In general, the parents have expressed an overall sense of calmness in their household, which is not typical of the family secondary to their schedules and holiday season. Eric began demonstrating change within his daily routine that included higher tolerance toward things previously disliked. His need for high energy and/or high movement activities has decreased. He can sit and attend to quiet, independent play for greater periods of time averaging 30 minutes in duration. He has begun showing signs of self-regulation and organization. It is believed that he is achieving this through listening.

The therapist determined that it was important to resume the passive introduction of the headphones during therapy sessions and on a daily basis; therefore, during therapy sessions during weeks one through present, the presence of headphones were always within view during therapy sessions by the therapist. The headphones were moved throughout the sessions; so that, Eric could always see them whether they were placed beside the therapist, beside Eric, on the sofa, on the table or on the chair, they remained in the room. During the course of the weeks, Eric

began developing toleration for the presence of the headphones. On a few occasions, Eric handed the headphones back to the therapist without too much of a fright or flight.

In December 2004 during therapy sessions (week five), the therapist began wearing the headphones during one activity. Initially, Eric fled the area and would not return until he was certain that the headphones had been removed from the therapists' head. During week six, Eric demonstrated understanding that the therapist would wear the headphones during the completion of one, simple activity. During this session, Eric required the presence of his mother during the said activity. He had difficulty being near the therapist or making eye contact when the headphones were on the therapist's head, but he was able to complete the activity with parent redirection. Once the activity was completed, he fled the area and returned when it determined that it was safe. During week seven, Eric gave a look at the therapist when she placed the headphones on her head, but remained in the room and finished the activity without complaint. He allowed the therapist to remove the headphones and place them in the vicinity without fleeing. Both therapist and parent were surprised and relieved.

PRE TEST TLP:

The Hawaii Early Learning Profile and Peabody Development Motor Scales were used to assess developmental skill performance with fine motor skills on 05/27/04. The tests were conducted within an unstructured setting in the family home offering toys and completing parent interview simultaneously. In addition, clinical observations were used to assess Eric's overall development in these domains.

Eric scored with an average age of 18.5 months as tested with the Peabody Developmental Fine Motor Scales-II resulting in a 38% delay in fine motor skill performance. Based on the standard scores, skill performance is described as "average" for grasping and "poor" for visual motor integration. Eric demonstrates fair fine motor skill development. Foundational components appear intact through 18 months of age. Has difficulty with bilateral tasks that require both hands to work together as a unit whereas one hand holds and the other manipulates. Without integration of this skill, Eric will have difficulty with pre-academic skills and dressing tasks.

The Infant/Toddler Sensory Profile was used to assess Eric's ability to process and regulate sensory motor information after probable concerns were expressed by the family and supported by clinical observations during therapeutic sessions.

Based on the Infant/Toddler Sensory Profile, Eric's quadrant scores are within Probable Difference (More Than Others) range in Sensation Avoiding. Scores are within Probable Difference (Less Than Others) range in Sensation Seeking. Scores fall in the Typical Performance range for Low Registration and Sensory Sensitivity. Section scores are within the Probable Difference (Less Than Others) range for Visual, Tactile and Vestibular Processing. Scores fall in the Typical Performance range for Auditory and Oral Sensory Processing. Eric demonstrates a low threshold or over responsive with visual, tactile and vestibular processing. With low thresholds, the nervous system responds frequently to stimuli because it does not take very much input to reach the threshold and activate the system.

SUMMARY OF PRE TEST SCORES:

Based on clinical findings supported by the Infant/Toddler Sensory Profile, Eric presents with borderline atypical responses in sensory regulation and processing indicating probable delays within the cognitive, language, and motor domains that are impacting his day to day activities as well as developmental growth. He would benefit from various interventions that include incorporating sensation-seeking activities into daily routines so that thresholds can be met and limiting unfamiliar sensory input and gradually broaden the sensory processing experiences within the child's accepted rituals. In addition to direct intervention, Eric would benefit from TLP to address sensory, language, attention, communication and auditory processing.

POST TEST TLP:

The Hawaii Early Learning Profile and Peabody Development Motor Scales were used to assess developmental skill performance with fine motor skills on 11/03/04. The tests were conducted within an unstructured setting in the family home offering toys and completing parent interview simultaneously. In addition, clinical observations were used to assess Eric's overall development in these domains.

Eric scored with an average age of 27 months as tested with the Peabody Developmental Fine Motor Scales-II resulting in an overall delay of 23% in fine motor skill performance. Based on the standard scores, skill performance is described as "average" for grasping and "below average" for visual motor integration. Eric demonstrates improvement with fine motor skill development. Foundational components appear intact through 24 months of age with scattered skill development between 24 – 30 months. He continues to work toward pre-academic skills such as pre-writing and scissor use. Difficulties within these skill areas are secondary to coordination and motor planning for these skills.

The Infant/Toddler Sensory Profile was used to assess Eric's ability to process and regulate sensory motor information after probable concerns were expressed by the family and supported by clinical observations during therapeutic sessions.

Based on the Infant/Toddler Sensory Profile, Eric's quadrant scores are within Probable Difference (More Than Others) range in Sensation Avoiding and Probable Difference (Less Than Others) range in Sensation Seeking and Sensory Sensitivity. Scores fall in the Typical Performance range for Low Registration. Section scores are within the Probable Difference (More Than Others) range for Oral Sensory Processing and Probable Difference (Less Than Others) range in visual, tactile and vestibular processing. Scores fall in the Typical Performance range for Auditory Processing. Eric demonstrates a high threshold with oral sensory processing. With high thresholds, the nervous system does not respond to the stimuli because it takes a lot of input to reach the threshold. Eric demonstrates a low threshold with visual, tactile and vestibular processing. With low thresholds, the nervous system responds frequently to stimuli because it does not take very much input to reach the threshold and activate the system.

SUMMARY OF POST TEST SCORES:

Based on clinical findings supported by the Infant/Toddler Sensory Profile, Eric continues to present with borderline atypical responses in sensory regulation and processing indicating probable delays within the language, motor and personal-social domains that is impacting his day to day activities as well as developmental growth. He would benefit from various interventions that include incorporating sensation seeking activities into daily routines so that thresholds can be met, providing sensory experiences as part of ongoing performance that support the child to continue a task and to minimize the chances for the thresholds to be fired repeatedly and limiting unfamiliar sensory input and gradually broaden the sensory processing experiences within the child's accepted rituals. While Eric has demonstrated in all areas, he would continue to benefit from TLP to address sensory, language, attention, communication and auditory processing.

SUMMARY OF CHANGES:

Eric has demonstrated changes with language development and sensory regulation and processing. Language development was not formally tested by this provider secondary to the scope of practice by this provider; however, Eric's level of understandability by others improved as reported by parent. This therapist could understand 75% of Eric's expressive language as compared to 25% at the initial evaluation. Parent reports that Eric's peer-to-peer relationships have shown improvement during playgroup with an increased interaction between peers. Eric now expresses his needs when a toy is attempted to be swiped and clearly states, "No, it's mine." The speech therapist has also reported change as evident with clinical observations even though the change has yet to be reflected with a standardized tool.

In terms of sensory integration, Eric no longer requires excessive amounts of movement prior to or during therapy sessions. In the beginning, the therapist and Eric could spend 45 minutes of a 60 minutes session playing chase as he attempted to calm his nervous system in order to participate in a cognitive activity. He always determined the amount of movement needed as following the floor time principles of treatment. Over the course of the weeks following Preludes 1 and 2, the amount of movement has decreased from 45 minutes to intermittent need lasting no greater than 3 minutes, 2-3 times per session. This dramatic change in sensation seeking has demonstrated great improvement with the ability to self regulate.

Parents have reported an improvement in Eric's social-emotional development whereas he is less likely to have a melt down when he does not get his way. He allows for redirection as long as fair warning is given.

Initial goals of TLP addressing sensory processing, organization and regulation have addressed the family concerns. Concerns with speech and language include articulation; fluency, word finding, expressive language, receptive language and letter recognition persist.

FOLLOW-UP RECOMMENDATIONS:

Eric will continue to participate in Preparatory Listening using TLP CDs that include Full Spectrum- Prelude 1 and 2 spatial stereo/ speakers and supplemental listening using Music for Babies. Various strategies will continue as Eric progresses towards the donning of headphones without music. The headphones will continue to be visually present throughout Eric's day, as tolerated. As suggested by the family, they are going to have "theme nights" where the members of the family wear headphones (without music) during dinner. It is the desires of the parent that Eric will want to imitate his sisters and partake in the same activity. Additionally, the family is going to provide Eric with several types of earmuffs and warmers; so that, he can get used to having "things" on his head and ears upon his own will. It is crucial that Eric accept headphones on his terms in order for the progression toward The Listening Program through headphones.

During the acceptance phase of headphones, Preparatory Listening using TLP CDs will continue by adding Sensory Integration Classic 1 Spatial Stereo Dynamic Speakers to the listening lineup. The individualized listening schedule will be devised for the family in order to incorporate a variety of listening of all CDs on a daily basis and rotating the music to allow for variety and modifications to the routine.

The recommended individualized listening schedule will be to play:

- A.M. Two (2) modules of Sensory Integration Classic 1 Spatial Stereo Dynamic Speakers in the background at low/moderate volume, one (1) time in the morning, Monday through Friday, during Play for two weeks. During week two, four (4) modules of SI Classic 1 in the background at low/moderate volume, one (1) time in the morning, Monday through Friday, during Play. Following this recommendation will take two (2) days to listen to SI Classic 1 in its entirety.
- P.M. Two (2) modules of Full Spectrum- Prelude 1 and 2 for spatial stereo/ speakers in the background at low/moderate volume, one (1) time in the evening during Mealtime. Following this recommendation it will take two (2) days to listen to Prelude 1 in its entirety. Each CD, Prelude 1 and 2, should be alternated after each listening of all four (4) modules in effort to maintain variety.
- Daily Auditory support will continue by using Music for Babies played at low/moderate volume through stereo speakers in the family room throughout the day using all four CDs. Play each CD in its entirety during the following activities:

Mealtime (Peaceful Baby), Play (Playful Baby and Cheerful Baby) and Sleep/Naptime (Sleepy Baby).

The schedule will be modified every two weeks. The therapist will be in contact with the family on a weekly basis secondary to the individualized nature of the program being conducted with Eric.

Depending upon review with family, headphones will be introduced, when ready, and will be initiated using the Full Spectrum- Prelude 1 and 2 Spatial Surround/ Dolby Headphone at low/moderate volume starting with A tracks only, then adding the C track, then moving to completing one module one (1) time per day. When this can be completed for 2 weeks, then, two (2) modules, two (2) times per day with one (1) in the morning and one (1) in the afternoon will be completed for 2 weeks.

At that time, continued listening will be determined based on outcomes and therapeutic goals.

DISCUSSION:

Ninety percent of the population of clients that Traci Tyler & associates primarily treat are between the ages of birth to three. In my daily practice, I have noticed a difference in the children and families where I have incorporated Music for Babies and TLP Full Spectrum Preludes in their therapy sessions. Inevitably after they've listened to the music during therapy sessions, they want to add it to their collections and immediately report that sleep is better for the entire family due to Sleepy Baby, my personal favorite.

Due to immature nervous systems and underdeveloped aural systems, it is a slow progression towards the introduction to The Listening Program with this population. However, it is the nature of the business as age only occurs with time. I am encouraged with the music offered by ABT that includes the Specialized CD's, Music for Babies and Sound Health that can be listened through stereo speakers. The music is full, and rich of sound allowing little and big ears to experience the art of listening. I've seen these changes with Eric and his family. It will be rewarding to observe Eric listening through headphones and experience sound as never before. I'm excited to hear the words that he uses to describe his listening and to see the expression on his parent's faces as his thoughts, needs and wants become clearly known.

Traci A. Tyler, MS, OTR/L
Traci Tyler & Associates, LLC
Cary, Illinois

End of Case Study

 **ADVANCED BRAIN TECHNOLOGIES**
5748 South Adams Avenue Parkway | Ogden, UT 84405
801.622.5676 | fax: 801.627.4505
provider@advancedbrain.com | www.advancedbrain.com