COMPLEX SYNTAX AND WITHDRAWN

BEHAVIOR IN CHILDREN

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CHAPTER I

INTRODUCTION

Multiple studies have established that children with speech and language

impairments may also experience difficulties with social behavior (Fujiki, Brinton,

Isaacson, & Summers, 2001; Fujiki, Brinton, Morgan & Hart, 1999; Redmond & Rice,

1998; Rescorla, Ross, & McClure, 2007). Many developmental perspectives consider

children's social interactions to be fundamental in the development of social and

cognitive skills (Allen, 1976; Combs & Slaby, 1978; Hartup, 1979; Mead, 1934;

Sullivan, 1953). One aspect of social behavior that has been investigated is withdrawn

behavior in children with language impairments, which has also been linked to poor

academic and socioemotional outcomes (Coplan & Armer, 2005; Coplan Prakash,

O'Neil, & Armer, 2004; Coplan, Gavinski-Molina, Lagace-Seguin, & Wichman, 2001;

Hart et al., 2000). Additionally, withdrawal has been associated with many

developmental disorders in children, including autism and language impairment

(Hoekstra, Bartels, Hudziak, Van Beijsterveldt, & Boomsma, 2007).

This study examined the relation between social behavior, specifically withdrawn

behavior's subtype of shyness, and language ability in children with speech and language

impairments. Therefore, it is necessary to understand the relations between the terms

withdrawn behavior, shyness, and unsociability. Withdrawn is an umbrella term used to

describe consistent and frequent displays of solitary behaviors while the child is with other children (Rubin, Coplan, & Bowker, 2009). Shyness and unsociability have been described as two sub-types of withdrawn behavior (Rubin & Copan, 2004). Shyness is defined as a form of social withdrawal in which the child experiences wariness and anxiety in the face of social novelty (Coplan & Armer, 2007). Shy children have the desire to interact with other children, but their social approach motivation may be hindered by fear-induced social avoidance (Coplan et al., 2004). Shy children may increasingly lag behind typically developing (TD) peers in socio-communicative skills because of their anxiety when interacting with others (Coplan & Armer, 2005). Shyness is also associated with socioemotional maladaption along the internalizing dimension. This internalizing dimension includes social anxiety, which causes shy children to less often initiate social situations and even to withdraw from peer interaction (Coplan & Weeks, 2009). Without the interaction of other children, a child loses the opportunity to practice receptive and expressive language skills in different settings and with different people (Asendorpf & Meier, 1993).

Unsociable children differ from shy children because they have a preference for solitary activities that is not driven by fear of social interaction (Coplan & Armer, 2007). Unsociable children have low-social approach motivation and low-social avoidance motivation. Because of this, an unsociable child can choose to play with other children or choose to play alone because he/she is socially disinterested at that time (Coplan & Armer, 2007). Coplan and Armer (2007) note that unsociable children are fully accepted in society while shy children have difficulty being accepted. This is because unsociable

children do not have different social and cognitive skills when compared to typically developing peers (Coplan & Armer, 2007).

There are also negative long-term outcomes that have been associated with shy behavior. One such negative long-term outcome associated with shyness is that it can lead to the development of other internalizing disorders, such as social phobia, as seen in older children with extreme social anxiety (Coplan & Weeks, 2009). Other negative long-term outcomes that can be caused by shy behavior include depression as seen in preschoolers who had shown overt indices of social anxiety when they played with peers and physiological stress reactions as shown in extremely shy children who may fail to engage in generative verbal skill development practices (Coplan & Armer, 2005; Cameron, 2009). In general, researchers have found that there are some correlations between language and shyness such that shy children speak less than typical peers and that shy children score lower than typical peers on measures of expressive and receptive language (Asendorpf & Meier, 1993; Cameron, 2009; Spere, Schmidt, Theall-Honey, & Martin-Chang, 2004). However, it has been noted that the extent that a shy child's language skills might fall behind more outgoing peers remains unclear (Spere et al., 2004).

<div align="center">Language Impairment and Shyness</div>

The term language impairment (LI) is often used to describe a child who "exhibits a significant deficit in language development without accompanying problems such as hearing impairment, neurological damage, or mental retardation" (Leonard et al., 2007,

p.408; Rice, 1997; Conti-Ramsden & Botting, 2008; Conti-Ramsden, 2009). Language impairment may also affect a child's social skills and social competence. It has been posited that since language is critical for social skills to develop, if a shy child spends less time in conversations and has fewer opportunities to practice conversational skills, then their language abilities may be less advanced (Spere et al., 2004). Children with language impairment may have an increased risk of developing social anxiety due to their communication deficits during peer interactions (Voci, Beitchman, Brownlie, & Wilson, 2006). Therefore, it is important that speech language pathologists (SLPs) examine shy behavior because it is potentially related to a child's language development and social skills and may have negative long-term outcomes for the child.

<center>Syntax</center>

Syntax is defined as sentence components such as the basic noun phrase and verb phrase and sentence types e.g., negative, conjoined, interrogatives structures (Paul, 2007, p.30). As children develop, their syntax becomes more complex and the emergence of complex syntax takes place, typically between the ages of 2 and 3 years (Schuele, 2009). Furthermore, school-aged children need complex syntax to "describe, persuade, report, and imagine" in their daily oral and written activities (Marinellie, 2004, p. 518). Children first produce simple sentences, such as *subject + verb + object* and then begin to produce compound sentences, such as sentences that have two clauses and are joined by a coordinating conjunctions (e.g., and, but, or). After compound sentences, children begin to produce complex sentences that include one or more dependent clauses joined with an

independent clause (Schuele, 2009). Seemingly, children do this all in an effortless manner (Marinellie, 2004). Syntax is important to study and is of great interest to researchers because it is a vehicle for conveying meaning and is necessary for acquiring the knowledge base needed for reading comprehension (Scott, 2009).

Children with language impairment differ from typically developing children in their use of syntax (Scott, 1988). Noticeable differences include fewer productions of complex sentences, fewer grammatically acceptable complex sentences, and fewer combined complex sentences (Marinellie, 2004). Marinellie also found that children with specific language impairment (SLI) omitted subject relative markers (see Table 1). Other studies have found that children with SLI omit obligatory relative markers, obligatory *wh*-words in embedded clauses, the infinitival *to,* and commit other grammatical errors in complex utterances (see Table 1) (Marinellie, 2004). Marinellie (2004) also found that children with SLI may use fewer complex sentences, although these sentences were grammatically correct when used and that they were able to produce a variety of examples of complex sentences that are characteristic of spoken syntactic complexity. Because of these differences in complex syntax, children with SLI stand out from TD children during peer interaction.

Table 1

Examples of Common Syntactic Errors by Children with LI

Sentence Type	Grammatically Correct Production	Ungrammatically Correct Production
Subject relative markers	The man who/that crashed the car is in jail.	The man crashed the car is in jail.
Obligatory -wh in embedded clause	I wondered where we were going on Saturday.	I wondered we were going on Saturday.
Infinitival -to	He wanted Mary to leave.	He wanted Mary leave.
Complex utterance	That is the dog that bit me.	(Example not provided)

Note. Adapted from "Complex Syntax Used by School-Age Children with Specific Language Impairment (SLI) in Child-Adult Conversation" by S.A. Marinellie, (2004), *Journal of Communication Disorders, 37,* 518-519 and adapted from "Complex Syntax Coding Manual," by C.M. Schuele, 2009. Unpublished manuscript.

CHAPTER II

REVIEW OF LITERATURE

There are multiple studies that have examined aspects of shyness in language impaired children. Fujiki, Brinton, Isaacson, and Summers (2001) investigated the difference between playground interactions of school-age children with LI and their TD peers in order to compare the social behaviors between these children. The authors found that children with LI had social difficulties in the area of peer interaction while their TD counterparts did not have social difficulties. This peer interaction difficulty resembled shyness since the children with LI would move from playgroup to playgroup without engaging in social interactions with their TD peers. These shy behaviors suggested the children with LI wanted to interact with their peers, but were fearful in doing so (Fujiki et al., 2001). The authors also found that children with LI spent a significant amount of recess time isolated from peers and that some children with LI were also actively excluded by their peers (Fujiki et al., 2001). Based on these findings, children with LI may have difficulties with peer interactions and therefore spend less time interacting with peers.

Shy like behavior has also been observed in peer interaction within the classroom setting in children with language impairment. In a study by Hadley and Rice (1991),

teachers reported that preschool children with LI frequently ignored the conversational requests in return. The researchers believed that the reason behind children with LI ignoring their peers' conversational requests was because they may not have understood the conversational request made by their peers or could not formulate an immediate response (Hadley & Rice, 1991). Similar to other studies, Hadley and Rice (1991) found that children with LI participated less in peer interactions than typically developing peers.

Using standardized tests, Spere et al. (2004) found that temperamentally shy children scored lower on measures of expressive and receptive language skills at age four as compared to their non-shy counterparts. This study used the *Peabody Picture Vocabulary Test-Revised* (*PPVT-R*; Dunn & Dunn, 1981), which is a standardized measure of receptive vocabulary, and the *Test of Auditory Analysis Skills* (*TAAS*; Rosner, 1979), which measured phonemic awareness and expressive language skills. Despite scoring lower on these measures than TD children, shy children were performing at age-appropriate levels on the standardized language measures while their TD peers performed at the higher end of the age appropriate levels. One possible reason for these results was that non-shy children actively engaged in social interactions. One limitation of this study included that scores on the *TAAS* could be unfairly biased towards shy children because the *TAAS* task required children to verbalize their responses.

The severity of the language impairment is one aspect researchers have considered when investigating social behavior. One such study was conducted by Hart, Fujiki, Brinton, and Hart (2004), in which they investigated the relation between severity of language impairment and social behavior. Language impairment was measured on the *Clinical Evaluation of Language Fundamental-Revised Edition* (*CELF-R*; Semel, Wiig,

& Secord, 1987), and social behavior was rated on the *Teacher Behavioral Rating Scale* (*TBRS*; Hart & Robinson, 1996). The *CELF-R* is a formal-norm-referenced measure that is used to assess the language abilities of children while the *TBRS* is a teacher based questionnaire examining children's social behavior (Hart et al., 2004). The results indicated that there were no significant group differences in withdrawn behavior between groups of children with language impairment based upon severity of language impairment. Overall, children with LI showed high levels of shyness, but the degree of LI did not influence shy behaviors.

One limitation of the study by Hart et al. (2004) was that the language severity of the participants was based upon only one standardized test rather than including multiple measures of a conversational language sample (Hart et al., 2004). This is an important distinction because conversational language samples provide speech language pathologists with information about the child's communication in a conversational setting. Another reason that standardized assessment testing methods need to be supplemented with additional information from a conversational language sample is because standardized assessment methods require more complex verbal skills, which places children with LI at a disadvantage (Marinellie, 2004; Redmond, 2002). Because of the limited verbal participation by a child in a standardized language test, these tests may not accurately portray the interactive social language skills between a child and a conversational partner (Hart et al., 2004). Furthermore, the authors stated that future assessments of severity of impairment should involve observing children in naturalistic contexts in order to provide a better indication of the child's language ability.

Currently, there has been little research investigating the relation between how children perform in naturalistic language tasks and their social competence. One way to investigate children's language ability is in a naturalistic setting is through conversational language sampling. Schuele (2009) argues that SLPs gather the best naturalistic context when administering language samples with children who are receiving services. Past research has included looking at vocabulary, complex syntax, and social competence on standardized tests more in children with LI, but has not addressed the relation of shyness to language skills from language samples (Slomkowski, Nelson, Dunn, & Plomin, 1992).

Purpose and Research Question

The purpose of this study was to investigate parental ratings of children's social behaviors specifically in regards to shyness and "speech language impaired" children's production of complex syntactic structures in conversational speech.

Complex syntactic utterances from a collection of spontaneous language samples from children with LI were examined. Spontaneous language samples were used in this study because conversational language samples provide children the opportunity to produce complex syntactic structures in a naturalistic context (Marinellie, 2004). Moreover, language sampling has been used to establish norms and provide information about a child's language development (Marinellie, 2004; Rice et al., 2010). Marinellie (2004) found that language samples containing 100 utterances for elementary school-age children adequately yielded various clause types (e.g., adverbial, relative, or infinitive) that demonstrate children's syntactic abilities. The development of complex syntax in

school-age children is an essential aspect of daily interactions (Marinellie, 2004; Schuele & Tolbert, 2001). Therefore, this study addressed the following question:

Is there a relation between "speech language impaired" children's complex syntactic productions and parental ratings of social behaviors? Specifically, this question was addressed by examining impaired children's production of conjoined clauses, subordinate clauses, and embedded clauses in conversational language samples in relation to parent's behavioral ratings on the *Social Responsiveness Scale (SRS)*. It was hypothesized that there would be a significant a negative relation between complex syntactic production and parental ratings of social behaviors related to shyness, such that children with lower complex syntactic abilities would have higher levels of withdrawn behaviors.

CHAPTER III

METHODS

Participants

Eight school-age children, three boys and five girls between four and eight years

of age, (M=6;6, SD=1;4) and their parents were recruited from the Oklahoma State

University Speech-Language-Hearing Clinic to participate in this study. In order to be

included, these children had been diagnosed with a speech and/or language impairment,

were receiving speech-language therapy services and had parents willing to participate.

Measures

Social Responsiveness Scale

The *Social Responsiveness Scale* (*SRS;* Constantino & Gruber, 2005) is a 65-item

rating scale that measures the severity of social impairment associated with autism

spectrum disorders. The *SRS* is primarily used for children of the ages 4-18 years, takes

approximately 15 minutes to administer, and provides a quantitative outlook of social

impairment across a wide range of severity. It is a standardized, parent reporting measure

developed to assess autistic behaviors and determine social behavior impairments (Constantino & Gruber, 2005). There are five treatment subscales in the *SRS*, which include social awareness, social cognition, social communication, social motivations, and autistic mannerisms. For this study, the Social Motivation subscale was the subscale of interest because it measures the extent to which a child is motivated to "engage in social-interpersonal behavior" and includes elements of social anxiety, inhibition, and empathic orientation (Constantino & Gruber, 2005, p.17). This subtest most reflected the essence of "shyness." The authors state that *T*-scores of 60 and higher on any subscale on the *SRS* may reflect deficits significant enough to warrant attention in treatment programs. The answers on the *SRS* consisted of the parents rating the behavior as 'not true,' 'sometimes true,' 'often true,' or 'almost always true.'

Procedures

Families were approached at the Oklahoma State University Speech-Language-Hearing Clinic and were read the IRB approved script for recruitment. When they volunteered, parents left their contact information and an appointment was later arranged for the parent interview and child language sample. On their appointment date, parents arrived at the Oklahoma State University Speech-Language-Hearing Clinic where interviews were conducted. During those parental interviews, the child's language sample was being obtained as well. Parents were administered the *Social Responsiveness Scale* (*SRS*; Constantino & Gruber, 2005). The research assistant read this questionnaire aloud to the parents and marked the answers given by the parents. Interviews lasted

approximately 30-45 minutes. Following their administration, the assessments were scored, analyzed, and double-checked by two research assistants.

Children who participated took part in a conversational language sample. Children's assent was obtained prior to the collection of the conversational language sample. The child was asked to play with a dollhouse along with toy animals and toy people. The examiner interacted with the child and facilitated the language sample. Language sampling took 20-30 minutes in order to obtain the minimum of 100 complete and intelligible child utterances (Rice et al., 2010).

Language Samples with Complex Syntax Coding

Following language sample collection, two different research assistants transcribed the language samples. After the samples were transcribed, an impartial statistician completed an utterance level reliability on each sample. Following the reliability check, the utterances in the language sample were coded according to the Schuele (2009) Complex Syntax Coding Manual. The author of this paper completed initial coding of the language samples following a training period. The language samples were coded a second time by another trained coder. Differences in coding were reconciled between the first and second coders. Following coding, the language samples were analyzed with *Systemic Analysis of Language Transcriptions* (*SALT*; Miller, 2010). A total of 111 total utterances were analyzed for each child in order to have an equal amount of analyzable utterances amongst the different samples. Each complex syntax code counted as one production.

This study identified complex syntax as defined in the Complex Syntax Coding Manual (Schuele, 2009). Schuele (2009) notes that the unit of interest used for analysis is at the utterance level rather than at the sentence level because in a naturalistic setting, people do not speak in sentences, but speak in utterances. Language samples in this study were coded according to the type of clause produced.

Clauses to be coded were the following from Schuele (2009):

I. Conjoined clause- the linking of two clauses joined by a coordinate conjunction – *and, but, or*

II. Subordinate clause- a type of dependent clause that uses subordinate conjunctions (e.g., *after, although, because, if, etc.*)

III. Embedded clause- when one clause is placed within another clause (many embedded clauses are complement of a verb).

    A. Infinitival clause- clauses that are verb complements and are arguments of a complement taking verb (e.g., *need, want, try*).

    B. Wh clausal complement- clauses that begin with the words *when, what, where, how,* and are complements of cognitive state verbs.

    C. Full propositional complement (clausal complement)- finite embedded clauses that serve as a complement for cognitive state verbs (e.g., *know, wonder, think, guess, pretend, etc.).*

    D. Relative clause- clauses that modify nouns, usually immediately follows the noun that it modifies.

    E. Participle clause- nonfinite clauses that include a part participle or present participle

Table 2 contains the codes and examples of the types of structures that were

analyzed in the language samples.

Table 2

Clauses to Code for Complex Syntax

Type of Clause	Example
1. Conjoined clause	I went to the store and I bought a new dress.
2. Subordinate clause	I went to the store because I needed a new dress.
3. Reduced infinitives	I wanna go play.
4. Marked infinitival clause	I want to go to the store.
5. Unmarked infinitival clause	I made him bake me cookie.
6. Let's, lemme, let me	Bill let Mary drive the car.
7. WH nonfinite clausal complement	He doesn't know where to go.
8. WH finite clausal complement	He doesn't know where he is going.
9. Full propositional complement or clausal complement	Mom knows if you are in trouble.
10. Subject relative clause	The man that drove the car is a policeman.
11. Other relative clause	The reason why/that you are leaving is not clear to me.
12. Nominal or headless relative clause	This is where I put my shoes.
13. Participle clause	Meat cooked on the grill tastes good.

Note: Adapted from "Complex Syntax Coding Manual," by C.M. Schuele, 2009. Unpublished manuscript.

Statistical Procedures

Statistical analysis was performed on the participants' *SRS* social motivation

subscale scores and their total syntactic complexity. Inter-rater reliability measures of the

language samples data were calculated. *T*-scores from the social motivation subscale of

the *SRS* for each individual participant were analyzed for impairment and grouped as

being socially motivated or socially unmotivated.

A two-tailed Wilcoxon Matched Pairs test was calculated on the parents' ratings

of their children's shy behavior, and their children's total complex syntax productions.

An additional Wilcoxon Matched Pairs test was used to verify that there was a significant

difference between the two groups and their scores on the social motivation subscale of

the *SRS*. Due to the population tested, speech and language disordered children, and the

small sample size, normal distribution could not be assumed and therefore parametric

statistics were considered inappropriate for this study.

CHAPTER IV

FINDINGS

The purpose of this study was to determine if there was a relation between parental ratings of children's social behaviors specifically in regards to shyness and children's production of complex syntactic structures in conversational speech.

A two-tailed Wilcoxon Matched Pairs Test analysis was performed on the mean data from the two groups based on impairment or no impairment on the *SRS* social motivation subscale. An additional test was calculated to examine each group's mean syntactic complexity productions. This analysis was chosen to determine whether there was a significant difference between the parents' ratings of their children and their children's total complex syntax productions. The data was analyzed using the *Statistical Package for the Social Sciences* (SPSS) to determine statistical significance.

Reliability Results

To ensure consistent language sample transcription between the two transcribers, interrater reliability was determined. An impartial statistician completed an utterance level reliability on each sample. The overall result from the interrater reliability for the language samples was 89% indicating that the language samples were transcribed with high reliability.

Additionally, interrater reliability was used to confirm the consistency of analysis of the language sample for complex syntax codes. Two coded language samples were chosen and compared for interrater reliability. The results of the similarity of language sample coding between the two coders were 92% and 94% indicating high reliability.

T-Scores on the Social Motivation Subscale of the SRS

The analyses of the descriptive results provided information about participants' *T*-scores on social motivation subscale of the *SRS* as well as participants' total complex syntactic production scores.

The *SRS* social motivation subscale data, as shown in Table 3, was used to group the children. The groups were: 1) socially motivated (for *T*-scores below 60) and 2) socially unmotivated (for *T*-scores 60 and above; this was also the group with the impairment).

Table 3

T-Scores for Participants for Social Motivation Subscale of the SRS

Participant	*SRS* Social Motivation
1	49
2	**61**
3	**60**
4	**67**
5	50
6	50
7	42
8	**84**
Note. Entries based on *T*-scores ($M = 50$, $SD = 10$)	

Complex Syntax Scores

Table 4 shows participants' total complex syntactic productions as coded from the language samples. The highlighted participants' total complex syntactic productions correspond to the socially unmotivated group based upon their scores on the *SRS* social motivation subscale.

Table 4

Total Complex Syntactic Productions of Participants

Participant	Total Complex Syntax
1	20
2	**6**
3	**23**
4	**45**
5	2
6	10
7	16
8	**45**

SRS Social Motivation Subscale Between Two Groups

The mean rank results of the *SRS* social motivation subscale were 2.5 for the

socially motivated and 6.5 for the socially unmotivated group as shown in Table 5. This

indicated that the mean of the scores on the *SRS* social motivation subscale for the

socially unmotivated group was 2.6 times greater than that of the socially motivated

group. The results from the two-tailed analysis on the *SRS* social motivation subscale

indicated a statistically significant difference between the two groups ($p < .02$) as shown

in Table 5.

Table 5

Mean Rank of Socially Motivated and Socially Unmotivated Groups for SRS

Motivation Group	No. of Participants	Mean Rank	Sum of Ranks	Asymp. Sig. (2-tailed)
Socially Motivated	4	2.50	10.00	.020
Socially Unmotivated	4	6.50	26.00	

Total Complex Syntactic Productions Between Two Groups

The mean rank results of syntactic complexity produced for the two groups were

3.25 for the socially motivated and 5.75 for the socially unmotivated group as shown in

Table 6. This indicated that the mean of the complex syntax scores for the socially

unmotivated group was 1.8 times greater than that of the socially motivated group. The

results from the one-tailed analysis on the complex syntax scores approached, but did not

achieve, statistical significance at the .07 level ($p < .073$) (as shown in Table 6).

Table 6

Mean Rank of the Syntactic Complexity for the Two Groups

Motivation Group	No. of Participants	Mean Rank	Sum of Ranks	Asymp. Sig. (1-tailed)
Socially Motivated	4	3.25	13.00	.073
Socially Unmotivated	4	5.75	23.00	

CHAPTER V

CONCLUSION

Shyness, as a subtype of withdrawn behavior, is one aspect of social behavior that

has been investigated in children with LI. A possible negative outcome of shyness in

children with LI is that because their language abilities are less advanced this could result

in an increase in social anxiety due to communication deficits during peer interactions.

One example of language ability difference between children with LI and typically

developing children is their use of syntax. Because of this difference in complex syntax,

children with LI may stand out from TD children during peer interaction and this may

affect the motivation of children with LI to socially interact with others.

Hence, the goal of this study was to investigate if there was a relation between

"speech language impaired" children's production of complex syntactic structures in

conversational speech and parental ratings of children's withdrawn behavior, specifically

the subtype shyness. This question was addressed by examining LI children's production

of conjoined clauses, subordinate clauses, and a variety of embedded clauses in

conversational language samples in relation to parent's behavioral ratings on the social

motivation subscale of the *Social Responsiveness Scale (SRS).* This study was conducted

because of the potential impact shyness has on language developments and social skills,

such that shy children with LI may increasingly lag behind typically developing (TD)

peers in socio-communicative skills because of their anxiety when interacting with others (Coplan & Armer, 2005). The research question was "if a child already has a documented language impairment, is shyness related to the severity of the impairment in complex syntax?"

Interpretation of Findings

The results of this study found no statistically significant relation between the complex syntax and "shyness" as judged by parents in children with disordered speech and language or "LI children." In fact, the results indicated that there was a trend for children with more withdrawn social behaviors to display greater syntactical complexity. This trend approached statistical significance at the .07 level on a one-tailed test. For children in this study, the greater the complex syntax exhibited by a child, the less socially motivated that child was as scored by parents on the *SRS* social motivation subscale. This was contrary to our initial hypothesis, but was similar to findings by Hart, Fujiki, Brinton, and Hart (2004). In that study, the authors used standardized language tests and teacher behavioral ratings. They found that overall children with LI had high levels of shyness, but the severity of the language impairment was not related to the level of shy behaviors.

A possible explanation for the lack of statistical significance could have been due to an outlier in the socially unmotivated group who received a score of six for complexity of syntax, but was judged as "at risk" for being socially unmotivated (with a *T*-score of 61 on the social motivation scale of the *SRS*).

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An additional explanation may have been the use of parental reports for rating the behaviors of their children. If teacher ratings were used there may have been a difference in the scoring of the child as being "shy" or "not shy" especially since the teachers are able to observe the child in another setting (e.g., school). Another additional explanation may have been the setting that the participants were recruited from.

Limitations and Future Directions

Although this study was conducted in order to determine whether reduced syntactical complexity was related to "shy" behavior in children with speech and/or language disorders, findings did not support this hypothesis. Limitations in this study included small sample size and participants recruited from the same site. There were only four participants categorized as "shy" and four participants categorized as "not shy." If there were more participants, statistical significance might have been achieved. The setting could have also limited the study as well because these children interacted with unfamiliar people during the language sample. Along with this, other factors that might affect complex sentence structure development and social skills such as nonverbal IQ and length of time in speech therapy were not looked at.

Future studies should investigate if more complex syntactic skills are significantly related to greater impairment in social motivation (as was the trend in this study) and include more participants with language impairment from a variety of settings. Teacher ratings of participants as well as parent ratings could be analyzed. The current study found that children with greater productions of complex sentence structure trended

toward more withdrawn behavior or were less motivated to interact. It would be interesting to investigate if a higher nonverbal IQ and/or cognitive awareness of language differences would result in more withdrawn, "shy" behavior. Language sample data could also be gathered at a home setting with the child communicating with parents or siblings that the child is familiar with and could use different types of language sample procedures such or narratives or story retelling which can result in more complex sentence structures. Other factors that could be investigated for its impact on complex syntax skills could include parental communication style with the child, expanding the age range of the participants (e.g., older children who should have a greater number of complex forms of language), and the number of years the child participated in speech therapy.

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Oklahoma State University Institutional Review Board

Date: Tuesday, April 06, 2010

IRB Application No   AS1028

Proposal Title: Parental Participation in Children's Speech-Language Treatment

Reviewed and   Expedited
Processed as:

Status Recommended by Reviewer(s): Approved   Protocol Expires: 4/5/2011

Principal
Investigator(s):

Andrea Ash   Natalie Jo Hurst
042 Murray   042 Murray
Stillwater, OK 74078   Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.
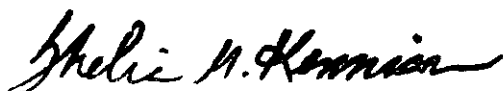
☑ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Shelia Kennison, Chair
Institutional Review Board

Oklahoma State University Institutional Review Board

Protocol Expires: 4/5/2011

Date   Tuesday, October 12, 2010

IRB Application No: AS1028

Proposal Title: Parental Participation in Children's Speech-Language Treatment

Reviewed and   Expedited
Processed as:
                             Modification

Status Recommended by Reviewer(s)   **Approved**

Principal
Investigator(s) :

Andrea Ash
042 Murray
Stillwater, OK 74078

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

Signature :

Shelia Kennison, Chair Institutional Review Board

Tuesday, October 12, 2010
Date

VITA

Patty I-Tyng Liu

Candidate for the Degree of

Master of Science

Thesis: COMPLEX SYNTAX AND WITHDRAWN BEHAVIOR IN CHILDREN

Major Field: Communication Sciences and Disorders

Biographical:

Education:

Completed the requirements for the Master of Science in your major at Oklahoma State University, Stillwater, Oklahoma in May, 2012.

Completed the requirements for the Bachelor of Arts in Economics at University of California, Irvine, California in 2004.

Experience:

Administered speech, language, and cognitive evaluations to children and adults ranging in disorder and severity and provided subsequent treatment in clinic and hospital settings.

Professional Memberships:

Member of the National Student Speech-Language Hearing Association since 2011.

Name: Patty I-Tyng Liu   Date of Degree: May, 2012

Institution: Oklahoma State University   Location: Stillwater, Oklahoma

Title of Study: COMPLEX SYNTAX AND WITHDRAWN BEHAVIOR IN
                        CHILDREN

Pages in Study: 33   Candidate for the Degree of Master of Science

Major Field: Communication Sciences and Disorders

Scope and Method of Study:

        This study investigated the relationship language impaired (LI) children's
production of complex syntactic structures in conversational speech and parental ratings
of children's social difficulties, specifically withdrawn behavior's subtype of shyness.
The purpose of this study was to determine if there was negative relationship between
complex syntactic production and parental ratings of social behaviors, such that children
with lower complex syntactic abilities would have higher levels of withdrawn behaviors.
        Eight school-aged LI children and a parent of each child participated in this study.
Parents were administered the *Social Responsiveness Scale*. Children who participated
took part in conversational language sample. The language samples were then
transcribed and coded complex syntax using the Complex Syntax Coding Manual by
Schuele (2009). Following coding, the language samples were analyzed with *Systemic
Analysis of Language Transcriptions* (*SALT*; Miller, 2010).

Findings and Conclusions:

        Results indicated that there was no relationship between the lack of complex
syntax and "shyness" as judged by parents. In fact, the results indicated that there was a
trend for LI children with more withdrawn social behaviors to display greater syntactical
complexity. For children in this study, the greater the complex syntax exhibited by a
child, the less socially motivated that child would be. However, statistical significant
achievement did not occur. These results went against the original question posed by the
researcher, but were similar to the findings by Hart, Fujiki, Brinton, and Hart (2004).

ADVISER'S APPROVAL: Dr. Cheryl L. Giddens