Specific Language Impairment (SLI)

An Honors Thesis (HONORS 499)

By

Michelle L. Hazelett

Thesis Advisor
Dr. Barry Wagner

Ball State University
Muncie, Indiana

May 2002

Spring 2002
I would like to extend a very sincere thank-you to my project advisor, Dr. Barry T. Wagner. If it were not for his willingness to collaborate with me on this thesis, it would not have been possible. He not only opened a door for me on the subject of Specific Language Impairment, but he also made it interesting for me, and motivated me to learn as much as possible about the disorder. He gave me countless hours of his time and provided me with numerous resources that helped in the formation of this thesis.
Abstract

The purpose of this paper is to investigate and more coherently understand Specific Language Impairment (SLI). In this thesis, I aim to address the nature and disorder of SLI, the criteria of the differential diagnosis of SLI, the components of information processing attributed to SLI, the nature of assessment and treatment of SLI, and the understanding of future research conducted on SLI. A review of the literature was conducted to define the disorder, determine the etiology of the disorder, and discuss the implications of assessment and treatment for persons with SLI.
Specific Language Impairment (SLI)

Definition of SLI

Many people in Speech Language Pathology have studied the unique disorder of Specific Language Impairment. Although the name of this disorder has become popular in the last ten years, some researchers have suggested that SLI has manifested in children through the beginning of civilization. Leonard (2000) has suggested that many researchers have used a variety of different names to define various language disorders, for example, as early as the 1960s, researchers have used the names Developmental Aphasia and Developmental Dysphasia as a label to characterize children with language impairments that exhibit a neurogenic etiology. These early labels of language impairments have provided us with a foundation to the uniqueness of different types of language disorders. Developmental Aphasia and Developmental Dysphasia have often been associated with, “language disruption caused by discrete brain damage, such as resulting from Cerebral Vascular Accident (stroke)” (Leonard, 2000, p.7). In contrast, SLI has been defined as a language disorder without any kind of neurogenic etiology. Leonard (2000) defines SLI as, “significant impairment in spoken language ability when there is no obvious accompanying condition such as mental retardation, neurological damage, or hearing impairment” (Leonard, 2000, p. vii). A significant concern among the profession is the lack of agreement of the terms delay versus disorder when referring to SLI and other language disorders. Often, service providers use the term delay when a child is initially diagnosed at a very young age. In this case, the child’s language abilities
are not always significantly behind his chronological age. Moreover, as a child becomes older and his language performance falls farther behind, he may be considered disordered. The issue here is to decide whether an SLI child should be defined as delayed versus disordered. Some researchers suggest that many of these children are just slow language talkers. However, other researchers suggest that these children demonstrate a disorder because their language abilities fall farther behind as they become older.

Many children who are SLI demonstrate a vast number of language and communication characteristics. This population of children is considered a heterogeneous group given that the characteristics of the disorder can vary from one child to the other. Researchers consider the uniqueness of the disorder, so numerous empirical studies have been conducted to better delineate the disorder (Miller, Kail, Leonard, & Tomblin 2001; Weismer, Evans, & Hesketh 1999; Weismer, Tomblin, Zhang, Buckwalter, Chynoweth, & Jones 2000). In this thesis, a discussion will be presented on the characteristics of SLI, the short-term memory characteristics of SLI, the rapid naming abilities of SLI, and the narrative abilities of SLI.

Leonard (2000) has suggested that both researchers and speech-language pathologists use specific criteria in the differential diagnosis of persons with SLI. Leonard (2000) suggests that a child must demonstrate an intelligent quotient of 85 or higher on a non-verbal cognitive reasoning test. Next, the child must pass a pure tone hearing screening. It is also important that the child does not have any recent ear infections. In regard to the oral mechanism, the child must demonstrate adequate
structure and function for speech production. Additionally, the child must have intact social skills. Lastly, one of the most important criteria for defining SLI is the child’s performance on standardized language tests. Leonard (2000) suggests that in order to be diagnosed as SLI, the child must fall at or below 1.25 standard deviations (SD) below the mean on a cluster of language tests. Of particular importance is to note that many researchers and speech-language pathologists use a variety of standardized tests to measure children’s language competencies. The literature suggests that given the difficulty of diagnosing SLI, the profession has recognized that a child should perform below the 1.25 SD below the mean on a cluster of tests. For example, if the Test of Language Development: P-3 (TOLD:P-3), the Test of Auditory Comprehension of Language: 3 (TACL-3), the Peabody Picture Vocabulary Test: 3 (PPVT – 3), the Mean Length of Utterance (MLU) of a spontaneous speech sample, and the Clinical Evaluation of Language Fundamentals: 3 (CELF-3) are administered, a child must fall below the 1.25 SD criteria on two of the four standardized tests. Given the heterogeneity of the disorder, it is worth noting that a child can fall below the criteria in receptive and/or expressive measures.

The prevalence of SLI has been estimated at 7% of the general population, and is more commonly seen in males than in females. This percentage can vary greatly based on the criteria and standardized tests that are used to diagnose SLI.
Characteristics of SLI

SLI children can demonstrate language difficulties in receptive language, expressive language, or a combination of both receptive and expressive language. Also, persons can characterize SLI under the five domains of language: pragmatics, morphosyntactic, phonology, and semantics.

Studies have indicated that children who demonstrate SLI have several deficits in the area of social development, or pragmatics. Reed (1994) has found that SLI children are less socially skilled, have poor leadership abilities, are less likely to assume leadership roles, and are less popular among peers of the same age. SLI children are also less likely to initiate conversations with others, and often take fewer conversational turns. “These children may have difficulty in using appropriate methods to gain a listener’s attention and may attempt to initiate conversations at the wrong times” (Reed, 1994, p. 135). It has also been found that breakdowns often arise once conversations have been initiated. “The children may not be able to sustain the topic over several conversational turns due, in part, to their problems with turn-taking; inserting noncontingent, irrelevant comments; switching topics abruptly; and failing to ask for clarifications” (Reed 1994, p. 135). In studies done among peers of children with SLI, results indicate that normal language-learning children are less likely to interact with children who demonstrate SLI, possibly due to the fact that these children rarely initiate conversation themselves. “Preschoolers with specific language impairments tended to address their communicative attempts to adults more than to their peers, possibly because of a history of unsuccessful
communicative interactions with their peers and/or because of a history of having had their communicative initiations ignored by their peers” (Reed, 1994 p. 135).

In regard to morphosyntactic development, children with SLI demonstrate many difficulties. It has been noted that children have difficulty with a variety of morphemes, such as plural –s, possessive –s, past –ed, third person singular –s, the articles a and the, the copula, on, auxiliary be, irregular past tense, and the complementizer to (Reed 1994). Additionally, many children with SLI have confusion with their use of personal pronouns (e.g., him for he, and her for she). Most researchers agree that these deficits in grammatical morphemes are attributed to the lack of perception of these unstressed segments in our language. Also, children with SLI demonstrate many difficulties marking the tense of their utterances. For example, they may communicate the sentence, “Three girls are running” as “Three girl are running,” or “Three girls is running,” when attempting to mark plural and auxiliary + main verb. It is believed that children produce these types of sentences because they do not understand the complete grammatical aspect of marking individual words in sentences. Given these deficits in grammatical morphemes, it is not uncommon for children to demonstrate significantly less mean length of utterances. Children with SLI can demonstrate varied MLUs when compared with their typical peers. Usually, to be diagnosed with SLI, children will demonstrate an MLU below 2 SD below the mean. One additional consideration is that children with SLI also demonstrate shorter sentences and difficulty with word order.
In the area of phonology, most researchers agree that children with SLI do not demonstrate pervasive phonological disorders. However, the literature has recently discussed the relationship between children's phonological development and language disorders. This is a challenging area to examine because when assessing children that have SLI and a phonological disorder, it is difficult to estimate their overall language abilities because of unintelligible speech patterns. Reed (1994) indicated that it is not uncommon to find an unintelligible three to four year old child with SLI. However, as a child becomes older, his phonological abilities may improve but still show deficits in receptive and or expressive language. One important developmental aspect when thinking about a child's phonological system is the notion that children will often produce words that are monosyllabic with consonants (e.g., stop plosives) that are acquired earlier in development. In essence, research suggests that the child's language development is highly influenced by his phonological system.

According to Reed (1994), the profession of speech-language pathology has limited knowledge in the area of semantic development in children with SLI. Researchers suggest that many children with SLI have significant reduced vocabulary abilities in comparison to typical children. Reed (1994) has indicated that children with SLI have difficulty learning abstract or figurative words versus concrete or literal words. Many children with SLI may also comprehend the meaning of words but do not use the words appropriately during conversations. Some children with SLI may overgeneralize known words to inappropriate contexts because their development of vocabulary is limited. Researchers have noted significantly reduced type token ratios for children who are SLI.
Just like significant discrepancies in morphosyntactic development, many children with SLI also can demonstrate substantial impairments with vocabulary diversity.

In addition to the five domains of language that may be affected, there are several other areas that researchers examine. One such area is known as nonword repetition. "Nonword repetition is a paradigm that has been used extensively as a measure of phonological working memory" (Weismer, Tomblin, Zhang, Buckwalter, Chynoweth, & Jones, 2000, p.865). Children who demonstrate SLI have poorer phonological working memories. Also, they demonstrate reduced phonological storage capacities than normal language learning children, thus impairing their nonword repetition abilities. This nonword repetition paradigm has been important because of its contribution to the differential diagnosis of SLI. A non-word repetition task has been reported to identify the SLI phenotype (Montgomery 2002). Additionally, the concepts of information processing theory support recent advances in the acceptable diagnoses of SLI. This theory is also well received by both researchers and practitioners in SLP.

Story retelling is another area that has gained the attention of researchers in recent years. The ability to retell a story depends on several factors. Primarily, it demands the comprehension and expression of sequentially presented information. Also incorporated are the abilities to decode meaning, to retain verbally presented information, and to organize and sequence content. Researchers in the field of SLP have also noted that story retelling in children is helpful in obtaining spontaneous language, thus providing the researcher or professional with an opportunity to evaluate grammar and vocabulary in a
speech sample similar to that of a conversation. Story retelling as a whole can be used as a predicting factor for school success. It has been noted that many children who are good conversationalists are also those children who perform well in their academic curriculums. In contrast, those children who are not good conversationalists are at risk for academic problems.

In regard to speed of processing, researchers have found several characteristics that children with SLI demonstrate. On average, children with SLI take longer to respond to auditory and visual stimuli, and are slower in completing both linguistic and nonlinguistic tasks (Leonard, 1999; Reed, 1994). When shown a picture, they are slower in recognizing the picture, retrieving the name of the picture, mentally formulating the name of the picture, and verbally producing the name of the picture, as compared to their normal language-learning peers. When shown a diagram of an unfamiliar shape, children who demonstrate SLI are slower when asked to mentally rotate the picture to different positions. Tactile kinesthetic abilities are also poor due to the fact that children with SLI are not able to identify an object that they are touching, even if it is familiar to them, if they are not able to see the object in front of them. Auditory processing is another area that researchers have studied in children with SLI. Studies have shown that when wearing headphones and presented with two sounds, one in each ear, these children are not able to identify which sound lasted longer. They also demonstrate great difficulty determining in which ear a sound was presented. In summary, phonological processing has provided researchers a better understanding of SLI. The literature that was just reviewed reveals that children with SLI have auditory sequential processing deficits.
Furthermore, this literature contributes to the definition of SLI. For example, some researchers believe that children who have difficulty with language learning is either attributed to a limited capacity model or deficits in phonological processing.

It is also well documented that many children with SLI have difficulties with phonological awareness. "Phonological awareness refers to an individual's awareness that spoken words consist of sound segments smaller than the syllable. That individuals have the ability to rhyme, to match beginning sounds, or to move disks to represent each sound segment in a word are among the ways phonological awareness traditionally has been determined" (Ball, 1997, p.15). Many researchers have viewed phonological awareness as the foundation for literacy (reading and writing). In other words, children who have difficulty with phonological awareness appear to be those children who are at risk for reading and writing disorders. In contrast those children who do not have difficulty with phonological awareness appear to be children that excel in reading and writing (Catts, 1999). Catts, Fey, Zhang, and Tomblin (1999) revealed in their study that over 70% of their children who had difficulty with reading and writing were also children who demonstrated deficits in phonological awareness and phonological processing. Additionally, their children who had reading and writing problems continue to have deficits later in the school-age years. Again, these researchers noted that their second grade children had difficulty with phonological awareness and phonological processing. Many of the children that these researchers examined, were also children who were diagnosed earlier in their development as having SLI. The implication of this study is that
Specific Language Impairment

SLPs should emphasize the importance of phonological awareness and phonological processing when providing services to children with language impairments.

Implications for Intervention for SLI

Most SLI researchers would agree that morphosyntactic development should be the primary emphasis for remediation. As indicated above, many children with SLI have difficulty with some and/or all domains of language. Given that morphosyntactic development is often most impaired, this author will place more emphasis in this area regarding intervention. Before SLPs provide direct intervention with children who have SLI, they will complete a thorough analysis of their spontaneous language. This type of sample will provide SLPs a description of children’s grammatical morphemes and syntax. For example, it would not be uncommon for children to leave out such grammatical morphemes as -ing, plural s, past -ed, articles a and the, and possessive s. Once the SLP has identified the child’s strengths and weaknesses in morphosyntactic development, intervention can begin. Most often, SLPs will incorporate an intervention paradigm that makes the language target more salient. There are a number of ways to make the language target more salient, such as emphasizing (emphatic stress, modifying prosodics) the grammatical morphemes that do not appear in the child’s linguistic system. Some researchers believe that by making the language target more salient, it also reduces the cognitive information processing demands placed on the child. In essence, by reducing the cognitive demands, the child can place more emphasis on language learning. It is also important to use familiar vocabulary as well as simplistic phonological structures when
working on grammatical morphology. As just indicated, this will also free-up cognitive resources that the child can then allocate again to his morphological system. Additionally, researchers suggest that SLPs should provide tasks that are not highly charged or emotional. This same concept of information processing theory applies to the specific tasks that SLPs introduce in the intervention paradigm. It is recommended that SLPs should incorporate tasks that are somewhat neutral and less emotionally charged. This again will allow the child to focus on his grammatical development by not using all of his cognitive resources.

In the last 15 years, researchers have stressed the importance of conversational and narrative intervention. With this intervention paradigm, children are encouraged to work on language as they tell functional and meaningful stories from their environments. These type of language tasks are important because they allow the child to use language at the discourse level. In order for children to be successful communicators, they need to be able to converse at the conversational and narrative level. As indicated above, narrative ability is highly correlated with academic success. In addition to working on the pragmatics of conversation and narratives, SLPs can address particular areas of language that the child may demonstrate difficulty. For example, SLPs could incorporate semantic and morphosyntactical goals as they work on conversation and narratives. This will allow the child to work on a variety of language skills at different levels to facilitate communicative competency. In essence, this intervention paradigm lends itself to a social learning model. Since conversation and narratives appear to be functional communication tasks, children can learn by experiencing positive social relationships with their
environments when learning to communicate. Social Learning Theory has been widely accepted as the preferred method of intervention for children with language impairments. It is believed that children learn language by the reinforcing consequences of social interaction.

Research Implications for SLI

Research in the field of SLP continues to grow rapidly. One of the most important areas of research would be the continuation of defining children who demonstrate SLI. Recall that many researchers acknowledge that further work is needed to refine the definition of SLI. As a result, both researchers and practitioners currently have difficulty with the differential diagnosis of SLI. Additionally, continued research should be conducted in the area of information processing theory and SLI. Researchers need to further understand the relationship between short term memory and long term memory as it relates to the disorder of SLI. Lastly, researchers need to continually investigate the relationship between language impairments and reading disabilities. Currently, researchers are suggesting that many children may have literacy difficulty because of deficits in oral language.

Summary

As noted earlier, the definition of SLI is still highly debatable. Several contributing factors complicate both the differential diagnosis and the treatment options available to persons who demonstrate SLI. Although research has suggested that the
disorder has been around since the beginning of civilization, it is the more recent investigations of the etiology and of the characteristics that are helping to form a true protocol for the disorder.
References


