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THE WITHDRAWN AND SOCIABLE BEHAVIORS OF CHILDREN WITH
SPECIFIC AND NONSPECIFIC LANGUAGE IMPAIRMENT

by

Heather Haskin

A thesis submitted to the faculty of

Brigham Young University

in partial fulfillment of the requirements for the degree of

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BRIGHAM YOUNG UNIVERSITY

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ABSTRACT

THE WITHDRAWN AND SOCIABLE BEHAVIORS OF CHILDREN WITH SPECIFIC AND NONSPECIFIC LANGUAGE IMPAIRMENT

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Department of Communication Disorders

Master of Science

Recently researchers have identified a group of children with language impairment (LI) whose IQ scores are below the typical IQ cutoff of 85 for specific language impairment (SLI) but above the IQ cutoff of 70 for intellectual disability (Weismer et al., 2000). This group is referred to as having nonspecific language impairment (NLI). Eleven children with NLI, eleven same-age peers with SLI, and eleven same-age typical peers were compared on withdrawn and sociable behaviors demonstrated in the classroom setting using the Teacher Behavior Rating Scale (Hart & Robinson, 1996). Three subtypes of withdrawal (solitary-active, solitary-passive, reticent) and two subtypes of sociable behavior (impulse control/likability and prosocial) were examined. The children were compared on the severity of their ratings as well as the pattern of item responses for each behavioral subtype. Teachers rated the group with NLI

significantly more poorly than the typical group on the reticence, impulse control/likability, and prosocial subtypes. Teachers rated the group with SLI significantly more poorly than the typical group on the impulse control/likability subtype. Participants were added to the typical group and the group with SLI to increase statistical power. With additional participants, the children with SLI were also rated significantly more poorly than the typical children on the reticence, likability, and prosocial subtypes. The group with NLI was consistently rated more poorly than the group with SLI except on the solitary-active subtype. However, there were no significant differences between the groups with LI, even with additional participants. The pattern of item responses was similar between the groups with NLI and SLI on all behavioral subtypes. In addition, the pattern of item responses for the groups with LI also matched the pattern of the typical group on the solitary-active withdrawal, impulse control/likability, and prosocial subtypes. These data indicate that the differences between the groups with NLI and SLI may be quantitative but not qualitative.

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Introduction

Researchers have previously examined the social behaviors of children with language impairment (LI). These behaviors include withdrawal and sociability, which are examined in the current study. However, research has focused on children with typical IQ, defined at or above 85. The current study compared the withdrawn and sociable behaviors characterizing children with LI with varying IQ levels. IQ levels above and below 85 were considered to determine the effect of IQ level on teacher ratings of withdrawn and sociable behaviors. In order to understand this relationship, it is beneficial to describe how the definition of LI is affected by IQ level. It is also beneficial to describe the similarities and differences between children with LI who have a range of IQ levels.

Classifications of Language Impairment

Historically specific language impairment (SLI) has been defined by poor language skills in the face of expected progress in other areas of development. A principal defining criterion of this definition has been typical nonverbal intelligence, often defined as a nonverbal IQ at or above 85 (Stark & Tallal, 1981). Recently, researchers have examined a group of children with LI with nonverbal IQ scores between 70 and 84, who have been referred to as having nonspecific language impairment (NLI; Weismer et al., 2000). Individuals with NLI have borderline IQ scores that are too low to categorize them as having SLI, but too high to categorize them as having intellectual disability.

Researchers have challenged the 85 IQ criterion by describing the similarities and differences between groups of children with NLI and SLI in order to determine the utility of the distinction between them. For example, a number of twin studies have found

similar heritability for children with NLI and SLI (Tomblin & Buckwalter, 1998), similar language profiles between twins with SLI and NLI (Tommerdahl & Drew, 2008), and increased likelihood of a twin with SLI having a twin with SLI or NLI, but neither type of LI being associated with children whose nonverbal intelligence level places them in the range of intellectual disability (Bishop, 1994; Hayiou-Thomas, Oliver, & Plomin, 2005).

Although not studying twins, Tomblin and Zhang (1999) also discovered similar language profiles between groups of children with SLI and NLI. Additionally, children with SLI and NLI were found to have similar recovery rates as measured in second and fourth grades (Tomblin, Zhang, Buckwalter, & O'Brien, 2003). Several researchers have also found similar reading abilities between the groups with SLI and NLI (Bishop & Adams, 1990; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998; Tomblin, 2008).

Similarities between these groups have also been found in a variety of other areas. In the area of morphosyntax, researchers have found similar pronoun use in the two groups (Finestack, Fey, & Catts, 2006) and similar syntactic skills during expository discourse (Nippold, Mansfield, Billow, & Tomblin, 2008). Children with SLI and NLI could not be differentiated on their written and oral story composition skills (Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004), nonword repetition (Weismer et al., 2000), or response time (Miller et al., 2006). Finally, children with SLI and NLI performed similarly on measures of mathematical achievement and overall academic performance (Tomblin, 2008).

While most of the studies comparing children with NLI and SLI demonstrated no statistically significant differences between the groups, a few studies have demonstrated differences. Catts, Fey, Tomblin, and Zhang (2002), Nippold et al. (2008), and Tomblin

and Zhang (1999) noted that the language abilities of children with NLI were slightly lower than the abilities of children with SLI when measured by standardized language tests. However, the two groups demonstrated similar patterns of performance in the affected areas of language. In contrast to Bishop and Adams (1990), Stothard et al. (1998), Tomblin (2008), and Catts, et al. (2002) found that children with NLI were at a higher risk for reading disability than children with SLI. Children with NLI had slower response times than children with SLI at age nine, although these differences had resolved by age fourteen when the participants were followed up (Miller, Kail, Leonard, & Tomblin, 2001; Miller et al., 2006). Adolescents with NLI were at a higher risk for clinical depression than adolescents with SLI (Tomblin, 2008). Tomblin also found individuals with NLI to be more socially isolated than those with SLI.

Nature of Social Behavior in Children with Language Impairment

Children with LI have been found to have difficulty with many aspects of social interaction. Tomblin (2008) is the only researcher who has described the social interaction of children with NLI, in addition to children with SLI. Tomblin found that while students with SLI and NLI had similar rates of social participation, adolescents with NLI felt significantly more socially isolated than either peers with typical language and IQ or peers with SLI.

This potential social difference between children with SLI and NLI is of interest in light of previous research that has documented social differences between children with LI and typical language. Children with LI have been found to have greater difficulty with social tasks such as joining an ongoing interaction (Brinton, Fujiki, Spencer, & Robinson, 1997) and negotiating with peers (Brinton, Fujiki, & McKee, 1998). They are less accepted by peers and have fewer friends (Fujiki, Brinton, Hart, & Fitzgerald, 1999).

Similarly, adolescents with LI have reported significantly poorer quality of friendships than typically developing peers (Durkin & Conti-Ramsden, 2007) and greater loneliness (Fujiki, Brinton, & Todd, 1996; Tomblin, 2008). Conti-Ramsden and Botting (2004) found that children with LI were three times more likely than their peers to be bullied. Children with LI have also experienced difficulty with socio-emotional aspects of communication, including higher rates of withdrawn behavior and fewer sociable behaviors than typical classmates (Fujiki, Brinton, Morgan, & Hart, 1999).

If children with NLI differ from children with SLI on social parameters, it is possible that the differences are influenced by the slightly lower linguistic abilities observed in children with NLI when using standardized testing (Catts, et al., 2002; Nippold et al., 2008; Tomblin & Zhang, 1999). Lower levels of social performance might also stem from the lower nonverbal IQ range that defines the group. Researchers examining children with NLI have attempted to isolate the effects of lower nonverbal IQ on language by comparing groups of children with typically developing language and IQ to those with typically developing language but lower nonverbal IQ, referred to as a group with low nonverbal IQ (LNIQ). When language ability was controlled, a group with LNIQ had significantly poorer reading outcomes than a group with typically developing language and IQ (Catts et al., 2002). The authors noted that nonverbal IQ may be one factor influencing reading outcome. Fey et al. (2004) reported that children with typically developing language and IQ had more grammatically correct and higher quality oral and written narratives than children with LNIQ. Other studies showed no statistically significant differences between these groups of children in areas such as pronoun referencing, grammatical tense marking, and nonword repetition (Finestack, Fey, &

Catts, 2006; Rice, Tomblin, Hoffman, Richman, & Marquis, 2004; Weismer et al., 2000). The available data suggest that nonverbal IQ is a factor influencing some language tasks more than others.

Regardless of the influencing factors, researchers want to describe the similarities and differences of children with NLI and SLI (Tager-Flusberg & Cooper, 1999) and then determine if the existing differences are meaningful. Researchers in genetics have found evidence leading toward the idea that NLI is more similar to SLI than it is to intellectual disability (Hayiou-Thomas et al., 2005) and that NLI and SLI seem to be part of the same disorder category (Bishop, 1994; Tomblin & Buckwalter, 1998; Tommerdahl & Drew, 2008). Behavioral testing supports the assertion that NLI and SLI are not qualitatively different by showing similarities in the pattern of weakness in affected areas (Tomblin & Zhang, 1999). The purpose of the present study was to look at the similarities and differences of the social behaviors of children with NLI, SLI, and typical language skills. The groups with NLI and SLI were expected to differ significantly from the typical group on measures of social behavior, but the relationship between groups with NLI and SLI could not be predicted based on prior knowledge. If the groups with NLI and SLI demonstrate differences in severity when compared to each other, we may assume that deficits in nonverbal IQ for the group with NLI add to the effects of LI on social behaviors. If the groups demonstrate the same pattern of deficits in social behavior, only differing in severity, we may assume that the differences are quantitative. This study was designed to answer the following questions:

1. Do children with NLI and SLI demonstrate general differences in the overall manifestation of withdrawn and sociable behaviors in the school setting?

2. Do children with NLI and SLI demonstrate qualitative differences in the pattern of withdrawn and sociable behaviors in the school setting?

Review of Literature

In order to understand social behavior in children with different types of language difficulties, it is important to understand how LI has been identified and classified. It is also important to consider the nature of withdrawn and sociable behaviors and how these behaviors are assessed.

History of Language Impairment

The current review draws heavily from the work of researchers who have provided excellent histories of the study of children with SLI (Aram & Nation, 1982; Leonard, 1998; Paul, 2007). Descriptions of language learning problems date back to at least the 1820s when Franz Gall provided an early account of these children. Gall's observations were followed by the work of many neurologists, including Paul Broca and Carl Wernicke, who became interested in the relationship between brain and language, particularly in adults. The language problems Gall studied were referred to as infantile or congenital aphasia due to the parallels found between what Gall studied and the adult aphasias described by Broca, Wernicke, and other neurologists (Johnston, 1998; Leonard, 1998; Paul 2007).

Neurologists led the field of language learning and its disorders for decades. In 1937, a physician named Samuel Orton provided a different perspective, emphasizing behavioral descriptions and classifications of language in addition to the previous neurological descriptions (Paul, 2007). He was followed by other medical professionals, including psychiatrists, psychologists, and pediatricians during the 1940s and 1950s. During this time, Arthur Benton gave a classic description of childhood aphasia, being

the first to describe disorders of language by excluding other syndromes rather than comparing them to adult aphasias (Aram & Nation, 1982; Leonard, 1998). Helmer Myklebust also introduced the concept of differential diagnosis based on differing etiologies (Aram & Nation, 1982). Until the 1950s, no group of professionals had defined language learning difficulties as being specific or separate from those that resulted from other disorders such as deafness (Paul, 2007). Also during this period a controversy arose over using the term aphasia for children since it implied a loss of language for those who had never acquired it (Aram & Nation, 1982; Leonard, 1998). The term dysphasia began to appear during the 1960s, implying problems with language rather than a complete absence of it (Leonard, 1998). Moreover, the term assumed neurologic impairment although lesions could not be found in the central nervous system (Aram & Nation, 1982).

Deaf educators also provided valuable contributions to the field of child language disorders. They noted that some children had language problems that could not be explained fully by hearing impairment. They provided helpful descriptions that distinguished the language of children with aphasia from children with hearing impairment. Deaf educators also developed special education approaches to teach language. Mildred McGinnis worked with children with hearing impairment and veterans with aphasia. She noted similarities between the two groups and found success in applying methods from adult aphasia treatment to children with hearing impairment who had added difficulty learning language. Eventually she developed the associated method for teaching children with aphasia and made the distinction between expressive and receptive aphasia (Aram & Nation, 1982).

Aram and Nation (1982) credited McGinnis, along with Helmer Myklebust and Muriel Morley for establishing the field of child language disorders. These three individuals made important contributions to the study of children with LI. Myklebust, a researcher interested in auditory disorders, highlighted the consequences of oral language disorders on literacy skills. As mentioned previously, he introduced the concept of differential diagnosis and in 1957 established the field of study and practice which he called *language pathology* (Aram & Nation, 1982; Paul, 2007). Morley, an early speech pathologist, conducted substantial research that provided detailed descriptions of the language characteristics of children with language disorders (Aram & Nation, 1982).

During the 1950s, Noam Chomsky developed the theory of transformational grammar, which led to an explosion of research in the area of child language acquisition (Bloom & Lahey, 1978; Leonard, 1998; Paul, 2007). This development began to direct the language pathology community away from describing LI by its etiology toward more detailed descriptions of language behavior (Aram & Nation, 1982). Research on child language acquisition throughout the 1960s and 1970s led the language pathology community to expand its focus on semantics and syntax to include phonology and pragmatics (Paul, 2007).

The contributions of neurologists, medical professionals, deaf educators, and linguists helped to form current views of SLI. In line with earlier researchers like Benton who first described language pathologies by excluding other disorders, Stark and Tallal (1981) developed criteria for defining SLI that excluded children with hearing impairment, intellectual disability, behavioral or emotional disorder, poor speech motor skills, abnormal neurological status, or low reading level. The criterion created to exclude

children with intellectual disability is currently being examined by researchers (Tager-Flusberg & Cooper, 1999).

Relationship between IQ Testing and Language Impairment

Some of the earliest researchers in the field of child language disorders described children whose language difficulties were not secondary to deficits in other areas, including intelligence (Aram & Nation, 1982). Because language impairment is felt to exist as a deficit separate from lower intelligence, IQ measurement has played a critical role in determining the presence of LI, or in characterizing it. Two important concepts related to identification of LI are the measurement of nonverbal intelligence and the practice of cognitive referencing.

Nonverbal IQ as a defining characteristic of SLI. Typical nonverbal intelligence has been a basic defining characteristic of SLI within these descriptions. The importance of nonverbal IQ was quantified by Stark and Tallal (1981). According to these researchers, the basic defining criterion for SLI was a nonverbal IQ at or above 85. Stark and Tallal studied 132 participants already identified as having LI. Of the 132 participants, 50 students were excluded based on having performance IQ (nonverbal IQ) scores below 85, compared with only 15 total participants excluded based on all the other criteria combined (hearing impairment, abnormal emotional and behavioral status, abnormal neurological status, poor speech motor skills, or low reading level). A nonverbal IQ of 85 was chosen because it was well above the full-scale IQ level (combined scores of performance and verbal IQ) of 70 which was used to categorize children as having intellectual disability. The verbal IQs of children with LI were expected to be low because of the impact of impaired linguistic skills on tasks requiring verbal abilities. Therefore, a conservative performance IQ criterion was chosen in order

to compensate for low verbal IQ, yielding a full-scale IQ above the cut off for intellectual disability. Even with this criterion, the full-scale IQ levels of some children with a typical performance IQ of 85 or above were expected to rank in the range of intellectual disability because of their substantially lower verbal IQ levels.

Plante (1998) analyzed the original criteria established by Stark and Tallal (1981). She stated that the original intent of excluding children with a performance IQ below 85 was to exclude children with intellectual disabilities. As stated previously, a performance IQ of 85 was chosen as a cutoff not because it reflected low intellectual functioning, but in order to offset the impact of below average verbal IQs on the full-scale IQ. However, the 85 IQ criterion has, over time, become disconnected from the full-scale IQ and instead has been applied only to nonverbal performance measures. As a result, many children whose nonverbal IQ scores fall below 85 but at or above 70 have been excluded from clinical services and research studies for children with SLI.

Cognitive referencing. Related to the IQ criterion established by Stark and Tallal (1981) is the practice of diagnosing LI based on a discrepancy between language age and mental age. Known as cognitive referencing, this practice is based on the idea that individuals with language ability above or consistent with cognitive ability have reached their potential for linguistic growth. Thus, children whose nonverbal IQ score and language scores do not show a gap have historically been excluded from speech-language services because their cognitive level was either equal to or below their language ability. As of 1992, Casby reported that cognitive referencing was used to diagnose LI in 31 of 50 states.

A number of writers have criticized the use of cognitive referencing to diagnosis LI. For example, Lahey (1990) pointed out that the theoretical relationship between cognition and language has not been well established, making a comparison between the two abilities questionable. This opinion has also been supported by the results of numerous empirical studies. For example, Cole, Dale, and Mills (1990) found that there were no significant differences in treatment outcomes for vocabulary between a group of children with equal impairments in cognition and language and a group of children with higher cognitive skills than language skills. Notari, Cole, and Mills (1992) looked at the same sample of children and added the data from 48 more participants in order to increase statistical power and the likelihood of finding differences between the groups. Both groups demonstrated progress in intervention, but despite the additional participants, neither group outperformed the other.

Fey, Long, and Cleave (1994) examined two groups of children similar to those studied by Cole et al. (1990) to determine if they benefited from language intervention focusing on grammar. The group of children with lower cognitive than language skills responded in a positive manner to intervention, similar to the group with higher cognitive than language skills. In contradiction to expectations based upon cognitive referencing, the group with lower cognitive abilities actually showed more improvement on several measures of grammar. The authors acknowledged that these results may have been due to the large number of analyses performed on the data.

The work described above examined semantic and morphosyntactic outcomes of treatment. Cole, Coggins, and Vanderstoep (1999) expanded this line of work by looking at interventions focusing on pragmatic skills used in discourse. Both groups of children in

the Cole et al. study benefited from discourse intervention over a period of six months but, contrary to assumptions based on cognitive referencing, the group with a discrepancy between cognitive and language skills did not make more progress than the group with lower cognitive and language skills. In fact, the group of children who would generally be excluded from services based on cognitive referencing actually showed more improvement on two of the pragmatic measures. This pattern was similar to that found by Fey et al. (1994). It should be noted that while those with higher cognitive abilities did not show as much improvement on a few measures, Cole et al. did not support excluding children with higher cognitive abilities. They suggested instead that neither group be excluded and that interventions should be adapted to fit the cognitive profiles of each child.

The studies by Cole et al. (1990), Notari et al. (1992), Fey et al. (1994), and Cole et al. (1999) show that children who would be excluded from services based on cognitive referencing can benefit from language intervention as much as, and sometimes more than, peers who demonstrate cognitive abilities above their language abilities. When those who have no discrepancy between cognitive and language abilities have typical nonverbal IQ there is no support for excluding them from intervention services. This has implications for a child with NLI, who may be excluded from services because of similar skills in language and cognition, but whose nonverbal IQ is 70 or above. Both the results of these studies, and the original intent of creating a nonverbal IQ criterion (to exclude children with LI secondary to intellectual impairment) would suggest that a child with NLI should not be excluded from receiving language intervention on the assumption that he or she does have the cognitive capability to benefit from intervention.

Characteristics of Nonspecific and Specific Language Impairment

A group of leading researchers concerned about the criteria necessary to diagnose SLI met in April 1998 to discuss defining the phenotype for SLI. They made several recommendations for future research. Among these recommendations was the suggestion to explore the similarities and differences among children with LI at different levels of IQ (Tager-Flusberg & Cooper, 1999). In keeping with this recommendation, researchers have taken more notice of children with LI and a nonverbal IQ in the range of 70 to 84. As noted above, traditionally, children in this range would have an IQ too low to be diagnosed as having SLI but too high to attribute their LI to intellectual disability. This group is referred to as having NLI, referencing the fact that their difficulties might not be specific to language, and may include a slight cognitive delay as well. While cognitive referencing studies included children who fit this category, they also included children with intellectual impairment. Tomblin and Buckwalter (1998) were among the first to use a performance IQ range of 70 to 84 to define the group, excluding those with intellectual impairment, although Tomblin (2008) used a performance IQ range of 75-85. Weismer et al. (2000) were the first to use the term NLI. Some studies defined children with NLI as having nonverbal IQs as high as 86 because the combined performance and verbal tests did not provide a standard score at 85 (Tomblin, et al., 2003). Because of similar delays in language and nonverbal abilities, the term, general delay (GD), has also been used to describe this group, although some studies looking at GD have included children with performance IQs below 70 (Bishop & Adams, 1990; Stothard et al. (1998); Tomblin & Zhang, 1999).

Relatively few studies have been conducted comparing children with NLI and SLI to determine if nonverbal IQ is a meaningful diagnostic indicator. With the limited data

available, researchers have examined the performance of children with NLI in areas such as overall language pattern, persistence of LI, genetic inheritance, reading ability, morphosyntactic abilities, nonword repetition, discourse and narrative skills, response time, and adolescent outcomes. All of the studies reviewed confirmed that children with NLI performed well below children with typical language. At the same time, the majority of research showed no differences between children with SLI and NLI. A few studies showed significant differences between the groups with LI. This work is reviewed in the following sections.

Language profiles and recovery rates. Tomblin and Zhang (1999) looked at the language patterns of children with GD as part of a larger epidemiological study of LI. When examining overall language performance sampled by tests of receptive and expressive vocabulary, grammar, and narration, they found the profiles of children with GD and those with SLI to be similar. Specifically, the performance of children with GD closely paralleled that of children with SLI except with slightly lower performance in every category, demonstrating a difference only in severity of LI, not overall pattern.

Similar to the studies discussed previously reporting treatment outcomes for children with varying levels of IQ, Tomblin et al. (2003) found that LI recovery rates in second and fourth grades were comparable for children with SLI and NLI. Initially, it appeared that children with SLI had a greater potential for recovery, but the authors attributed this difference to regression toward the mean (extreme scores tend to be less extreme on a second measurement). They found no significant differences between the groups with LI when a measure that controlled for the regression effect was used.

Genetic profiles. Several twin studies support the elimination of the 85 IQ criterion. Bishop (1994) examined the concordance rate for LI in a group of twins. She found 54% (34 out of 63 pairs) of monozygomatic twins (identical twins with nearly identical DNA) were concordant, meaning both twins had LI. The twins without LI in the discordant pairs often had similarly low language as their twin but were categorized as unaffected because of their borderline IQ scores (IQ as low as 70). When the standards were relaxed to include these twins, the concordance rate rose to 70% (44/63), a number more likely to be expected for twins with such similar genetic makeup. Based on these results, Bishop concluded that SLI and NLI are not genetically distinct disorders.

Hayiou-Thomas et al. (2005) also examined concordance rates. They were interested in finding concordance for SLI and NLI by looking at the likelihood of a child with SLI having a twin with NLI or vice versa. There was some evidence of an overlap between SLI and NLI, but neither was likely to have a twin with LI and nonverbal IQ below 70, indicating no genetic overlap between children with intellectual disability.

Bishop (1994) and Hayiou-Thomas et al. (2005) suggest that SLI and NLI may exist somewhere along the same etiological continuum while children with IQ scores below 70 represent a fundamentally different disorder category. Tommerdahl and Drew (2008) conducted a case study with a pair of 12-year-old twin boys, one who was categorized as having SLI and the other who was categorized as having NLI. In this case study, they found similar language profiles in this particular pair of boys and felt that distinguishing the boys as having different diagnoses because of their differing IQ levels was misleading. The authors believe that separate language diagnoses should exist because the language characteristics of the disorders are different, possibly dictating

differences in language intervention. However, the profiles of these boys indicated similar language characteristics and similar approaches to therapy.

In another twin study, Tomblin and Buckwalter (1998) examined the heritability, or the extent to which a disorder is genetically determined, of SLI and NLI. When children with SLI and NLI were included in the analysis, the heritability level was .48. When only children with NLI were considered, the heritability level was .47. These similar levels of heritability when all children with LI were considered and when children with NLI were isolated suggested that the two diagnostic categories have similar genetic components. If NLI was a categorically different disorder, the level of heritability would likely be different, as driven by the different genetic components. Overall, the twin studies cited show that NLI and SLI are likely to have a similar disorder, distinct from children with nonverbal IQ scores below 70.

Reading impairments. In a series of studies, Bishop and Adams (1990) were the first to examine the relationship between LI and reading impairment, while also considering those with typical and sub-typical nonverbal IQs. These authors conducted a follow up study of 8.5 year old children who were initially identified as having LI by Bishop and Edmundson (1987) at 4 years old. Children with GD demonstrated reading abilities significantly below peers with typical language and nonverbal IQ based on lower scores in reading accuracy and reading comprehension. Based on tests in these areas, about 43% of children with GD were considered to have a reading impairment, compared with about 24% with persistent SLI (poor language outcomes and normal nonverbal abilities) and only about 3% with resolved SLI (no sign of LI at age 8.5, assumed to have similar skills to typically developing peers).

Stothard et al. (1998) followed the same children as Bishop and Adams (1990) at ages 15-16. They found that reading abilities in the Group with GD were significantly lower than the group of children with resolved SLI. However, they were not significantly lower than the group of children with persistent SLI. Some 80% of children with GD demonstrated literacy difficulties, producing a score below the 12-year-old level on at least one test of reading accuracy, reading comprehension, or spelling, compared with 93% of children with persistent SLI and 52% of children with resolved SLI. Only 22% of the children in the group of same age peers with typical language and nonverbal IQ scored at this level.

The studies by Bishop et al. (1990) and Stothard et al. (1998) indicated differences in reading ability between children with typical language and nonverbal IQ and children with GD, confirming the presence of reading disabilities in children with GD. Only Stothard et al. (1998) found differences between children with GD and SLI. In this case, the group of students with GD differed only from the group of students with resolved SLI, a group showing few enough signs of SLI to be considered similar to typically developing peers. No significant differences could be found between students with GD and those with persistent SLI. While these studies included children with nonverbal IQs between 70 and 84, it should be noted that a few children with nonverbal IQs below 70 were also included in the group of children with GD.

Conversely, Catts et al. (2002) found that children with NLI were indeed at a higher risk for reading disabilities than children with SLI. Children with NLI demonstrated a reading disability rate of about 65% in second and fourth grades compared with about 40% of children with SLI. Even when differences in severity of LI

were taken into account, children with NLI, who tended to have poorer language skills than those with SLI, had significantly poorer reading outcomes than children with SLI. Catts et al. suggested that the differences in risk for reading disability for the groups with NLI and SLI were quantitative rather than qualitative. A comparison of a group with typical language and nonverbal IQ and a group with unremarkable language skills but low nonverbal IQ served to eliminate the variable of LI and focus on nonverbal IQ as it relates to reading disability. The low nonverbal IQ group had significantly poorer reading outcomes than the group with typical language and nonverbal IQ, thus indicating that nonverbal IQ may, in fact, be one factor affecting reading outcome.

These same children were followed to tenth grade when reading ability was assessed along with other outcomes. Tomblin (2008) reported that on measures of reading comprehension, children with NLI scored significantly below children with typical language, but similarly to children with SLI. In addition, 19% of children with SLI and 31% of children with NLI were functionally illiterate, that is, their reading ability was below fifth grade, compared with only 5% of the children with typical language and nonverbal IQ. The difference between the two groups of children with LI and the group with typical language and nonverbal IQ was significant, but the difference in functional illiteracy rate between children with SLI and NLI was not. Tomblin commented that this is evidence against making a distinction between the groups because of differing IQ.

Morphosyntactic skills. Finestack et al. (2006) studied the pronoun use of children with LI in oral narratives. Children with NLI used pronouns in their oral narratives significantly less frequently than girls with typical language, but were no different from children with SLI. The authors also looked at the number of pronoun references that were

complete. Surprisingly, children with NLI did not differ significantly from children with typical language or SLI on the number of complete pronoun references. This, however, was likely due to the fact that about 80% of children with NLI were eliminated from the measure because they did not have at least five pronouns in their narratives. The fact that such a high percentage of children with NLI had less than five pronouns in an oral narrative was cause for concern in regards the children's abilities. Approximately 65% of children with SLI were also eliminated from analysis for having less than five pronouns. The reduction in the number of participants' stories analyzed resulted in an overestimation of pronoun referencing skills for the groups of children with LI.

Nippold et al. (2008) examined the syntactic skills of children with SLI and NLI. The group with SLI outperformed the group with NLI on standardized measures of syntax from the CELF-3, a pattern that was also noted by Tomblin and Zhang (1999) and Catts et al. (2002). However, in syntactic measures (total T-units, mean length of T-unit, and clausal density) taken during expository discourse, children with SLI and NLI could not be differentiated. Both groups performed below children with typical language on mean length of T-unit. The group with NLI performed below children with typical language on relative clause use, although they were not significantly different from the group with SLI. These results indicate that the differences between SLI and NLI were manifested in a standardized test, but not in an informal measure such as the expository discourse task. The authors speculated that while the CELF-3 required precise correct or incorrect answers, the expository discourse was more flexible and likely to be affected by the individuals' knowledge about the topic.

Fey et al. (2004) studied written and oral story composition skills in children with LI. In second and fourth grades, children with NLI had significantly weaker narratives than the group with typical language and nonverbal IQ, most pronounced in the area of grammatical accuracy, but also on measures of utterance length, story length, lexical diversity, grammatical complexity, and narrative quality. Children with NLI also had weaker narratives than a group of children with typical language and below average nonverbal IQ. While children with SLI generally scored higher on each of these measures, their stories were not significantly different from the stories of children with NLI.

Accuracy of clinical markers. Weismer et al. (2000) looked at the performance of children with and without LI on a nonword repetition task, considering this behavior as a clinical marker of LI. Analysis indicated that children with SLI and NLI performed significantly poorer than children with typical language, as expected. However, children with SLI and NLI did not perform differently when compared to one another. When the group with NLI was compared to a group with similarly low cognitive status but typical language, the group with NLI performed significantly lower, indicating that low cognitive status was insufficient to explain poor nonword repetition abilities.

Rice et al. (2004) studied grammatical tense marking in a group of children with SLI, a group of children with NLI, a group of children with typically developing language but low nonverbal IQ, and a typical control group. Fill in the blank probes with pictures were used to elicit tense marking for third-person, singular, present tense and past tense regular and irregular. Kindergarten children with NLI scored significantly below both the group with SLI and the group with typical language and nonverbal IQ on

probes of grammatical tense marking. As the same children were followed in a longitudinal study, the group with NLI continued to show deficits in grammatical tense marking in first through fourth grades. Most notably, they lagged behind the group with SLI in resolving the overgeneralization phase of irregular past tense acquisition. To isolate the effects of low nonverbal intelligence, the group with typically developing language but low nonverbal IQ was compared with the group with typical language and nonverbal IQ. The groups did not differ, indicating that low nonverbal intelligence alone was not enough to account for poor grammatical tense marking. Therefore, the poor grammatical tense marking found in children with NLI was probably a function of LI severity rather than low nonverbal IQ. It should be noted that this study examined grammatical tense marking as a potential clinical marker for identification of LI. Given that perspective, the groups with LI were not differentiated, as both would be identified by the clinical marker. Therefore, the differences between the groups with NLI and SLI would be most useful for planning clinical services, and not for initial identification of LI.

Response times. Miller et al. (2001) examined the response times of nine-year-old children with LI on linguistic and nonlinguistic tasks. Both groups of children with LI were significantly slower on both types of tasks than the children with typical language. Children with NLI were about 30% slower than peers with typical language, and children with SLI were about 14% slower than the group with typical language and nonverbal IQ. The response times of children with NLI were significantly slower than those for children with SLI. Further analysis revealed that the greater degree of slowing in children with NLI than children with SLI could not be fully accounted for by differences in nonverbal IQ.

Miller et al. (2006) followed all three groups originally studied by Miller et al. (2001). They found that as they grew older, the groups with LI showed improved response times compared with those found at age nine. However, at age 14, the groups with LI continued to exhibit slower response times on linguistic and nonlinguistic tasks in relation to children with typical language. In contrast to the earlier study, the response times of children with SLI and NLI could not be distinguished. Although the average response times of the groups with LI were slower than children with typical language, there were a few individuals from each group who were not significantly slower than the group with typical language and nonverbal IQ.

Adolescent outcomes. Tomblin (2008) looked at the outcomes of tenth graders, initially grouped by language status during Kindergarten and followed in a longitudinal study, in the areas of academics, social performance, conduct, and self-perceived quality of life. The results strongly support the argument against using nonverbal IQ discrepancy as criteria for defining SLI. In the area of academics, children with GD continued to exhibit reading disabilities, as mentioned previously. In addition, they scored significantly below the normal group with typical language and nonverbal IQ on parent and teacher ratings of school performance, an overall test of academic achievement, and an applied mathematical problem solving subtest. The group with SLI also scored significantly below the group with typical language and nonverbal IQ on each of these measures. The slight observed differences in academic performance between adolescents with GD and SLI were not statistically significant.

Of all the outcomes examined by Tomblin (2008), reading ability had the strongest relationship between early language problems and adolescent outcomes.

Therefore, in order to investigate the slight differences between the groups of children with LI, reading comprehension was further examined to determine which factors had a greater effect on academic outcome. From a stepwise multiple regression, Tomblin concluded that 43% of the differences in academic performance could be accounted for by LI and only 3% by nonverbal IQ. This finding indicated that differences between the groups were more likely due to differences in the severity of LI rather than deficits caused by lower nonverbal intelligence. Thus, the typical nonverbal IQ of students with SLI was not enough to differentiate them from peers with lower nonverbal IQ in the areas of reading, mathematics, and overall academic performance.

Parent and teacher questionnaires for the area of conduct, or compliance with rule systems in the home, school, and community, included questions about stealing, lying, cheating, skipping school, and alcohol and drug use. Based on these parent and teacher reports, more adolescents with SLI and GD had clinical levels of rule breaking in the home and at school than those in the group with typical language and nonverbal IQ. The two groups with LI did not differ from each other, however. This finding demonstrated that childhood LI is a risk factor for adolescent misconduct in the home and at school, but that adolescents with GD are not at a significantly higher risk for rule breaking than students with SLI.

In self-perceived quality of life, adolescents with SLI had poorer self-worth in relation to mental competence than typical adolescents, while adolescents with GD did not differ from either group. Tomblin (2008) stated that this could possibly be because students with SLI had higher nonverbal IQs and a greater discrepancy between cognitive and language abilities, and were therefore more aware of their poor performance. He also

stated the possibility that students with SLI were placed in classroom settings with higher expectations. Both groups with LI had lower global self-esteem than typical peers. Neither LI group differed from typical peers on their perception of social appearance. Adolescents with LI did not have poorer perception of life circumstances; however, those with GD were more likely to have clinical depression than typical peers and peers with SLI.

In the area of social competence, Tomblin (2008) found a similar pattern to the academic outcomes. On both self reports and parent ratings reflecting the quantity of social participation, adolescents with GD and SLI had significantly less social activity than the group with typical language and nonverbal IQ, but were not significantly different from one another. However, the Group with GD reported significantly more loneliness than the group with typical language and nonverbal IQ, while the group with SLI did not. This suggests that while their rates of social participation were generally similar, those with GD felt more socially isolated than those with SLI, even though the difference was not statistically significant. This represents one of the few differences found by Tomblin between the groups of children with LI. Because of their higher risk for social isolation and depression, Tomblin suggested that children with GD should be monitored by psychological and psychiatric services.

Nature of Withdrawn and Sociable Behaviors

The social behaviors most pertinent to the present study are subtypes of withdrawal and sociability. Three subtypes of withdrawal commonly identified in the literature are solitary-active, solitary-passive, and reticent behavior (Coplan & Rubin, 1998; Harrist, Zaia, Bates, Dodge, & Pettit, 1997). The TBRS included items addressing all three subtypes. Children who demonstrate reticent behavior want to participate in

activities with peers, but do not because of fear or anxiety. The reticent behaviors on the TBRS include behaviors such as “stares at other children without interacting” and being “unoccupied even when there is plenty to do” (Hart & Robinson, 1996). Children who are reticent are often seen on the edges of play and their behavior has been linked to peer rejection in the United States as well as in China and Russia (Hart et al., 2000). Reticence is also commonly observed in children with SLI (Brinton, Fujiki, Montague, & Hanton, 2000; Fujiki, Brinton, Isaacson, & Summers, 2001; Fujiki, Brinton, Morgan et al., 1999; Fujiki, Spackman, Brinton, & Hall, 2004; Hart, Fujiki, Brinton, & Hart, 2004).

Children who demonstrate solitary-passive behavior tend to play apart from the group but do not appear to mind being alone. They prefer solitary play, but their play is constructive (Coplan & Rubin, 1998). This is in contrast to children demonstrating reticent behavior who want to participate with peers but are hesitant to do so. Asendorpf (1991, 1993), however, found that as children grew older, the subtypes of reticence and solitary-passive withdrawal manifested themselves as one behavior, characterized by social fear and anxiety. Hart et al. (2004) also found that solitary-passive and reticent withdrawal were correlated. Solitary-passive withdrawal has occasionally, but not consistently, been observed in children with LI (Fujiki, Brinton, Morgan et al., 1999; Hart et al. 2004). Fujiki, Brinton, Morgan et al. (1999) found that solitary-passive withdrawal was negatively correlated with sociable behaviors.

Children who demonstrate solitary-active withdrawal are typically engaged in a similar activity to their peers, but are not interacting with other children. For example, a child who demonstrates solitary-active withdrawal may be on the soccer field with the other children, but kicking a ball around in circles alone instead of participating in the

game. Solitary-active withdrawal also involves repetitive motor movements, such as repetitive hand movements. It is less common for children to demonstrate solitary-active withdrawal than the other subtypes of withdrawn behavior. It is only observed about 4% of the time in free play, but is very noticeable when it appears (Coplan, Rubin, Fox, Calkins, & Stewart, 1994). Solitary-active withdrawal is associated with impulsivity and aggression (Rubin, 1982; Rubin & Mills, 1988). Fujiki, Brinton, Morgan et al. (1999) found that males with LI had higher levels of solitary-active withdrawal, but Hart et al. (2004) found no differences in solitary-active behavior between children with LI and typical peers. Despite the significant differences reported by Fujiki, Brinton, Morgan, et al. (1999), the behavior was infrequently observed in both studies. Solitary-active behavior leads to peer rejection (Coplan et al., 1994; Harrist et al., 1997)

Sociable behaviors are more positive behaviors that can be considered in contrast to the withdrawn subtypes mentioned previously. Although the subtypes of sociable behavior are not as well defined as the subtypes of withdrawn behavior, they include behaviors such as playing cooperatively, comforting or nurturing others, acting in a socially assertive but friendly manner, controlling one's emotions, participating in social conversation, and being responsive to the ongoing activities of others (Hart, McGee, & Hernandez, 1993). Hart, Olsen, and Mandelco (1997) drew upon previous research to define the subtypes of impulse control/likability and prosocial, which are measured on the TBRS.

Impulse control refers to a child's ability to control emotions and cooperate during rough and tumble play. Impulse control/likability (referred to as likability hereafter) is determined by how easily the child enters ongoing play and if peers enjoy

being with the child. Assertive leadership is also a characteristic of likability (Hart et al., 1993).

The prosocial subtype includes behaviors such as sharing, offering help, and comforting peers (Radke-Yarrow, Zahn-Waxler, & Chapman, 1983). Sociable behaviors, including both the likability and prosocial subtypes, contribute to peer acceptance (Coie, Dodge, & Kupersmidt, 1990). Children with LI have not demonstrated stronger sociable behaviors to balance their higher rates of withdrawn behavior. They have received lower teacher ratings than typical peers on both likability and prosocial subtypes (Fujiki, Brinton, Morgan et al., 1999; Hart et al., 2004).

Reliability and Validity of Teacher Ratings

The withdrawn and sociable subtypes mentioned previously were examined in the present study through teacher ratings of each student's behaviors. Because the Teacher Behavior Rating Scale (TBRS; Hart & Robinson, 1996) is an unpublished, informal questionnaire, its reliability and validity are reviewed here. Fujiki, Brinton, Morgan et al. (1999) and Hart et al. (2004) reviewed the psychometric properties of the TBRS. Fujiki et al. investigated test-retest reliability by comparing TBRS ratings that were filled out approximately four weeks apart for 94 students (mean age = 8;5, $SD = 1;5$). The researchers found high temporal reliability for all five subtypes of behavior with Pearson correlations of .70 for reticent withdrawal, .76 for solitary-active withdrawal, .73 for solitary-passive withdrawal, .74 for likability, and .71 for prosocial.

Hart et al. conducted a confirmatory factor analysis to assess the construct validity of the TBRS. The analysis revealed that the five-construct model was an acceptable fit to the data. The items for each subtype of withdrawn or sociable behavior grouped together

with the other items from the same subtype of behavior, indicating that these items were measuring the same basic construct.

Summary

LI has been defined by excluding other disorders for some time. The 85 IQ criterion developed by Stark and Tallal (1981) has been questioned recently as researchers have examined the characteristics of children with a nonverbal IQ between 70 and 84. Data from cognitive referencing studies has shown positive treatment outcomes for children with NLI. Additionally, comparisons between children with NLI and SLI have revealed similar language profiles, genetic profiles, LI recovery rates, morphosyntactical skills, and rule following outcomes. Both groups of children are identified by similar clinical markers, and have similar academic outcomes as adolescents. Data on whether children with NLI and SLI differed in reading impairment was somewhat inconclusive, but three out of four studies reported similar rates of impairment for the two groups. Data from studies of response time initially showed differences between the two groups, but these differences were absent when the participants reached adolescence. The differences most relevant to this study are the reports of greater loneliness and clinical depression in children with NLI. Further research is needed to determine if social behaviors in children with language difficulties are affected by lower nonverbal IQ scores. This study examined two social behavioral domains that have been found to be problematic in children with LI (withdrawn and sociable behavior) to determine if IQ level differentiated performance.

Method

Participants

The data for this project were drawn from two studies examining emotion understanding in children with LI conducted during 2004-2005 and 2007-2008. The sample consisted of 11 children in three groups: SLI, NLI, and typically developing. The participants ranged from ages 7;10 to 11;0 ($M = 9;6$, $SD = 10$ months). Each of the three groups included six males and five females with a total of 18 males and 15 females. Thirty participants were Caucasian, two were Mexican American, and one was African American. The mean percentage of families with incomes below the poverty level in the areas surrounding the schools involved in the studies is presented in Table 1 (U.S. Census Bureau, 2009).

Children with LI. Participants with LI were recruited through referrals from speech-language pathologists in three local school districts. Children with LI performed at least one standard deviation below the mean on a formal language measure assessing expressive and/or receptive language. Participants with LI were subdivided into two groups: NLI and SLI. There were 11 children identified from the original data sets with LI and IQ scores between 70 and 84 who served as the group with NLI. The mean age for the group with NLI was 9;5 (years; months). Nine participants were Caucasian, one was Mexican American, and one was African American.

These children had a diagnosis of LI and IQ scores at or above 85. Eleven of these children with SLI were selected as matches for the children with NLI. To be considered a possible match for a child with NLI, the child with SLI had to be the same gender and have a chronological age within six months of the child with NLI. Chronological age at the date of testing was used to match age instead of comparing date of birth, since

children were tested at various times throughout the school year. A list of possible matches was compiled for each child with NLI. One child with SLI was chosen from each list to serve as a match for each child with NLI using a random number generator. The resulting group with SLI had a mean age of 9;7. All of the participants in the group with SLI were Caucasian.

Table 1

Socio-economic Status Data for Participating Schools

School	Number of Participants	% of Population Below the Poverty Line ^a
1	5	0.00
2	3	3.79
3	4	0.39
4	2	12.40
5	5	17.76
6	1	2.76
7	6	11.02
8	3	5.18
9	4	0.89

^aData calculated for the census block group in which the school is located.
<http://www.census.gov>

The mean IQ scores and language scores for the groups are reported in Table 2. Other qualifications shared by both groups included mainstream classroom placement with enrollment in special services for language disability and no formal diagnosis of emotional or behavioral disorder based on school records.

Table 2

Language and Non-verbal IQ Standard Scores of Children with Specific Language Impairment (SLI), Children with Nonspecific Language Impairment (NLI), and Children with Typical Language and IQ

Test	NLI <i>M (SD)</i>	SLI <i>M (SD)</i>	Typical <i>M (SD)</i>
<i>CASL</i>	72 (5)	79 (9)	107 (11)
<i>UNIT</i>	77 (5)	95 (6)	103 (10)

Note. CASL = Comprehensive Assessment of Spoken Language. UNIT = Universal Nonverbal Intelligence Test.

Children with typical language skills. Once the children with LI were identified during the original data collection process, the following procedure was used to select peers with typical language skills. Classroom teachers identified children of the same gender and age (date of birth within six months) from the same classroom as the child with LI. Typical matches were then randomly selected from the resulting group of children. Although typical matches were recruited for every child with LI, the typical matches for the 11 children with NLI were used in this project. Each child in the typical group scored within one standard deviation of the mean on a formal language assessment and at or above 85 on a nonverbal assessment of IQ. The mean age for the typical group was 9;6. Ten of the participants in the typical group were Caucasian and one was Mexican American.

Instrumentation

The following measures were used in data collection. The Comprehensive Assessment of Spoken Language (CASL; Carrow-Woolfolk, 1999) is a formal language assessment designed to assess language comprehension, expression, and retrieval. It is normed for ages 3 to 21 years. The CASL was used as a measure of global language ability. Participants were classified as having LI if their core composite score was at least one standard deviation below the mean ($M = 100$, $SD = 15$). The CASL has 15 subtests in four general language domains: lexical/semantic, syntactic, supralinguistic, and pragmatic. Each of the 15 subtests are used with specific age groups, thus all 15 subtests are never administered to an individual child. The subtests are further categorized as either core tests, which provide a global language composite when scores are combined, or supplementary subtests, which provide additional diagnostic information. In order to decrease the time each child was absent from the classroom, only the core subtests that matched the age range of participants (7;10 to 11;0) were administered for this study. These included the following subtests: Antonyms, syntax construction, paragraph comprehension, nonliteral language, and pragmatic judgment.

The Universal Nonverbal Intelligence Test (UNIT; Bracken & MaCallum, 2003) is a formal intelligence test designed for children ages 5;0 to 17;11 years. The UNIT is not a test of nonverbal intelligence, but rather an instrument that tests intelligence nonverbally. Thus, a child taking the test is neither required to produce verbal responses, nor to read or write. Instead, the individual makes use of eight hand and body gestures to respond to test items. The administrator also uses the hand and body gestures to explain the tasks on the test. Because the testing is completed nonverbally the authors, indicate that the UNIT is intended to be a fair assessment for individuals who do not perform well

on traditional language-dependent IQ assessments. This includes individuals who are English language learners, culturally and linguistically diverse, deaf or hard of hearing, or have communication disorders. The UNIT can be administered as an abbreviated (two subtypes), standard (four subtypes), or extended battery (all six subtypes). The authors indicate that the standard battery is ideal for diagnostic decision making. For this reason, the standard battery was used to provide a measure of general intelligence across all participants and to classify the participants with LI into groups with SLI and NLI. Those participants with LI who scored more than one standard deviation below the mean ($M = 100$, $SD = 15$) were categorized as having NLI, and those who scored at or within one standard deviation of the mean were categorized as having SLI.

The TBRS (Hart & Robinson, 1996) was completed by each participant's teacher to provide a measure of social functioning. The TBRS is an unpublished, informal questionnaire for teachers¹. It contains items that can be grouped to measure subtypes of aggressive, anxious, withdrawn, and sociable behavior that have been identified in the literature on social competence. Only the subtypes of withdrawn and sociable behavior were used in this study.

Teachers rated each item on the TBRS as a 0 (child never does this behavior), 1 (child sometimes does this behavior), or 2 (child very often does this behavior). Four or five questionnaire items were associated with each subtype of behavior. Each participant's score for a subtype was determined by calculating the mean scores of the

¹TBRS items are available from Dr. Craig H. Hart, School of Family Life, Brigham Young University, 2102D JFSB, Provo, UT 84602. E-mail: craig_hart@byu.edu

responses associated with that specific subtype. Each teacher completed the TBRS for at least two children since the original matches were drawn from the same classrooms.

Although the teachers were aware of which children were receiving intervention for LI, they did not know the purpose of the studies for which the data were collected. In addition, the withdrawn and sociable items were spread out amongst the items measuring other behavior subtypes and the teachers did not know which items would be used in the data analyses.

Procedure

Participants were individually tested over two sessions, each lasting approximately an hour, in a quiet room in their own public school. The TBRS (Hart & Robinson, 1996) was given to each participant's teacher. The CASL (Carrow-Woolfolk, 1999), the UNIT (Bracken & MaCallum, 2003), a measure of working memory, and several tasks measuring emotion understanding were administered to each participant by a graduate student in Communication Disorders. Each child was given a small toy or treat at the end of each testing session. Only the CASL, UNIT, and TBRS are relevant for the purposes of this study.

When the data were collected, participants were grouped as having LI or typical development. Participants with NLI were subsequently identified from among the participants with LI by reviewing each child's UNIT protocol. Children who had CASL and UNIT scores below 85 were selected for inclusion in the group with NLI. One participant with NLI was missing a teacher rating for one solitary-passive TBRS item and another participant with NLI was missing ratings for three solitary-active TBRS items. One typical match was missing a rating for one solitary-active TBRS item. These participants were excluded from the subtype analyses from which they were missing data

but were included in the other subtype analyses for which their data were complete. This reduced the number of participants with NLI for the solitary-active and solitary-passive analyses from 11 to 10. The number of typical participants for the solitary-active subtype analysis was also reduced from 11 to 10. The reticence, likability, and prosocial subtype analyses used data from all 11 participants from each group.

Results

Group Differences on Behavioral Subtypes

The mean ratings and standard deviations for the groups on each of the TBRS subtypes are reported in Table 3. In order to answer the first research question, a one-way MANOVA was conducted to assess the effect of group membership (NLI, SLI, Typical) on the ratings for the behavioral subtypes (reticent withdrawal, solitary-active withdrawal, solitary-passive withdrawal, likability, and prosocial). Significant differences were found between groups, Wilks's lambda = .422, $F(10, 46) = 2.481$, $p = .018$. To follow up on the MANOVA, a one-way ANOVA was conducted on each behavioral subtype. For each analysis, the independent variable was group membership (NLI, SLI, Typical). The ratings on the TBRS subtype served as the dependent variable in each analysis. The critical value for each test was set at .05.

Solitary-active withdrawal. The mean ratings of solitary-active withdrawal for each group are presented in Table 3. There were no main effects for the solitary-active withdrawal subtype, $F(2, 30) = 2.302$, $p = .119$, $\eta^2 = .14$. Thus, neither of the groups with LI differed from the typical group and the groups with LI did not differ from each other. The solitary-active means were the lowest withdrawn scores (the least amount of

withdrawn behavior) for each group, indicating it was the least occurring withdrawn behavior for all groups. The mean for the group with SLI was slightly higher (more solitary-active behavior) than the group with NLI, but this difference was not significant.

Table 3

Teacher Behavior Ratings of Withdrawn and Sociable Behaviors for Groups with Specific Language Impairment (SLI), Nonspecific Language Impairment (NLI), and Typical Language and IQ

Test	NLI <i>M (SD)</i>	SLI <i>M (SD)</i>	Typical <i>M (SD)</i>
Withdrawn behaviors			
Reticent	1.14 (.38)	.70 (.60)	.36 (.28)
Solitary-active	.28 (.42)	.39 (.45)	.05 (.11)
Solitary-passive	.74 (.49)	.53 (.33)	.53 (.42)
Sociable behaviors			
Likability	1.05 (.44)	1.29 (.56)	1.82 (.19)
Prosocial	.89 (.63)	1.25 (.55)	1.69 (.48)

Note. All ratings fall between 0 to 2.0. For solitary-active, reticent, and solitary-passive, higher scores indicate higher levels of withdrawn behavior. For prosocial and likability, higher scores indicate greater sociability.

Solitary-passive withdrawal. The mean ratings of solitary-passive withdrawal for each group are presented in Table 3. There were no significant main effects for the solitary-passive subtype, $F(2, 31) = .901, p = .417, \eta^2 = .06$. The solitary-passive means for the groups with LI were lower (less withdrawn behavior) than the means for reticent withdrawal and higher than the means for solitary-active. Interestingly, the group with

SLI and the typical group had the same mean rating. The mean for the group with NLI was slightly higher than the other groups, but the difference was not significant.

Reticent withdrawal. The mean ratings of reticent withdrawal for each group are presented in Table 3. The analysis of main effects revealed significant differences for reticent withdrawal, $F(2, 32) = 8.506, p = .001, \eta^2 = .36$. Post hoc comparisons were made using the Tukey HSD method. The group with NLI had significantly higher ratings (more reticent behavior) than the typical group, $p = .001$. The group with NLI did not differ significantly from the group with SLI, $p = .071$, although a trend was observed. In addition, the group with SLI did not differ from the typical group, $p = .182$.

Table 4 presents an analysis of the individual ratings of the participants in all three groups on the reticent withdrawal subtype. These data illustrate the tendency of the individuals in the typical group to cluster around the lower scores (indicating lower levels of withdrawn behavior) with no individual rating above .75. This placed all of the typical participants between the points that indicated the participants either never demonstrated withdrawn behaviors (a score of 0) or only sometimes did (a score of 1). The opposite trend was produced for participants in both of the groups with LI, who had a greater number of high ratings (more reticent behavior) than the typical group. This was especially true for the group with NLI which had nine ratings of reticent behavior at or above 1, placing most of the participants between the ratings that indicated they were either sometimes (a score of 1) or very often demonstrated reticent behaviors (a score of 2). The group with SLI had four ratings above 1.

Table 4

Mean Teacher Behavior Ratings for Reticent Behavior Reported by Frequency of Occurrence for Groups with Nonspecific Language Impairment (NLI), Specific Language Impairment (SLI), and Typical Language and IQ

Teacher rating	NLI	SLI	Typical
0.00	0	2	3
0.25	0	2	2
0.50	2	2	4
0.75	0	1	2
1.00	2	1	0
1.25	5	1	0
1.50	1	1	0
1.75	1	1	0
2.00	0	0	0

Note. Higher scores indicate higher levels of reticent withdrawn behavior.

Likability. The mean ratings of likability for each group are presented in Table 3. Comparisons of the performance of the three groups on the likability subtype produced significant differences, $F(2, 32) = 9.284, p = .001, \eta^2 = .38$. Post hoc analysis using the Tukey HSD method revealed that the typical group had higher ratings (more likable behavior) than the groups with NLI, $p = .001$, and SLI, $p = .018$. The groups with LI did not differ from each other, $p = .405$. Therefore, the groups with LI both performed more poorly than the typical group, without being differentiated from one another. This was the only subtype on which both groups with LI were rated significantly differently from the typical group.

The number of individual group members scoring at differing levels of likability is presented in Table 5. The groups with NLI and SLI demonstrated a comparable

distribution of individual mean ratings. Four individuals in the group with NLI and three in the group with SLI ranked below 1. The scores of the typical group were clustered toward the higher likability ratings.

Table 5

Mean Teacher Behavior Ratings for Likability Reported by Frequency of Occurrence for Groups with Nonspecific Language Impairment (NLI), Specific Language Impairment (SLI), and Typical Language and IQ

Teacher rating	NLI	SLI	Typical
0.0	0	1	0
0.2	0	0	0
0.4	2	0	0
0.6	1	0	0
0.8	1	2	0
1.0	0	0	0
1.2	4	1	0
1.4	1	2	1
1.6	2	2	1
1.8	0	3	5
2.0	0	0	4

Note. Higher scores indicate higher levels of likability.

Prosocial. The mean ratings of prosocial behavior for each group are presented in Table 3. Analysis of the performance of the three groups on the prosocial subtype produced significant differences, $F(2, 32) = 5.617, p = .008, \eta^2 = .27$. Post hoc analysis, using the Tukey HSD method revealed that the group with NLI had significantly lower ratings (less sociable behavior) than the typical group, $p = .006$, but did not differ from the group with SLI, $p = .295$. In addition, the group with SLI did not differ from the

typical group, $p = .179$. These relationships are similar to the results for the reticent withdrawal subtype.

The number of individual participants scoring at each level of prosocial behavior is presented in Table 6. The typical group was heavily weighted toward higher ratings, with ten out of eleven participants with mean ratings between scores indicating that the participants demonstrated prosocial behavior “sometimes” to “very often.” The groups with LI produced a more dispersed distribution, but the group with NLI had the most severe scores. Three individuals in this group had mean rankings of 0 and .2, while the group with SLI had no individuals with means that ranked below .6.

Table 6

Mean Teacher Behavior Ratings for Prosocial Behavior Reported by Frequency of Occurrence for Groups with Nonspecific Language Impairment (NLI), Specific Language Impairment (SLI), and Typical Language and IQ

Teacher rating	NLI	SLI	Typical
0.0	2	0	0
0.2	1	0	0
0.4	0	0	1
0.6	1	3	0
0.8	1	0	0
1.0	0	3	0
1.2	4	0	0
1.4	1	0	2
1.6	0	1	0
1.8	0	3	3
2.0	1	1	5

Note. Higher scores indicate higher levels of prosocial behavior.

Summary. The group with NLI was rated lower than the typical group on all three of the subtypes that produced significant differences. However, the group with SLI was only different from the typical group on the likability subtype. Therefore, the group with SLI as a whole did not deviate from the typical group as much as the group with NLI. However, there were individuals from the group with SLI that were rated as poor as or poorer than the group with NLI on the reticent, solitary-active, solitary-passive, and likability subtypes. The prosocial subtype was the only subtype with no participants from the group with SLI who were rated as poorly as the group with NLI. Although the groups with NLI and SLI did not receive significantly different teacher ratings on any of the subtypes, the means in Table 3 show that the group with NLI had poorer group ratings than the group with SLI on all of the subtypes except for solitary-active withdrawal.

Patterns of Withdrawn and Sociable Behavior Ratings

The second question examined was whether the groups with NLI and SLI would produce qualitatively differing patterns of performance on the five behavioral subtypes. This question is addressed in the following analyses.

Solitary-active withdrawal. Figure 1 depicts the pattern of mean teacher ratings of solitary-active behavior for each of the groups. All three groups, including the typical group, demonstrated a relatively similar pattern of item ratings. As noted previously, although both groups with LI were somewhat higher, there were no main effects for the solitary-active subtype.

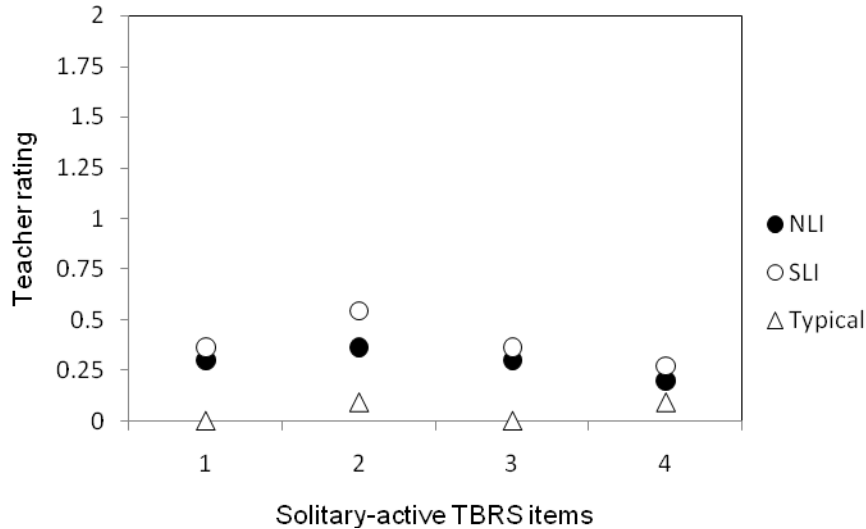


Figure 1. Mean ratings for items on the *Teacher Behavior Rating Scale (TBRs)* solitary-active subtype for the groups with nonspecific language impairment (NLI) and specific language impairment (SLI) and the typical group.

Solitary-passive withdrawal. Figure 2 depicts the pattern of mean teacher ratings of solitary-passive behavior for each of the groups. This is the only subtype for which the pattern of item ratings was not clearly similar for the groups with NLI and SLI. Although the general patterns of these groups showed some disparity, the groups with LI did have a similar pattern of ratings on items 1 and 2. These items asked if the child read or participated in constructive activities (e.g., blocks, legos, puzzles) alone. Item 3, the most distinguishing item in the pattern, asked if the child “builds things by self rather than with other children” (Hart & Robinson, 1996). On items 3, 4, and 5, the pattern of the group with SLI more closely matches the group with typical skills than the group with NLI.

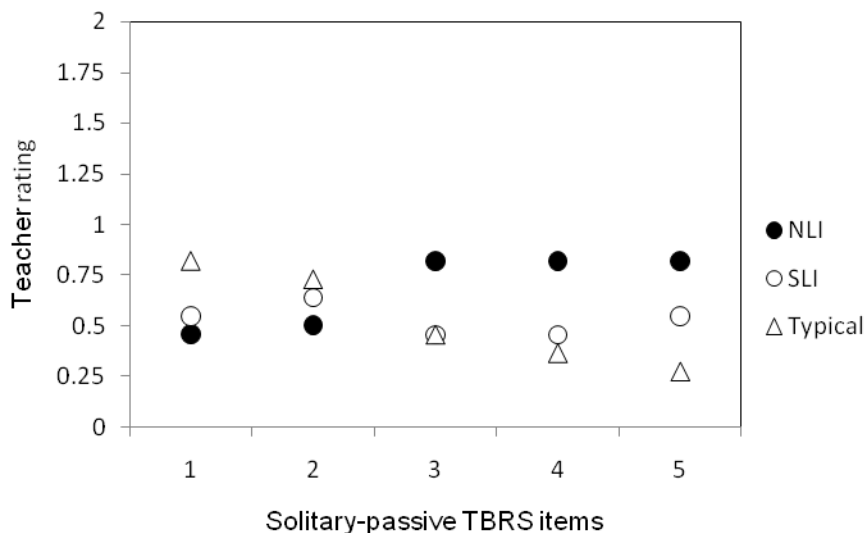


Figure 2. Mean ratings for items on the *Teacher Behavior Rating Scale (TBRs)* solitary-passive subtype for the groups with nonspecific language impairment (NLI) and specific language impairment (SLI) and the typical group.

Reticent withdrawal. Figure 3 depicts the pattern of mean teacher ratings of reticent behavior for each of the groups. Although the group with NLI demonstrated more severe withdrawn ratings, especially on item 3, the general pattern of the groups with NLI and SLI was generally similar. The overall pattern of the groups with LI is also distinct from the pattern of the typical group. The teacher ratings on reticent withdrawal items 1 and 3 were the most disparate. These items asked if the child “stares at other children without interacting” and is “unoccupied even when there is plenty to do” (Hart & Robinson, 1996). The higher ratings on item 3 could be argued to represent a qualitative difference. Both groups with LI were rated with high levels of withdrawn behavior on these items, although the typical group did not have any participants rated above 0 on these items. Item 4 (“fearful when approaching other children;” Hart & Robinson, 1996) showed an opposite trend, with all groups receiving very similar ratings.

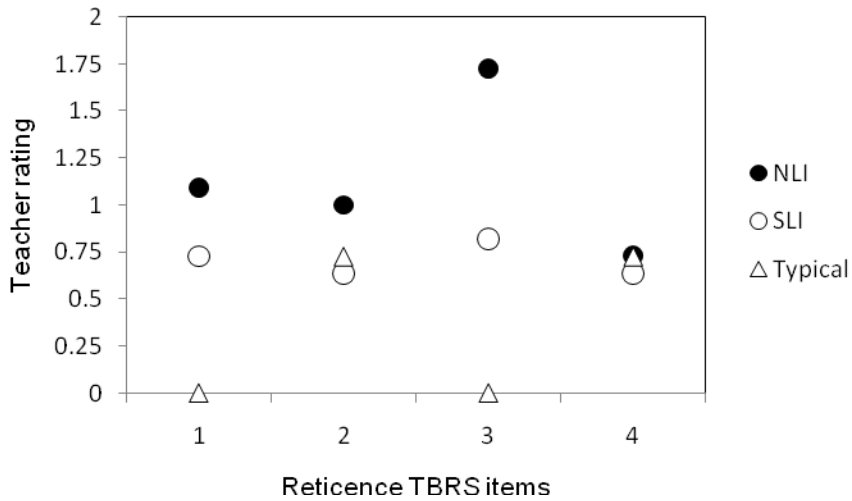


Figure 3. Mean ratings for items on the *Teacher Behavior Rating Scale (TBRS)* reticent withdrawal subtype for the groups with nonspecific language impairment (NLI) and specific language impairment (SLI) and the typical group.

Likability. Figure 4 depicts the pattern of mean teacher ratings of likability for each of the groups. The finding that the groups with LI differed from the typical group, but not from each other, is clearly illustrated. The typical group had a similar pattern to the groups with LI except on item 5 where the typical group sloped down while the groups with LI rose in their ratings. On this item, teachers were asked to rate how often the child “controls temper in conflicts with peers.” Item 3, where all of the groups were rated lowest, asked how often the child “is cooperative in rough and tumble play” (Hart & Robinson, 1996).

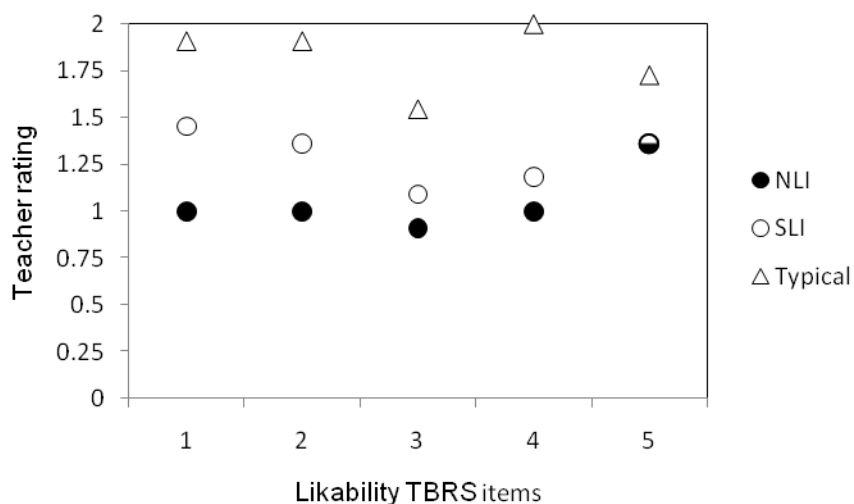


Figure 4. Mean ratings for items on the *Teacher Behavior Rating Scale (TBRS)* likability subtype for the groups with nonspecific language impairment (NLI) and specific language impairment (SLI) and the typical group.

Prosocial. Figure 5 depicts the pattern of mean teacher ratings of prosocial behavior for each of the groups. The pattern of ratings is generally similar for all three groups, with only a few variations. The largest differences were observed in response to item 1, which asked teachers how often the child “offers to help a child having difficulty with [a] task.” The ratings for the group with NLI and the typical group were both poorer on item 3 than most of the other items, however children with SLI were not rated more poorly on this item than other items. Item 3 asked teachers to rate how often the child “helps other children who are feeling sick” (Hart & Robinson, 1996).

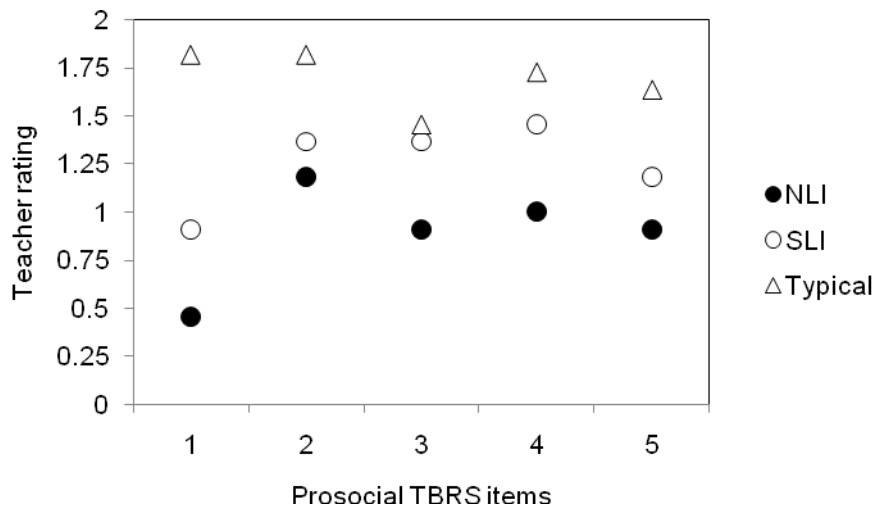


Figure 5. Mean ratings for items on the *Teacher Behavior Rating Scale (TBRs)* prosocial subtype for the groups with nonspecific language impairment (NLI) and specific language impairment (SLI) and the typical group.

Summary. Despite quantitative differences, teacher ratings of the groups with LI generally demonstrated similar patterns on the reticent withdrawal, solitary-active withdrawal, likability, and prosocial subtypes. The typical group demonstrated a similar rating pattern to the groups with LI on the solitary-active, likability, and prosocial subtypes. The teacher ratings on the solitary-passive subtype did not demonstrate consistent patterns of performance for any of the groups.

Effects of IQ

In order to examine further the effects of IQ on withdrawn and sociable behaviors, analysis was conducted with the addition of 17 participants to the group with SLI and 4

participants to the typical group². The group with SLI was split into a group with higher IQ (high-IQ-SLI) and a group with lower IQ (low-IQ-SLI). The group with low-IQ-SLI had 13 participants, a mean IQ of 90, and an IQ range of 85 to 96. The group with high-IQ-SLI had 15 participants, a mean IQ of 103, and an IQ range of 98 to 116. In addition to having a lower mean IQ, the group with low-IQ-SLI also had a lower mean language score of 75 in comparison to the group mean for the group with high-IQ-SLI, which produced a mean of 79. The typical group had a total of 15 participants and the group with NLI remained the same with 11 participants because additional participants with NLI were not available. The mean ratings and standard deviations for the groups on each of the behavioral subtypes are reported in Table 7.

A one-way ANOVA was conducted on each behavioral subtype (reticent withdrawal, solitary-active withdrawal, solitary-passive withdrawal, likability, and prosocial). For each analysis, the independent variable was group membership (NLI, high-IQ-SLI, low-IQ-SLI, Typical). The ratings on the TBRS subtype served as the dependent variable in each analysis and the critical value for each test was set at .05. The

² Data from additional participants were drawn from the same databases as the data in this study. The data from the remainder of the group with SLI, which included 17 participants, were combined with the data from the existing group with SLI. A median split using IQ score was used to divide the group, resulting in two subgroups with SLI. Because participants in the groups with SLI were not originally recruited as matches for participants with NLI, it was not possible to find a peer with the same age and gender for every participant with NLI. Therefore, none of the groups was examined as matched pairs in this analysis. In order to keep the number of participants in the groups consistent, 15 of the total 28 typical participants were randomly selected to serve as the typical group.

analysis of main effects revealed significant differences for reticent withdrawal, $F(3, 53) = 9.670, p < .001, \eta^2 = .37$, likability, $F(3, 53) = 7.959, p < .001, \eta^2 = .32$, and prosocial, $F(3, 53) = 5.890, p = .002, \eta^2 = .26$. Analysis of the performance of the four groups did not produce significant differences on solitary-active withdrawal, $F(3, 52) = 2.457, p = .074, \eta^2 = .13$, or solitary-passive withdrawal, $F(3, 52) = 1.985, p = .128, \eta^2 = .11$.

Table 7

Mean Teacher Behavior Ratings of Withdrawn and Sociable Behaviors for Groups with High IQ-Specific Language Impairment (High-IQ SLI), Low-IQ-SLI, Nonspecific Language Impairment (NLI), and Typical Language and IQ

Test	NLI		Low-IQ-SLI		High-IQ-SLI		Typical	
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>
Withdrawn behaviors								
Reticent	1.14	(.38)	.87	(.59)	.77	(.65)	.15	(.20)
Solitary-active	.28	(.42)	.27	(.45)	.38	(.41)	.03	(.09)
Solitary-passive	.74	(.49)	.55	(.32)	.75	(.40)	.45	(.32)
Sociable behaviors								
Likability	1.05	(.44)	1.49	(.28)	1.22	(.59)	1.80	(.28)
Prosocial	.89	(.63)	1.27	(.49)	1.09	(.61)	1.70	(.35)

Note. All ratings fall between 0 to 2.0. For solitary-active, reticent, and solitary-passive, higher scores indicate higher levels of withdrawn behavior. For prosocial and likability, higher scores indicate greater sociability.

Post hoc analysis on the reticent withdrawal subtype, using the Tukey HSD method revealed that all of the groups with LI were more reticent than the typical group (Typical-NLI, $p < .001$; Typical-low-IQ-SLI, $p = .002$; Typical-high-IQ-SLI $p = .007$), but that none of the groups with LI differed from each other. On the previous analysis of

reticent withdrawal, the group with SLI did not differ from the typical group, but in this analysis, with the added participants, both of the groups with SLI (high-IQ-SLI, low-IQ-SLI) differed from the typical group.

Post hoc analysis on the likability subtype, using the Tukey HSD method revealed significant differences between the typical group and the group with NLI, $p < .001$, as well as between the typical group and the group with high-IQ-SLI, $p = .003$. On the previous analysis of the likability subtype, the group with SLI differed from the typical group. In the present analysis, only the group with high-IQ-SLI differed. There were no significant differences in likability between the three groups with LI.

Post hoc analysis on the prosocial subtype, using the Tukey HSD method revealed significant differences between the typical group and the group with NLI, $p = .002$, as well as between the typical group and the group with high-IQ-SLI, $p = .013$. On the previous analysis of the prosocial subtype, the group with SLI did not differ from the typical group, but by adding participants and splitting the group with SLI by IQ, the group with high-IQ-SLI did differ from the typical group, while the group with low-IQ-SLI did not. There were no significant differences between the three groups with LI.

These analyses supported the previous finding that the groups with LI did not differ from each other on any of the behavioral subtypes, even when participants were added to some groups. In addition, the group with NLI differed from the typical group on all of the same subtypes as the previous analyses. When considering the sociable subtypes in the present analyses, the group with high-IQ-SLI differed from the typical group, but the group with low-IQ-SLI did not.

Discussion

This research extended the study of children with SLI and NLI by examining teacher ratings of withdrawn and sociable behavior. Ratings of children with SLI, NLI, and typically developing language skills were compared. The patterns created by teacher responses to individual rating items were also examined in both groups. For current purposes, the terms quantitative and qualitative were used as follows. The numerical similarities and differences of ratings were considered quantitative. For example, the groups with NLI and SLI did not differ quantitatively on all of the behavioral subtypes because the differences between the ratings of the two groups not statistically significant. The similarities and differences in the patterns of teacher ratings were considered qualitative (Tomblin & Zhang, 1999). For example, the groups with LI produced a similar pattern of performance on prosocial items thus demonstrating a qualitatively similar pattern.

Group Differences on Behavioral Subtypes

The first research question asked, “Do children with NLI and SLI demonstrate general differences in the overall manifestation of withdrawn and sociable behaviors in the school setting?” The results showed that the group with NLI was consistently rated lower than the group with SLI on sociable behaviors and higher on withdrawn behaviors, except for solitary-active withdrawal. As with several previous studies, these differences between the groups for solitary-active withdrawal were not significant (Fujiki, Brinton, Morgan et al., 1999; Fujiki et al., 2004; Hart et al., 2004). There were, however, significant differences between the group with NLI and the typical group on three subtypes of behavior, reticent withdrawal, likability, and prosocial.

The group with SLI only differed from the typical group on the likability subtype. This finding contrasts with previous findings (Fujiki, Brinton, Morgan et al., 1999; Hart et al. 2004) in which children who met the defining criteria for SLI were rated as being significantly more reticent, less prosocial, and less likeable than typical children. Given the general trends in the data, it was expected that the outcomes would be similar to previous findings with larger groups of participants. When participants were added to the typical group and the group with SLI, this speculation was confirmed. Both groups with SLI were rated as being more reticent than the typical group and the group with high-IQ-SLI was rated as being less prosocial and less likeable than the typical group. In that the groups with NLI and high-IQ-SLI were rated more poorly than the typical group on the sociability subtypes, but the group with low-IQ-SLI was not, it can be concluded that lower IQ was not the sole influencing factor of differences in sociable behaviors. The results for each behavioral subtype are discussed in more detail below.

Solitary-active withdrawal. Examination of the group means from the TBRS (Table 3) revealed that the only subtype in which the group with NLI was not rated more poorly than the group with SLI was solitary-active withdrawal. In fact, all of the groups performed in a generally similar manner. Across all three groups solitary active withdrawal was rated as occurring infrequently. This finding is supportive of previous work on this subtype, indicating that this type of behavior is relatively rare (Fujiki, Brinton, Morgan et al. 1999; Hart et al. 2004).

Despite the low frequency level of occurrence, solitary-active withdrawal is of concern clinically. When a child does produce solitary-active behavior, it is highly noticeable and leads to peer rejection (Coplan et al., 1994; Harrist et al., 1997). Solitary-

active withdrawal has also been associated with impulsivity and aggression. Both of these behaviors could further lead to peer rejection (Rubin, 1982; Rubin & Mills, 1988).

Therefore, even though the children with LI were not rated as demonstrating higher solitary-active withdrawal than the typical group, any occurrence of this behavior should be viewed with some concern. It should be noted that solitary-active withdrawal was very rarely observed in typical children.

Solitary-passive withdrawal. There were no significant differences between the groups on solitary-passive withdrawal, even with the addition of participants. This finding is similar to that of Fujiki, Brinton, Morgan et al. (1999), who observed that children with LI did not show significant levels of solitary-passive withdrawal. Fujiki, Brinton, Morgan et al. suggested that these results ran counter to the idea that solitary-passive withdrawal and reticence merge into one behavior as children grow older (Asendorpf, 1991, 1993). However, Hart et al. (2004) found that children with SLI demonstrated significantly more solitary-passive withdrawal than typical peers and that solitary-passive withdrawal and reticence were related behaviors. They attributed the differences between the results of the two studies to different sampling and statistical procedures. These factors may also be the basis for differences between Hart et al. and the current study.

Reticent withdrawal. The groups with NLI exhibited a quantitative difference in reticent behavior when compared to the typical group. It was of note that in the first analysis, the group with SLI did not differ from the typical group. The differences were quantitative, although performance on a single item, being unoccupied even when there

was a lot to do, seemed to be extremely high in the group with NLI, and possibly could be interpreted as a qualitative difference.

The finding that the group with SLI did not differ from the typical group contrasted with previous work which has consistently shown that teachers rated children with SLI as being much more reticent than their typical peers (Fujiki, Brinton, Morgan et al., 1999; Fujiki et al., 2004; Hart et al., 2004). In this regard, however, it is notable that when participants were added to increase statistical power, all three groups with LI differed from the typical group, but not from each other. Also, the trend indicating differences between the groups with NLI and SLI from the original analysis disappeared. This latter analysis suggested that the failure to find differences in the first analysis was the result of small sample size. In considering this finding it is important to remember that by definition, children with LI with diagnosable social or emotional problems were excluded from the sample. Thus, if the remaining children with LI had socioemotional problems these difficulties would be subclinical in nature. The exclusion of the more severe cases would tend to minimize the differences between groups. The fact that statistically significant differences still existed was notable, even though it required greater statistical power to find it.

In examining the individual performance of the children, it is interesting that none of the participants in the typical group had a rating above 1 (“sometimes demonstrates the behavior”). The groups with LI demonstrated the most reticence on items 1 and 3: “stares at other children without interacting” and “unoccupied even when there is plenty to do” (Hart & Robinson, 1996). Both of these behaviors suggest fear and anxiety in approaching peers associated with reticence. Hart et al. (2000) observed that reticence led

to peer rejection for children with LI. As a result of their fear and anxiety in approaching peers, children from both groups with LI would likely have difficulty accessing the ongoing interactions of peers, a behavior that Brinton et al. (1997) identified as a common social deficit for children with SLI, particularly boys.

Prosocial. The original analysis on the prosocial subtype indicated differences only between the group with NLI and the typical group, similar to the results for reticence. With the addition of participants, the group with high-IQ-SLI also demonstrated less prosocial behavior than the typical group. The group with low-IQ-SLI did not differ from the typical group. The mean language composite score for the group with high IQ-SLI was higher ($M = 79$) than the mean for the group with low IQ-SLI ($M = 75$). Thus the lower prosocial rating for the group with high-IQ-SLI cannot be attributed to language level. Given that the group with low-IQ-SLI did not differ from the typical group, but the group with high-IQ-SLI did, less prosocial behavior was not exclusively influenced by lower IQ. Ultimately, both groups with NLI and SLI were rated with less prosocial behavior than what is considered typical, which affects how accepted they are by peers (Coie et al., 1990).

Likability. The original analysis for likability indicated that groups with LI were considered by teachers less likely to exhibit likable behaviors, but the mean ratings for the two groups with LI were not different from each other. When participants were added, the group with low-IQ-SLI did not exhibit significantly different ratings on the likability subtype. Contrary to what might be expected if IQ were associated with social behavior, the subgroup with high-IQ-SLI did differ significantly from the typical group. As with the prosocial subtype, these differences cannot be attributed to language level.

More likely they are due to the heterogeneity in those individuals diagnosed as having SLI.

Low likability ratings have importance implications for social acceptance. For example, Coie et al., 1990 identified cooperativeness, addressed in the likability subtype of the TBRS, as one of the biggest indicators of peer acceptance. Given that the groups with NLI and SLI were rated lower on likability than the typical group, it is likely that both groups of children with LI would be less accepted or less liked than typical peers.

Summary. The results of each of the behavioral subtypes indicate that the groups with LI did not show significantly different behavioral ratings when compared to each other, and that they had poorer behavior than typical peers in the areas that have been established by previous research (Fujiki, Brinton, Morgan et al., 1999; Hart et al., 2004). Despite heterogeneous samples, the groups with LI did not differ from each other, even when the sample size for the group with SLI was increased. The slightly lower ratings of the group with NLI for most subtypes (see Table 3) represent differences in severity. However, individual patterns of performance for the most part did not suggest qualitative differences, an issue which is addressed in the next section.

Patterns of Withdrawn and Sociable Behaviors

The second research question examined in this study asked, “Do children with NLI and SLI demonstrate qualitative differences in the pattern of withdrawn and sociable behaviors in the school setting?” A few studies have found quantitative, but not qualitative differences between children with SLI and NLI (Catts et al., 2002; Tomblin & Zhang, 1999) and others have noted qualitative similarities without looking at quantitative differences (Hayiou-Thomas et al., 2005; Tommerdahl & Drew, 2008). The results of this study revealed that the patterns of withdrawn and sociable ratings were

generally similar for the groups with NLI and SLI. This finding has implications for diagnosing categorically different disorders because similar profiles or patterns of affected areas indicate that two groups are not categorically different in performance, although they may differ in the extent to which they demonstrate certain behaviors or deficits (Tomblin & Zhang, 1999). This issue is elaborated upon in more detail below for each of the specific subtypes of behavior.

Solitary-active withdrawal. All three groups demonstrated a similar pattern for solitary-active withdrawal. As stated previously, any level of solitary-active withdrawal would have the potential to impact the acceptance of children with LI. Still, the similar pattern observed across all three groups (and confirmed by the analysis involving the high and low IQ groups with SLI) indicated that IQ level did not influence teacher ratings of solitary-active withdrawn behaviors in the classroom environment.

Solitary-passive withdrawal. There were no overall group differences in solitary-passive withdrawal between the groups studied. Although group differences were not significant, it is interesting that item 3 (“builds things by self rather than with others;” Hart & Robinson, 1996) was one of the few items that seemed to reflect a qualitative difference in rating pattern between the two groups with LI. The children with NLI were rated high while the group with SLI was rated low on this item. On the other subtypes, the groups with LI were rated poorly on the same items. Considering the similar patterns of teacher ratings for the rest of the subtypes, this difference is the exception rather than the rule. Whether this difference was indicative of a difference in performance or the result of random variation will need to be explored in future research.

Reticent withdrawal. In the initial analysis, the groups with NLI and SLI demonstrated generally similar rating patterns on the reticence subtype. Items 1 and 3, which distinguished the groups with LI most from the typical group, were both classic indications of reticence: “Stares at other children with out interacting” and “unoccupied even when there is plenty to do” (Hart & Robinson, 1996). The groups with NLI and SLI had a similar pattern that differed only in severity from the pattern of each other and the typical group. The one exception to this was the response of both groups to item 3, in which children with NLI showed a spike in performance. This large increase in ratings could be considered as a qualitative difference.

Likability. All three groups produced a similar pattern of ratings across items, differing primarily in terms of severity. Because the pattern of the groups with LI was also similar to the pattern of the typical group, it appeared that LI influenced the severity of the ratings, but not the qualitative pattern of items. All three groups were rated fairly closely on item 5 (“controls conflict in temper with peers;” Hart & Robinson, 1996), including the typical group which was rated poorer on this item than the other likability items. The similar ratings between groups on this item indicates that decreased temper control in peer conflict is more standard across all children than other likability behaviors.

Prosocial. As stated previously, the pattern of teacher ratings on the prosocial subtype was qualitatively similar for all groups, with a few variations. Item 1, which the groups with LI received lower ratings in comparison to their ratings on item 2, asked about how often the participant “offers to help a child having difficulty with a task” (Hart & Robinson, 1996). The ratings on this item could have been heavily influenced by the

language deficits in the group with LI since a child with poor language would likely be less adept at explaining tasks to a peer. The pattern on this subtype supported the assertion that the groups with NLI and SLI are part of the same disorder category because they were affected in the same areas.

Limitations

The main limitation of this study was small sample size. The data for this study were collected at two separate time intervals, during 2004-2005 and 2007-2008. When the data were collected, the researchers were not actively looking for children with NLI to participate in the studies. Instead, the children were identified because they were enrolled in special services for language disability. The language and IQ of each child were tested after the initial identification and some children presented with the criterion for NLI although most did not. This study utilized all of the children with NLI and an equal number of children from the group with SLI and the typical group, but the resulting groups were fairly small with only 11 participants per group. Additional data from participants from the larger group with SLI and the typical group were examined in a secondary analysis, which yielded results more consistent with past findings. However, the size of the groups could not be significantly increased without a considerable imbalance between these groups and the group with NLI.

Heterogeneity can be particularly problematic in small groups. Children with LI are known to be a heterogeneous group (Brinton & Fujiki, in press). Data from Tables 4, 5, and 6 demonstrated heterogeneity by showing the range of individual means in each group for three subtypes of behavior. The individual ratings of the typical group tended to cluster around the positive end of the scale whereas the individual ratings of the groups with LI were more spread out. Because of the great heterogeneity of the groups with LI,

more participants are needed to increase statistical power. Future studies may be able to increase statistical power by seeking out a greater number of participants with NLI in the data collection process. Future research should include at least 20 participants in each group in order to better determine the social skills of children with NLI.

Another disadvantage of the current study was selecting matches with SLI for the participants with NLI after the initial data collection. Because of this procedure, the matched pairs were not from the same classroom; therefore, their teacher rating scales were not filled out by the same teacher (Brinton, Spackman, Fujiki, & Ricks 2007). This problem could be alleviated by initially seeking out participants with NLI and matching them with peers with SLI, although it would be difficult to find matches with NLI and SLI in the same classroom.

Conclusion

The group with NLI was consistently rated more poorly than the group with SLI. These quantitative differences were not statistically significant, however. Additionally, the groups generally did not differ qualitatively. Patterns of performance, produced by examining teacher ratings of individual TBRS items, were also similar in the groups with LI. These similarities in the patterns of ratings produced by groups with LI supported the claim that NLI and SLI are qualitatively similar as well. When additional participants were added to increase statistical power, the findings obtained with the smaller groups were clarified. Children with NLI and SLI suffer from social deficits, and IQ level does not appear to be an influential variable.

References

- Aram, D. M., & Nation, J. E. (1982). *Child language disorders*. St. Louis, MO: C.V. Mosby Company.
- Asendorpf, J. (1991). Development of inhibited children's coping and unfamiliarity. *Child Development, 62*, 1460-1474.
- Asendorpf, J. (1993). Beyond temperament: A two-factorial coping model of the development of inhibition during childhood. In K. H. Rubin & J. B. Asendorpf (Eds.), *Social withdrawal, inhibition and shyness in childhood* (pp. 265-289). Hillsdale, NJ: Erlbaum.
- Bishop, D. V. M. (1994). Is specific language impairment a valid diagnostic category? Genetic and psycholinguistic evidence. *Philosophical transactions of the royal society B, 364*, 105-111.
- Bishop, D. V. M., & Adams, C. A. (1990). A prospective study of the relationship between specific language impairment, phonological disorders and reading retardation. *Journal of Child Psychology and Psychiatry, 31*, 1027-1050.
- Bishop, D. V. M., & Edmundson, A. (1987). Language-impaired 4-year-olds: Distinguishing transient from persistent impairment. *Journal of Speech and Hearing Disorders, 52*, 156-173.
- Bloom, L., & Lahey, M. (1978). *Language development and language disorders*. New York: John Wiley & Sons, Inc.
- Bracken, B. A., & MaCallum, S. (2003). *Universal Nonverbal Intelligence Test*. Itasca, IL: Riverside Publishers.

- Brinton, B., & Fujiki, M. (in press). Principles of assessment and intervention. In J. S. Damico, M. J. Ball, & N. Muller (Eds.), *Handbook of language and speech disorders*. Oxford: Blackwell.
- Brinton, B., Fujiki, M., & McKee, L. (1998). The negotiation skills of children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 41*, 927-940.
- Brinton, B., Fujiki, M., Montague, E. C., & Hanton, J. L. (2000). Children with language impairment in cooperative work groups: A pilot study. *Language, Speech, and Hearing Services in Schools, 31*, 252-264.
- Brinton, B., Fujiki, M., Spencer, J. C., & Robinson, L. A. (1997). The ability of children with specific language impairment to access and participate in an ongoing interaction. *Journal of Speech, Language, and Hearing Research, 40*, 1011-1025.
- Brinton, B., Spackman, M. P., Fujiki, M., & Ricks, J. (2007). What should Chris say? The ability of children with specific language impairment to recognize the need to dissemble emotions in social situations. *Journal of Speech, Language, and Hearing Research, 50*, 798-811.
- Carrow-Woolfolk, E. (1999). *Comprehensive Assessment of Spoken Language*. Pines, MN: American Guidance Service.
- Casby, M. W. (1992). The cognitive hypothesis and its influence on speech-language services in schools. *Language, Speech, and Hearing Services in Schools, 23*, 198-202.

- Catts, H. W., Fey, M. E., Tomblin, J. B., & Zhang, X. (2002). A longitudinal investigation of reading outcomes in children with language impairments. *Journal of Speech, Language, and Hearing Research, 45*, 1142-1157.
- Coie, J. D., Dodge, K. A., & Kupersmidt, J. B., (1990). Peer group behavior and social status. In S. R. Asher & J. D. Coie (Eds.), *Peer rejection in childhood* (pp. 17-59). New York: Cambridge University Press.
- Cole, K. N., Coggins, T. E., & Vanderstoep, C. (1999). The influence of language/cognitive profile on discourse intervention outcome. *Language, Speech, and Hearing Services in Schools, 30*, 61-67.
- Cole, K. N., Dale, P. S., & Mills, P. E. (1990). Defining language delay in young children by cognitive referencing: Are we saying more than we know? *Applied Psycholinguistics, 11*, 291-302.
- Conti-Ramsden, G., & Botting, N. (2004). Social difficulties and victimization in children with SLI at 11 years of age. *Journal of Speech, Language, and Hearing Research, 47*, 124-161.
- Coplan, R. J., & Rubin, K. H. (1998). Exploring and assessing nonsocial play in the preschool: The development and validation of the Preschool Play Behavior Scale. *Social Development, 7*, 72-91.
- Coplan, R. J., Rubin, K. H., Fox, N. A., Calkins, S. D., & Stewart, S. L. (1994). Being alone, playing alone, and acting alone: Distinguishing among reticence, and passive and active solitude in young children. *Child Development, 65*, 129-137.

- Durkin, K., & Conti-Ramsden, G. (2007). Language, social behavior, and the quality of friendships in adolescents with and without a history of specific language impairment. *Child Development, 78*, 1441-1457.
- Fey, M. E., Catts, H. W., Proctor-Williams, K., Tomblin, J. B., & Zhang, X. (2004). Oral and written composition skills of children with language impairment. *Journal of Speech, Language, and Hearing Research, 47*, 1301-1318.
- Fey, M. E., Long, S. H., & Cleave, P. L. (1994). Reconsideration of IQ criteria in the definition of specific language impairment. In R. V. Watkins & M. L. Rice (Eds.), *Specific language impairments in children* (pp. 161-178). Baltimore: P.H. Brookes Publishing.
- Finestack, L. H., Fey, M. E., & Catts, H. W. (2006). Pronominal reference skills of second and fourth grade children with language impairment. *Journal of Communication Disorders, 39*, 232-248.
- Fujiki, M., Brinton, B., Hart, C. H., & Fitzgerald, A. (1999). Peer acceptance and friendship in children with specific language impairment. *Topics in Language Disorders, 19*, 34-48.
- Fujiki, M., Brinton, B., Isaacson, T., & Summers, C. (2001). Social behaviors of children with language impairment on the playground: A pilot study. *Language, Speech, and Hearing Services in Schools, 32*, 101-113.
- Fujiki, M., Brinton, B., Morgan, M., & Hart, C. H. (1999). Withdrawn and sociable behavior of children with language impairment. *Language, Speech, and Hearing Services in Schools, 30*, 183-195.

- Fujiki, M., Brinton, B., & Todd, C. M. (1996). Social skills of children with specific language impairment. *Language, Speech, and Hearing Services in Schools, 27*, 195-202.
- Fujiki, M., Spackman, M. P., Brinton, B., & Hall, A. (2004). The relationship of language and emotion regulation skills to reticence in children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 47*, 637-646.
- Hart, C. H., McGee, L., & Hernandez, S. (1993). Themes in the peer relations literature: Correspondence to playground interactions portrayed in children's literature. In C. H. Hart (Ed.), *Children on playgrounds: Research perspectives and applications* (pp. 371-416). New York: State University of New York Press.
- Hart, C. H., Olsen, S. F., Robinson, C. C., & Mandlco, B. L. (1997). The development of social and communicative competence in childhood: Review and a model of personal, familial, and extrafamilial processes. In B. R. Burleson (Ed.), *Communication yearbook* (Vol. 20, pp. 305-373). Thousand Oaks, CA: Sage.
- Hart, C. H., & Robinson, C. C. (1996). *Teacher Behavior Rating Scale*. Provo, UT: Brigham Young University.
- Hart, C. H., Yang, C., Nelson, L. J., Robinson, C. C., Olsen, J. A., Nelson, D. A., et al. (2000). Peer acceptance in early childhood and subtypes of socially withdrawn behavior in China, Russia, and the United States. *International Journal of Behavioral Development, 24*, 72-81.
- Hart, K. I., Fujiki, M., Brinton, B., & Hart, C. H. (2004). The relationship between social behavior and severity of language impairment. *Journal of Speech, Language, and Hearing Research, 47*, 647-662.

- Harrist, A. W., Zaia, A. F., Bates, J. E., Dodge, K. A., & Pettit, G. S. (1997). Subtypes of social withdrawal in early childhood: Sociometric status and social-cognitive differences across four years. *Child Development, 68*, 278-294.
- Hayiou-Thomas, M. E., Oliver, B., & Plomin, R. (2005). Genetic influences on specific language impairment in 4-year-old twins. *Journal of Learning Disabilities, 38*, 222-232.
- Johnston, J. (1988). Specific language disorders in the child. In N. Lass, L. McReynolds, J. Northern, & D. Yoder (Eds.), *Handbook of speech-language pathology and audiology* (pp. 685-715). Toronto: Decker.
- Lahey, M. (1990). Who shall be called language disordered? Some reflections and one perspective. *Journal of Speech and Hearing Disorders, 55*, 612-620.
- Leonard, L. (1998). *Children with specific language impairment*. Cambridge, MA: The MIT Press.
- Miller, C. A., Kail, R., Leonard, L. B., & Tomblin, J. B. (2001). Speed of processing in children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 44*, 416-433.
- Miller, C. A., Leonard, L. B., Kail, R. V., Zhang, X., Tomblin, J. B., & Francis, D. J. (2006). Response time in 14-year-olds with language impairment. *Journal of Speech, Language, and Hearing Research, 49*, 712-728.
- Nippold, M. A., Mansfield, T. C., Billow, J. L., & Tomblin, J. B. (2008). Expository discourse in adolescents with language impairments: Examining syntactic development. *American Journal of Speech-Language Pathology, 17*, 356-366.

- Notari, A., & Cole, K. (1992). Cognitive referencing: The (non)relationship between theory and application. *Topics in Early Childhood Special Education, 11*, 22-38.
- Paul, R. (2007). Models of child language disorders. In *Language disorders from infancy through adolescence: Assessment and intervention* (pp. 3-22). St. Louis, MO: Mosby, Inc.
- Plante, E. (1998). Criteria for SLI: The Stark and Tallal legacy and beyond. *Journal of Speech, Language, and Hearing Research, 41*, 951-957.
- Radke-Yarrow, M., Zahn-Waxler, C., & Chapman, M. (1983). Children's prosocial dispositions and behavior. In E. M. Hetherington (Ed.), *Handbook of child psychology: Vol. 4 Socialization, personality, and social development* (pp. 469-546). New York: Wiley.
- Rice, M. L., Tomblin, J. B., Hoffman, L., Richman, W. A., & Marquis, J. (2004). Grammatical tense deficits in children with SLI and nonspecific language impairment: Relationships with nonverbal IQ over time. *Journal of Speech, Language, and Hearing Research, 47*, 816-834.
- Rubin, K. H. (1982). Non-social play in preschoolers: Necessary evil? *Child Development, 53*, 651-657.
- Rubin, K. H. (1988). The many faces of social isolation in childhood. *Journal of Consulting and Clinical Psychology, 56*, 916-924.
- Stark, R. E., & Tallal, P. (1981). Selection of children with specific language deficits. *Journal of Speech and Hearing Disorders, 46*, 114-122.

- Stothard, S. E., Snowling, M. J., Bishop, D. V. M., Chipchase, B. B., & Kaplan, C. A. (1998). Language-impaired preschoolers: A follow-up into adolescence. *Journal of Speech, Language, and Hearing Research, 41*, 407-418.
- Tager-Flusberg, H., & Cooper, J. (1999). Present and future possibilities for defining a phenotype for specific language impairment. *Journal of Speech, Language, and Hearing Research, 42*, 1275-1278.
- Tomblin, J. B. (2008). Validating diagnostic standards for SLI using adolescent outcomes. In C. F. Norbury, J. B. Tomblin, & D. V. M. Bishop (Eds.), *Understanding developmental language disorders: From theory to practice* (pp. 93-114). New York: Psychology Press.
- Tomblin, J. B., & Buckwalter, P. R. (1998). Heritability of poor language achievement among twins. *Journal of Speech, Language, and Hearing Research, 41*, 188-199.
- Tomblin, J. B., & Zhang, X. (1999). Language patterns and etiology in children with specific language impairment. In H. Tager-Flusberg (Ed.), *Neurodevelopmental disorders* (pp. 361-382). Cambridge, MA: MIT Press.
- Tomblin, J. B., & Zhang, X., Buckwalter, P., & O'Brien, M. (2003). The stability of primary language disorder: Four years after kindergarten diagnosis. *Journal of Speech, Language, and Hearing Research, 46*, 1283-1296.
- U.S. Census Bureau, (2009). *American factfinder data sets*. Census 2000 summary file 2 (SF 2) 100-percent data. Block group data for Salt Lake and Utah counties, Utah. Available from U.S. Census Bureau <http://www.census.gov/>.
- Weismer, S. E., Tomblin, J. B., Zhang, X., Buckwalter, P., Chynoweth, J. G., & Jones, M. (2000). Nonword repetition performance in school-age children with and

without language impairment. *Journal of Speech, Language, and Hearing Research, 43*, 865-878.