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Relationship Between a Measure of Social and Emotional Development and Early
Communication Development in Young Children with Cleft Palate

A thesis
presented to
the faculty of the Department of Audiology and Speech-Language Pathology
East Tennessee State University

In partial fulfillment of the requirements for the degree
Master of Science in Communicative Disorders with a concentration in Speech-Language
Pathology

by
Jenna L. Pugh
August 2013

Nancy J. Scherer, Ph.D., Chair
A. Lynn Williams, Ph.D.
Kerry Proctor-Williams, Ph.D.

Keywords: CLP, toddler, social-emotional development, speech, language

ABSTRACT

Relationship Between a Measure of Social and Emotional Development and Early Communication Development in Young Children with Cleft Palate

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Jenna L. Pugh

This study was an examination of responses to a standardized assessment of social-emotional behaviors and correlation with speech and language development in young children with cleft palate and/or lip. Twenty-eight participants aged 14-35 months with nonsyndromic cleft palate and/or lip were included in this study. The *Infant-Toddler Social and Emotional Assessment* (ITSEA) was used to identify emerging social and emotional behaviors. Descriptive analysis of ITSEA results was completed. Pearson correlation coefficient and effect size estimates were calculated between ITSEA domain raw scores and measures of speech and language development. A small proportion of participants (14%) showed ITSEA scores beyond the test cut-off scores across all domains ; 43% demonstrated concerns at the subdomain level. Correlational analysis indicated significant relationships between Externalizing, Dysregulation, and Competence Domains and speech accuracy and language measures. Interpretation of the outcomes suggests that early social emotional behaviors are emerging simultaneously with speech and language skills during early communicative development.

TABLE OF CONTENTS

	Page
ABSTRACT	2
Chapter	
1. INTRODUCTION	5
Speech and Language Development.....	5
Early Social Development and Behavioral Concerns.....	8
Research Questions.....	11
2. METHODS	13
Participants.....	13
Screening	15
Assessment	16
Reliability	17
Analysis	18
3. RESULTS	21
Social-Emotional Deficits Identified by the ITSEA for Children with CLP	21
The Relationship Between Emotional Development and Speech-Language Development	24
Speech Measures	24
Language Measures	25
4. DISCUSSION	30
Presence of Emerging Social-Emotional Risk Factors in Children with CLP	30

Chapter	Page
Key Relationships Between Early Speech and Language and Social-Emotional Behaviors	
.....	31
Speech and Language Impairment Hypothesis	31
Concomitant Social-Emotional Behavior Development Hypothesis.....	33
Gender Differences	34
Limitations	35
Future Research	35
5. CONCLUSION	36
Clinical Implications	36
REFERENCES	37
VITA	44

CHAPTER 1

INTRODUCTION

The occurrence of cleft lip and/or palate (CLP) is estimated to be approximately 1 in every 600 births worldwide (Wyszynski, 2002) and 1 in 700 births in the United States (Kummer, 2011). The Centers for Disease Control and Prevention (CDC) (2012) estimate that in the US 4,437 babies are born each year with cleft lip or cleft lip and palate; approximately 2,651 babies are born each year with a cleft palate only. The presence of this commonly occurring birth defect can place the child at risk for future communication and social concerns throughout development.

Speech and Language Development

Speech and language delays are prominent characteristics of young children with CLP due in part to the structural abnormalities of the oral cavity and associated middle ear pathology caused by misalignment of the muscles that control Eustachian tube function (Collett & Speltz, 2006; Scherer & D'Antonio, 1997). Language delays have been seen in toddlers with cleft palate (Scherer & D'Antonio, 1997). The early language delays have been characterized as primarily vocabulary in nature (Broen, Devers, Doyle, Prouty, & Moller, 1998; Broen, Doyle, Moller, & Prouty, 1991). These vocabulary delays persist through preschool ages (Scherer & D'Antonio, 1997) and could potentially impact early academic and social development.

Speech production differences between children with CLP and children with typical development can be observed as early as 6 months of age when it has been noted that children with CLP babble later, less frequently, and with less complexity (Scherer, Williams, & Proctor-Williams, 2008). At the age of 9 months children with CLP have been found to not only babble

less frequently with fewer consonants in their repertoire, but marked differences have been noted regarding the characteristics of their babbling, in both placement and manner. Canonical babbling of children with CLP consists of predominately sounds produced in the glottal area, with less frequent velar and bilabial placement, and the frequency of stops, glides, and high pressure consonants is reduced (Chapman, Hardin-Jones, Schulte, & Halter, 2001).

As children reach 1 year of age they show delayed onset and acquisition of language milestones, which is associated with smaller consonant inventories, speech accuracy, and intelligibility (Chapman & Hardin, 1992; Scherer et al., 2008). Early speech and language intervention has proven to reduce speech sound errors, increase speech sound inventories, and increase vocabulary (Scherer, 1999; Scherer, D'Antonio, & McGahey, 2008; Scherer & Kaiser, 2007). Difficulties with speech production also impact the conversational skills of children with CLP. Children with CLP tend to be less “assertive” in conversation, have difficulty responding appropriately in conversation, and exhibit difficulty expanding on conversational topics relative to their nonleft peers (Frederickson, Chapman, & Hardin-Jones, 2006). These communicative deficits could lead to frustration during interaction and impact social development.

A model has been proposed to describe the factors contributing to slow speech and language development in children with CLP. The model, presented in Figure 1, suggests that reduced consonant inventories affect vocabulary acquisition due to limited consonants to differentiate words (Scherer, Williams, Kaiser, Frey, & Roberts, In preparation). Fewer words and reduced diversity of speech sounds in turn affect intelligibility which reduces the communication success of the child. Fewer communicative attempts made by these children give caregivers less opportunities to provide feedback to expand and correct the language and speech of their children (Scherer et al., In preparation). Some research emphasizes the

importance of parental input matching the child's current level of development and ability to process this information (Girolametto, 2002). A recent study of the effects of early intervention indicates that changes can be made in children's speech and vocabulary production through feedback that models, expands, and recasts speech and language (Scherer et al., In preparation). It is important to note that these changes rely on the children to engage communicatively with adults. Whether it is a mediating cause or a consequence of the cycle, communication attempts could be affected by social and emotional deficits.

It may be that differences in behavioral and social development contribute to individual differences in communication. Little is known about the early impact of behavioral and social development on communicative development of children with CLP. Delays in communicative development could cause frustration that results in behavioral and social problems and further impacts the children's ability to produce communicative attempts that are so essential for learning speech and language.

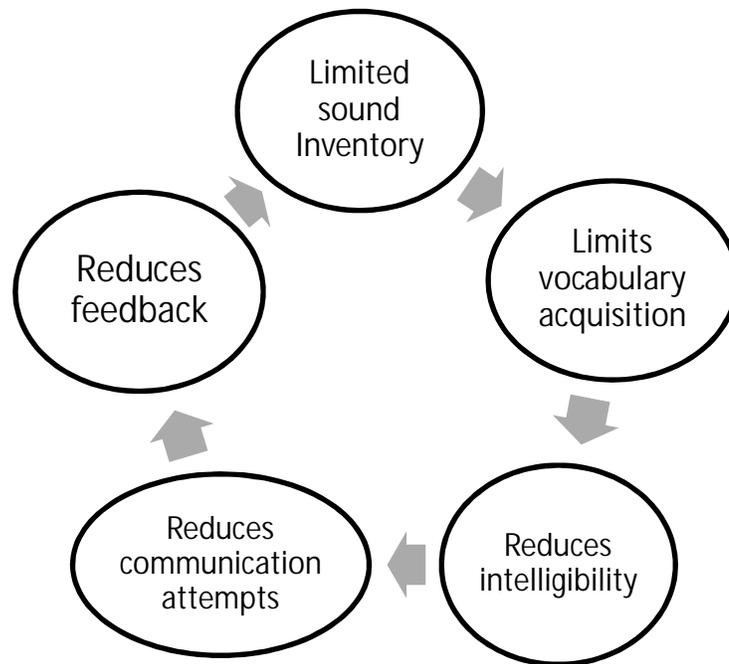


Figure 1. *Model of Early Speech/Language Development in Children with Clefts* (Scherer et al., In preparation). Illustrates the model proposed for demonstrating the effect each area of speech and language development in children with CLP has on the following factor. Communication attempts could be affected by social and emotional deficits.

Early Social Development and Behavioral Concerns

Research indicates that children with CLP show deficits in social and emotional development (Collett & Speltz, 2006; Demir, Karacetin, Baghaki, & Aydin, 2011; Montirosso et al., 2012; Murray et al., 2010). Differences between children with CLP and their typically developing peers have been noted as early as 2 months of age (Montirosso et al., 2012). At the age of 2 months, children with CLP were found to be less interactive with their mothers, made fewer attempts to communicate with their mothers, were less explorative of their environments, and tended to “exhibit more self-absorbed behavior” when compared to healthy infants (Montirosso et al., 2012, p. 245).

While it has been recognized that children with CLP demonstrate social and emotional concerns as infants (Montirosso et al., 2012), the majority of research has focused on these behaviors within the school-age and adolescent population (Collett, Cloonan, Speltz, Anderka, & Werler, 2012; Collett & Speltz, 2006; Murray et al., 2010; Richman & Millard, 1997; Schneiderman & Auer 1984; Turner, Thomas, Dowell, Rumsey, & Sandy, 1997). School-aged children present with behaviors that can be characterized by withdrawal or anxiety, per teacher and parent report, and observations also indicate difficulties with social relationships (Murray et al., 2010). These behaviors have been described as internalizing and include behaviors that indicate anxiousness and social withdrawal (Hymel, Rubin, Rowden, & Lemare, 1990). A frequent finding of past research indicates that children with CLP often show signs of internalizing behaviors resulting from others' negative response to their appearance (Collett & Speltz, 2006). Other researchers, however, have found some children with CLP present with internalizing while others demonstrate externalizing behaviors (Richman & Millard, 1997). Externalizing behaviors include aggression or other outward displays such as defiance (Hymel et al., 1990).

Age and gender appear to play a role in determining the type of behaviors used by the children. Notable differences in demonstration of externalizing and internalizing behaviors were found between children with and without CLP identified at age 6, but at age 7 no difference was observed between groups (Collett & Speltz, 2006). Conversely, Richman and Millard (1997) found that externalizing and internalizing behaviors increased between the ages of 7-12. They also found that externalizing behaviors were at much higher levels for boys at ages 6 and 7 and much lower than girls at ages 11 and 12. When comparing the use of internalizing behaviors, boys tended to present with a steady mild increase, whereas girls exhibited a gradual increase in

internalizing behaviors, which became significantly higher than boys by adolescence (Richman & Millard, 1997).

While the literature does support a higher occurrence of behavioral and emotional issues in children with CLP than in children with typical development, reports of the nature and severity of the behavioral problems are inconclusive. Furthermore, the cause of these behavioral issues in children with CLP who do not have other developmental issues is not understood. Using the *Behavior Problem Checklist* (Quay & Peterson, 1979), Schneiderman and Auer (1984) found that parents and teachers rated children with CLP, preschool-age to 9th grade, with concerns in four domains of assessment: (a) conduct (i.e., aggressive-type behaviors, deviance), (b) personality, (c) inadequacy-immaturity, and (d) socialized delinquency (i.e., does not feel guilty after misbehaving, lies, cheats, steals). Furthermore, it was discovered that the domains of conduct, personality, and socialized delinquency were judged as more of a problem as the child aged (Schneiderman & Auer, 1984). Collett and Speltz (2006) suggest that emotional and behavioral difficulties may become increasingly more problematic as the child ages. These problems appear to persist through adolescence and place children with nonsyndromic clefts at a higher risk for developing psychiatric disorders, such as social anxiety disorder and major depressive disorder, suggesting early intervention may prevent or reduce the effects of these deficits (Collett & Speltz, 2006; Demir et al., 2011). The occurrence of psychosocial problems in children with CLP is likely higher than is documented, stressing the importance of early identification (Turner, Rumsey, & Sandy, 1998).

Researchers agree that children with CLP often present with social or behavioral concerns (Collett & Speltz, 2006; Demir et al., 2011; Montirosso et al., 2012; Murray et al., 2010), but little research has focused on a means of evaluating these concerns within this

population, particularly in very young children. This study is an attempt to determine whether a standardized measure of early behavior differences can identify emerging social and emotional concerns in young children with CLP as measured by *The Infant-Toddler Social and Emotional Assessment* (ITSEA; Carter & Briggs-Gowan, 2006) identifies social, emotional, or behavioral concerns in toddlers with CLP. ITSEA is a 168-item questionnaire administered as parent or caregiver report or structured interview for children 12-35 months (Carter & Briggs-Gowan, 2006). The Dutch version of the ITSEA was given to a nationally representative sample of 926 children with and without disabilities in the Netherlands. The results revealed 7.6% of the sample had social-emotional or behavioral concerns (Velderman, Crone, Wiefferink, & Reijneveld, 2010). The ITSEA was successful at identifying social and emotional concerns of children with autism spectrum disorders or known internalizing or externalizing behavior disorders, with scores similar to other assessments given to assess these concerns (Visser et al., 2010).

The examination of the origins of social-emotional difficulties in children with CLP has focused on facial disfigurement primarily. Yet, it is known that communicative performance plays a significant role in social development. The relationship between social-emotional development and speech and language development in children with CLP has yet to be examined.

Research Questions

This correlational study aims to provide qualitative and quantitative information about the relationship between a measure of social emotional development (ITSEA) and speech and language measures for children under 3 years of age with nonsyndromic CLP. The following questions are addressed in this study:

- 1) Do children with CLP exhibit social-emotional deficits as measured by the ITSEA?
- 2) Is there a relationship between emotional development and speech or language development?

CHAPTER 2

METHODS

The data analyzed in this study were collected as part of a previous study conducted by Scherer and colleagues (in preparation). The procedures used in that study are described in the following sections.

Participants

Participants were recruited from three sites: East Tennessee Children's Hospital Cleft and Craniofacial Clinic (Knoxville, TN), East Tennessee State University (Johnson City, TN), and Vanderbilt University (Nashville, TN). Children were recruited from local and regional cleft palate teams, university speech and hearing clinics, local health departments, and early intervention agencies. All participants were followed regularly by a craniofacial or cleft team.

Children with CLP were included in this study if all of the following conditions were met:

- 1) 14-35 months of age
- 2) Joint attention appropriate for verbal engagement and imitation skills
- 3) Five distinguishable word approximations
- 4) Cognitive performance above a standard score ≥ 80
- 5) Primary palate repair at 15 months of age or earlier

Children were excluded from the study if they met any one of the following conditions:

- 1) Had a sensorineural hearing loss or sound field hearing thresholds over 30dB HL as measured by an audiologist
- 2) Were multilingual or non-English speaking per parent report,

- 3) Were internationally adopted
- 4) Had more than three additional dysmorphic features in addition to the cleft or a syndrome diagnosis from a geneticist.

Twenty-eight participants, 18 male and 10 female, were included in the study. The mean age of the participants was 23.4 months, with a mean age at palate repair of 10.7 months. Table 1 provides additional demographic information about the participants.

Table 1
Participants' Demographic Information

Characteristic	Descriptor	n/*age in months
Cleft type	Unilateral	14
	Bilateral	5
	Cleft palate only	9
Age of palate repair	Mean	*10.7 months
	Range	*7-15 months
Chronological age	Mean	*23.4 months
	Range	*14-34 months
Maternal education	Completed High School	4
	Trade School	1
	Some College	5
	2 Year Degree	4
	4 Year Degree	5
	Some Graduate School	2
	Graduate School	7
Gender	Male	18
	Female	10
Ethnicity	White, not Hispanic	25
	Black, not Hispanic	1
	Hispanic	1
	Asian/European	1

Screening

Children received an initial screening using the following measures administered by a speech-language pathologist (SLP):

- 1) *Bayley Scales of Infant and Toddler Development-III*, Cognition subtest (Bayley, 2005)
- 2) *MacArthur-Bates Communicative Development Inventory* (CDI; Fenson et al., 2007)
- 3) Speech screening of words elicited in imitation during play (a correct response rate of 70% or higher was considered a passing score)
- 4) 20-minute language sample of spontaneous speech to ensure that the child produced at least five words
- 5) Medical history form completed by parents
- 6) Hearing screening performed by a pediatric audiologist at East Tennessee State University Speech and Hearing Clinic, Bill Wilkerson Center of Vanderbilt University in Nashville, TN, or the University of Tennessee Speech and Hearing Clinic in Knoxville, TN.

Consent was obtained from the parents for participation in the study.

Children were seen in a clinical setting at the East Tennessee State University Speech-Language-Hearing Clinic, Vanderbilt Kennedy Center, or the University of Tennessee Speech and Hearing Center for assessment procedures.

Demographic information was obtained in a parent or guardian interview and a history form that provided information regarding medical and developmental history, gender, cleft type, and socioeconomic status of the parents, adhering to the protocol of Eilers et al. (1993).

Assessment

If a child passed the screening and met all criteria for inclusion in the study, an assessment of language, speech, and social and behavioral skills was conducted. All assessments were administered by an ASHA certified speech-language pathologist.

The Preschool Language Scale, Fourth Edition (PLS-4; Zimmerman, Steiner, & Pond, 2002) was administered as a general measure of receptive and expressive language skills and raw scores were used in data analysis. Raw scores were used in data analysis due to the increased sensitivity to individual differences relative to standard scores. A 20-minute total language sample of mother-child interactions, taken during snack (5 minutes), book reading (5 minutes), and play (10 minutes) using a standardized set of toys for all participants was completed. The samples were transcribed from video and audio tapes and analyzed using the Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 2007) to provide information about: (a) the total number of words produced, (b) the number of different words produced, (c) the mean length of utterance in morphemes (MLU), (d) total number of spontaneous utterances, (e) mean turn length, and (f) intelligibility. The total number of words on the Words Produced section of the CDI was administered to provide information regarding vocabulary development.

To assess speech skills, *The Profiles of Early Expressive Phonological Skills* (PEEPS; Williams & Stoel-Gammon, In preparation) was administered as a measure of single word production and Percent Consonants Correct (PCC) was calculated from the sample.

To assess social and emotional skills, the ITSEA was administered as a measure of social and emotional development and Domain mean raw scores were used in the analysis for all correlations. The ITSEA is a 168-item questionnaire completed by a parent. The format of the

assessment is a Likert Scale ranging from 0-2. The descriptors for each item score are as follows: 0 indicates not true or rarely, 1 indicates somewhat true or sometimes, and 2 indicates very true or often. The written instructions at the beginning of the assessment ask that the parents give the most appropriate response regarding their child's behavior in the last month. The ITSEA is made up of four Domains, and three to six subscales make up each Domain for a total of 17 subscales. The Externalizing Domain includes the following subscales: *Activity/Impulsivity*, *Aggression/Defiance*, and *Peer Aggression*. The Internalizing Domain includes the following subscales: *Depression/Withdrawal*, *General Anxiety*, *Separation Distress*, and *Inhibition to Novelty*. The Dysregulation Domain includes the following subscales: *Negative Emotionality*, *Sleep, Eating*, and *Sensory Sensitivity*. Lastly, the Competence Domain includes the following subscales: *Compliance*, *Attention*, *Mastery Motivation*, *Imitation/Play*, *Empathy*, and *Prosocial Peer Relations*. Each domain mean raw score corresponds to a *T* score for males or females. A *T* score ≥ 65 indicates a concern within problem domains (Externalizing, Internalizing, and Dysregulation), whereas a *T* score ≤ 35 indicates concern within the Competence Domain. A deficit within a subscale may or may not indicate the child has a deficit within the domain as a whole. For problem subscales, a mean raw score greater than or equal to the cut score indicates an area of concern, and a mean raw score less than or equal to the cut score indicates concern within the Competence subscales.

Reliability

For all standardized assessments (ITSEA and PLS-4) verification was completed to ensure that they were scored appropriately and entered into the database accurately. All assessments were scored by the examiner as well as a graduate student clinician to reduce scoring and procedure errors. Consensus was reached for all differences in scoring. Verification

and transcription reliability was completed for 25% of all language and speech samples by a speech–language pathologist not associated with the data collection and a second speech–language pathologist. Inter- and intra-rater reliability was completed for SALT and PEEPS transcriptions. Inter-rater reliability for PEEPS coding and scoring was 93% for participants included in the study while intra-rater reliability was 96%.. SALT reliability for the language samples yielded 90% for inter-rater and 94% for intra-rater reliability. Percent agreement was obtained and consensus established for disagreements in both speech and language samples.

Analysis

The first research question was: *Do children with CLP exhibit social-emotional deficits, as measured by the ITSEA?* This question was addressed through descriptive statistics by determining the number of participants and areas of concern within each Domain and subscale of the ITSEA.

The second research question was: *Is there a relationship between emotional development and speech or language development?* To address this question, Pearson correlations were used to evaluate the relationships among the following outcome measures:

1. The four Domain mean raw scores on the ITSEA:
 - a. Externalizing Domain
 - b. Internalizing Domain
 - c. Dysregulation Domain
 - d. Competence Domain
2. Speech accuracy
 - a. PCC based on words elicited using the PEEPS

- b. Average percent intelligibility taken from the 20-minute language sample.
3. Language skills:
- a. Language sample measures
 - i. MLU,
 - ii. Total number of words,
 - iii. Total number of different words,
 - iv. Total number of spontaneous utterances,
 - v. Mean turn length
 - b. CDI number of words produced
 - c. PLS-4 Auditory Comprehension and Expressive Communication raw scores.

Pearson's r correlation coefficients were calculated and outcomes examined in scatterplots for qualitative analyses. Effect size estimates were made for all statistical comparisons using the guidelines suggested by Cohen (1988); $r \geq 0.1$ was considered to be a small effect size, $r \geq 0.3$ was considered to be a moderate effect size, and $r \geq 0.5$ was considered to be a large effect size. Pearson's r correlation coefficients and p values were calculated using SPSS version 20.0 (SPSS, 2011). A p value < 0.05 was considered to be statistically significant. Gender differences were examined as well due to previous research findings that indicate differences in the occurrence of behaviors based on gender (Collett & Speltz, 2006; Richman & Millard, 1997).

A post hoc evaluation of the 95% confidence interval (CI) was conducted for all large effect sizes and statistically significant moderate effect sizes for an additional judgment of reliability using *Practical Meta-Analysis Effect Size Calculator* (Wilson, 2001; Lipsey & Wilson, 2001). When the 95% confidence interval for r does not cross 0, it suggests that it can be judged

as reliable. It indicates there is little variability across children in the effects observed, and the probability that the actual effect was 0 or less than observed is less than 5%.

CHAPTER 3

RESULTS

Two analyses were used to address the research questions posed in the study. To answer the first research question, which aimed to determine the presence of social-emotional concerns within this population, a descriptive analysis was conducted for children whose scores indicated concern about the four domains or 17 subscales of the ITSEA. The second question was designed to determine the relationship between social-emotional development and speech or language performance. To address this question Pearson's r correlation coefficients were calculated to determine the strength of the association between variables and estimate effect size using the guidelines suggested by Cohen (1988).

Social-Emotional Deficits Identified by the ITSEA for Children with CLP

Do children with CLP exhibit social-emotional deficits as measured by the ITSEA? This question was addressed by providing descriptive information about the number of participants whose scores indicated an area of concern on the ITSEA. The ITSEA has two levels for analysis, at the broad domain level (four domains) and subscale level (17 subscales). When examining the results for the children at the broad domain level 4 of the 28 (14%) children showed performance below the test cutoff scores, suggesting there were concerns about social and emotional skills. One child had an overall domain deficit in Externalizing, one in Internalizing, one in Dysregulation, and one in Competence.

The subscale information was more revealing. When subscales were included in the analysis, more participants were identified with social or emotional deficits in specific areas within domains. In total, 12 of the 28 children (43%) were rated as having deficits in one or more

subscales. Six children showed deficits on one subscale; 1 child showed deficits on two subscales; 3 children showed deficits on three subscales; 1 child showed deficits on four subscales; 1 child showed deficits on five subscales. In an effort to determine the specific areas of concern, the subscales were also included in this analysis. Table 2 indicates the number of children whose scores indicate concern in each of the ITSEA Domains and subscales.

Table 2
Number of Participants' Scores Indicating Concern within Domains and Subscales of ITSEA

Domain/ <i>Subscale</i>	Number of Participants
Externalizing Domain	1
<i>Activity/Impulsivity</i>	0
<i>Aggression/Defiance</i>	1
<i>Peer Aggression</i>	0
Internalizing Domain	1
<i>Depression/Withdrawal</i>	2
<i>General Anxiety</i>	2
<i>Separation Distress</i>	1
<i>Inhibition to Novelty</i>	1
Dysregulation Domain	1
<i>Negative Emotionality</i>	2
<i>Sleep</i>	1
<i>Eating</i>	4
<i>Sensory Sensitivity</i>	2
Competence Domain	1
<i>Compliance</i>	1
<i>Attention</i>	1
<i>Mastery Motivation</i>	2
<i>Imitation/Play</i>	2
<i>Empathy</i>	3
<i>Prosocial Peer Relations</i>	1

The subscales of the Externalizing Domain include: *Activity/Impulsivity*, *Aggression/Defiance*, and *Peer Aggression*. As shown in Table 2, one participant was found to have an area of concern within the Externalizing Domain as a whole, and another participant had an area of concern in just the *Aggression/Defiance* subscale.

The Internalizing Domain is comprised of four subscales that are: *Depression/Withdrawal*, *General Anxiety*, *Separation Distress*, and *Inhibition to Novelty*. As indicated in Table 2, one participant was found to have concern within the Internalizing Domain, as a whole. On the subscales alone, at least one participant was found to have concerns in each of the subscales. Two participants' scores indicated a concern in the *Depression/Withdrawal* subscale and one of these participants was identified with deficits in the Internalizing Domain. Two participants were found to have areas of concern in the *General Anxiety* subscale, and one of these participants was found to have deficits in the Internalizing Domain as a whole. One participant was found to have an area of concern within each of the *Separation Distress* and *Inhibition to Novelty* subscales, respectively.

The Dysregulation Domain's four subscales are: *Negative Emotionality*, *Sleep*, *Eating*, and *Sensory Sensitivity*. As Table 2 indicates, one participant was found to have concern in the Dysregulation Domain as a whole, and nine participants were found to have concerns in the subscales that comprise this domain. Each subscale of this domain was a specific area of concern for at least one participant. Two children were found to have concerns within the *Negative Emotionality* subscale. One participant was found to have concerns in the *Sleep* subscale concerns in the Dysregulation Domain as a whole. Four participants were found to exhibit concerns in the *Eating* subscale, including the participant who was found to have concerns in the Dysregulation Domain as a whole. Within the last subscale of the Dysregulation Domain,

Sensory Sensitivity, two participants were found to demonstrate concerns in this area. One of these participants was found to have concerns in the Dysregulation Domain.

The Competence Domain is made up of six subscales that are: *Compliance*, *Attention*, *Mastery Motivation*, *Imitation/Play*, *Empathy*, and *Prosocial Peer Relations*. As displayed in Table 2, one participant was found to have concerns within the Competence Domain as a whole, and six participants' scores indicated concerns in the subscales of the Competence Domain. Each of the subscales was found to be an area of concern for at least one participant. One participant was found to have deficits in the area of *Compliance*. One participant was found to have deficits in *Attention* subscale and the Competence Domain. Two participants were found to exhibit deficits in the *Mastery Motivation* subscale, including a participant who fell below the cut-off score in the Competence Domain. Two participants were identified as demonstrating concerns in the *Imitation/Play* subscale, which includes a participant who demonstrated concerns in the Competence Domain. Three participants were found to exhibit concerns in the *Empathy* subscale, and one of these participants was found to have concerns in the Competence Domain as a whole. One participant was found to have concerns in the *Prosocial Peer Relations* subscale.

The Relationship Between Emotional Development and Speech-Language Development

Speech Measures

The second research question was designed to investigate the relationships between emotional development and speech or language. Table 3 displays the Pearson r correlation coefficients for the speech and language measures and ITSEA domain scores for all children.

PCC was found to have a moderate correlation with the Externalizing Domain, as illustrated in Figure 2, but did not reach the level of statistical significance. A positive correlation

with large effect sizes was found between the Externalizing Domain and PCC for both genders, as indicated in Table 4. When gender was examined, a positive relationship with large effect size was found between PCC and the Dysregulation Domain, which approached significance for males. No significant gender differences were noted for the association between intelligibility and ITSEA domains.

A statistically significant relationship was found between PCC and the Dysregulation Domain of the ITSEA. Figure 3 illustrates a positive and statistically significant correlation ($r=0.52, p=0.04$) with a large and reliable effect size between PCC and the Dysregulation Domain, and the data indicate that Dysregulation behaviors increase with PCC. The 95% confidence interval for r was 0.03 to 0.8066.

Language Measures

No significant relationships were found between the Externalizing Domain and language measures when all participants were combined, as indicated in Table 3; however, when gender differences were examined, as shown in Table 4, a significant correlation was found between the Externalizing domain and MLU for males ($r=0.53, p= 0.03$), with a large and reliable effect size. The 95% confidence interval for r was 0.0789 to 0.7967. This suggests that as males produce more complex utterances their externalizing behaviors increase.

Table 3 shows statistically significant correlations, with moderate and reliable effect sizes, between the Dysregulation Domain and several language sample measures including MLU ($r= 0.47, p= 0.01, 95\% CI= 0.1096$ to 0.7212), total number of words produced ($r= 0.44, p= 0.02, 95\% CI=0.072$ to 0.7025), and number of different words produced ($r= 0.39, p= 0.05, 95\%$

CI= 0.007 to 0.668). The correlation between the Dysregulation Domain and mean turn length approached significance and had a moderate effect size.

When gender differences were examined, a statistically significant, positive correlation with a large, reliable effect size was found between the total number of words produced and the Dysregulation Domain for males ($r= 0.52, p= 0.03$). The 95% confidence interval for r was 0.0715 to 0.7946. A moderate correlation between the Dysregulation Domain and the total number of different words approached significance for males. Mean turn length and the Dysregulation Domain were positively correlated with large effect size for females, but not statistically significant.

Several significant relationships were found between language measures and the Competence Domain. The Competence domain was found to have a statistically significant positive correlation of moderate, reliable effect size with PLS-4 Auditory Comprehension ($r= 0.42, p= 0.03$), which indicates receptive language performance improves as competence behaviors increase. The 95% confidence interval for r was 0.0496 to 0.6824. Other associations, with moderate effect sizes, that approached significance included the Competence Domain with Expressive Communication (PLS-4) and mean turn length. Gender differences were found for total number of spontaneous utterances, total number of different words, mean turn length, and Words Produced (CDI) and Competence domain. A significant, positive correlation with large, reliable effect size was found between mean turn length and the Competence Domain for males ($r=0.54, p= 0.02$). The 95% confidence interval for r was 0.102 to 0.8056. The moderate association found between Auditory Comprehension (PLS-4) and the Competence Domain for both genders, as indicated in Table 4, approached significance for males. A positive relationship, with moderate effect size, approaching significance was found between CDI Words Produced

and the Competence Domain for males. No statistically significant association was found between Competence Domain and the language measures for females.

Table 3

Pearson's Correlation Coefficients (r) for Speech and Language Measures and all ITSEA Domains

Instrument/measure	Externalizing	Internalizing	Dysregulation	Competence
PCC PEEPS	0.419*	0.078	0.518**#	-0.074
Language Sample intelligibility	0.142	0.252	0.164	0.099
Language Sample MLU	0.235	0.188	0.470**#	0.145
Language Sample # of spontaneous utts.	0.034	-0.320*	0.172	-0.084
Language Sample total # of word produced	0.142	0.107	0.440**#	0.189
Language Sample # of different words	0.098	-0.046	0.386**#	0.278
Language Sample mean turn length	-0.023	-0.069	0.361*	0.345*
PLS-4 Auditory Comprehension	-0.120	-0.027	0.228	0.415**#
PLS-4 Expressive Communication	0.037	-0.112	0.256	0.343*
CDI Words Produced	0.015	-0.147	0.245	0.313*

*Note: * Indicates moderate effect size, **Indicates large effect size, # Indicates $p < .05$, indicates CI that did not cross "0" and was considered to be reliable*

Table 4

Pearson's Correlation Coefficients (r) for Speech and Language Measures and all ITSEA Domains: Gender Differences

Instrument/measure	Externalizing	Internalizing	Dysregulation	Competence
	M/F	M/F	M/F	M/F
PCC PEEPS	0.564**/0.533**	-0.163/0.179	0.665**/0.380*	0.209/-0.240
Language Sample intelligibility	0.088/0.257	0.247/0.278	0.037/0.418*	0.218/-0.266
Language Sample MLU	0.527**# /0.087	0.163/0.223	0.398*/0.615**	0.040/0.269
Language Sample # of spontaneous utts.	-0.023/0.249	-0.248/-0.414*	0.271/0.006	0.001/-0.450*
Language Sample total # of word produced	0.349*/0.144	0.088/0.166	0.521**# /0.446*	0.220/0.011
Language Sample # of different words	0.281/0.067	-0.152/0.033	0.426*/0.399*	0.383*/0.045
Language Sample mean turn length	0.103/0.016	-0.098/-0.051	0.285/0.518**	0.543**# /-0.018
PLS-4 Auditory Comprehension	-0.145/0.043	-0.172/0.098	0.013/0.464*	0.419*/0.337*
PLS-4 Expressive Communication	0.216/-0.073	-0.131/-0.161	0.206/0.248	0.361*/0.157
CDI Words Produced	0.178/-0.038	-0.176/-0.191	0.279/0.142	0.424*/0.079

Note: * Indicates moderate effect size ($r \geq .3$), **Indicates large effect size ($r \geq .5$), # Indicates $p < .05$, ## Indicates $p < .01$, indicates CI that did not cross "0" and was considered to be reliable

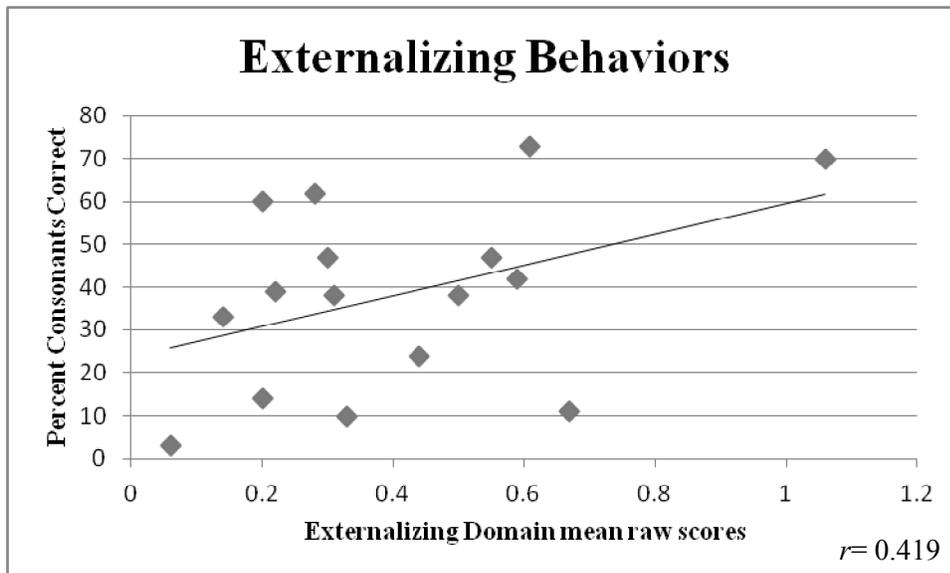


Figure 2. Comparison of Externalizing mean raw scores to Percent Consonants Correct for children with CLP. This figure illustrates the positive relationship found between percent consonants correct and the Externalizing Domain of the ITSEA.

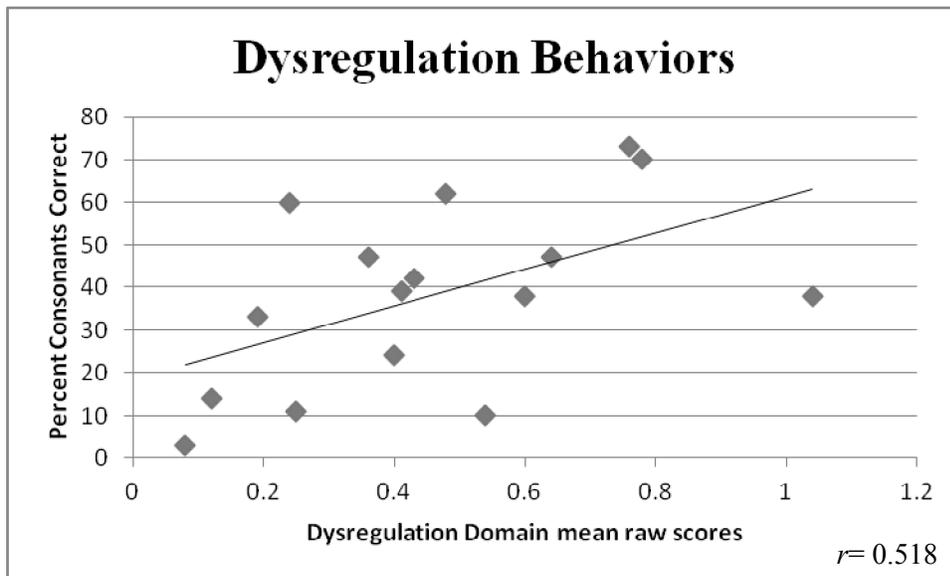


Figure 3. Comparison of Dysregulation mean raw scores to Percent Consonants Correct. This figure illustrates the positive relationship found between percent consonants correct and the Dysregulation Domain of the ITSEA.

CHAPTER 4

DISCUSSION

The purpose of this study was to provide preliminary information regarding the presence of social or emotional deficits as well as determine the existence of relationships between social and emotional development and speech and language performance for young children with CLP.

Presence of Emerging Social-Emotional Risk factors in Children with CLP

Past research findings have indicated the presence of emerging social interaction concerns in infants with CLP. These findings indicated that the children were less interactive and made fewer communicative attempts with their mothers (Montirosso et al., 2012). Social and behavioral concerns have also been identified in school-age children and adolescents with CLP (Collett et al., 2012; Collett & Speltz, 2006; Murray et al., 2010; Richman & Millard, 1997; Schneiderman & Auer 1984; Turner et al., 1997). These behaviors have been classified as externalizing and internalizing behaviors within the school-age population (Collett & Speltz, 2006; Hymel et al., 1990; Richman & Millard, 1997). The present study was an examination of the presence of these emotional and behavioral issues in toddlers with CLP. The ITSEA was used as a means of identifying these concerns in toddlers with CLP in the present study. The findings of this study indicate that the predominant social-emotional behaviors that are present in toddlers with CLP were incompetent (does not follow rules, does not do as asked, has short attention span , does not imitate gestures, does not show empathy, plays well with other children, etc.) and dysregulating (difficult to soothe, tantrums until exhausted, often angry or irritable when not tired, difficulty sleeping, difficulty eating, demonstrates sensory sensitivity, etc.) behaviors. Although a small proportion of children with CLP were identified with social and emotional concerns based on the ITSEA, the Competence Domain was more frequently

identified than any other domain as an area of concern in this population. The subscale with the most frequently indicated area of concern was the *Eating subscale* within the Dysregulation Domain. Aside from eating difficulties, though, these findings indicate that toddlers with CLP still have social-emotional difficulties primarily with self-regulating their behaviors.

Key Relationships Between Early Speech and Language and Social-Emotional Behaviors
Speech and Language Impairment Hypothesis

The speech and language deficits in children with CLP have been investigated and social-emotional behaviors have been identified in the school-aged population. It could be that these social-emotional behaviors arise from frustrations resulting from speech and language deficits.

We first explored this possible explanation. In the strong version of this view, it would be expected that the language skills of the children with social-emotional difficulties would not be age-appropriate. In the weaker version of this view we would expect negative correlations between problem social-emotional domains and speech and language skills and positive correlations between the competence social-emotional domains and speech and language skills.

First, to examine the strong version PLS-4 standard scores were reviewed to determine if the children with below average language skills also scored more poorly on the ITSEA. This view received partial support. Only one participant was found to have concerns in a domain of the ITSEA who was also found to have Auditory Comprehension and Expressive Communication standard scores that fell below one standard deviation below the mean as measured by the PLS-4. This participant was indicated to demonstrate concerns in the Competence Domain and four subdomains within that domain. Two participants were indicated to have concerns in one subscale of the ITSEA (one in Internalizing and one in Competence) and

whose Auditory Comprehension standard scores fell below one standard deviation below the mean.

Second, to examine the weak view, we review the direction of the correlations between ITSEA domains and subscales and the speech and language measures. The correlations between the Competence Domain and its subscales with speech and language measures were in the expected direction. The correlations between the problem domains and subscales were not. This explanation can be further discounted by the fact that competent behaviors increased as communication skills improved, as well. As speech and language skills improved, aberrant and competent behaviors increased.

Furthermore, examination of the intelligibility variable did not yield relationships to variables similar to percent consonants correct, as might be expected. The associations found with percent consonants correct had larger correlations than intelligibility, particularly with the Dysregulation Domain, overall, and Externalizing Domain, when gender was examined. It may have been the case that children with CLP who had poor intelligibility would use Externalizing and Dysregulation behaviors more as a reflection of frustration; however, that did not happen. It may be that parents use context to interpret toddlers' communication even if that communication is not intelligible. This interpretation was confirmed in a recent study examining the significance of children's intelligibility on the quality of parental models. It was determined in this study that the intelligibility of the children did not impact the parents' ability to facilitate language models in children with CLP; the context was more important (Frey, 2012).

While a relationship was found between social-emotional development and speech and language development, the direction of the relationship was different than was hypothesized. It was expected that aberrant behaviors would decrease and social-emotional competence would

increase as speech and language skills improved. It was not found that these social-emotional deficits arise from difficulties with communication, as problem and competent behaviors increased as speech and language performance increased.

The outcomes of the study do not indicate that these problematic social-emotional behaviors are broadly present as a result of below average speech or language skills, but that there may be a relationship, at least for some children. This study also suggests that these behaviors emerged very early.

Concomitant Social-Emotional Behavior Development Hypothesis

The results of this study suggest a plausible alternate interpretation. It shows that positive and negative social-emotional behaviors were increasing with acquisition of speech and language skills. It is proposed that the demonstration of Externalizing and Dysregulation behaviors emerge during the period covered in the study and may be a typical developmental parameter of this age. These findings support the common expectation of children of this age to exhibit some negative behaviors as part of typical development, which is often referred to as the “terrible twos”. Children often exhibit these behaviors as part of typical developmental progression and despite social, emotional, speech or language competence. This parallels the findings of the study. Only if these behaviors are sustained in older children, do they become associated with negative behavioral outcomes. Research indicates that Externalizing behaviors are present in some school-age children, as well as adolescents with CLP (Collett et al., 2012; Collett & Speltz, 2006; Murray et al., 2010; Richman & Millard, 1997; Schneiderman & Auer 1984; Turner et al., 1997).

Finally, it could be that these behaviors are related to a third variable that was not examined in this study, such as temperament. The evidence indicates there is a strong relationship between acquisition of first words and the temperamental profiles of typically developing children. Children who are temperamentally difficult and have fewer attentional resources are at a greater disadvantage than their temperamentally easy counterparts when it comes to learning early vocabulary (Dixon & Shore, 1997; Dixon & Smith, 2008; Eisenberg, Damon, & Lerner, 2006; Rothbart & Bates, 2006). Perhaps children who with different temperamental profiles demonstrate different patterns of scores on the ITSEA and might help to explain the unexpected relationship between social-emotional development and communication development.

Gender Differences

For males, a significant correlation was found between the Externalizing Domain and a language measure (MLU). No significant correlations were found for females with this Domain. This is similar to findings of past research that suggest that males exhibit more externalizing behaviors than females (Richman & Millard, 1997). Overall, more significant relationships were found for males when gender differences were examined. This could be due to the limited number of female participants. More female participants could have yielded more significant findings. Yet, research has indicated some brain abnormalities in children with isolated CLP, particularly in males (Nopoulolos, Langbehn, Canady, Magnotta, & Richman, 2007). The presence of these behaviors could be related to the differences in brain structure in children with CLP.

Limitations

Additional participants would have strengthened the findings of the study. The effects of age were of interest in this study and were initially examined; however, analysis could not be completed due to the small numbers of participants at some ages. The effects of age are of interest because the majority of past research has focused on the presence of behavioral concerns within the school-age population and older (Collett et al., 2012; Collett & Speltz, 2006; Murray et al., 2010; Richman & Millard, 1997; Schneiderman & Auer 1984; Turner et al., 1997). Anecdotally we noted that many of the significant findings appeared as the children's speech and language permitted conversational, intelligible communication.

An aim of this study was to determine whether social or emotional deficits were able to be identified in this population. While only a small percentage of the participants were identified with concerns, it appears that a small number of children may need to be monitored for these behaviors as they age.

Future Research

Future research should focus on examining the presence of social-emotional concerns in a larger group of children with CLP and in comparison to a control group of typically developing children. Additional research is needed to fully understand the relationship between variables that were found to have strong associations, such as examining these associations across age and gender to determine if similar trends exist in typical development or continue to persist.

CHAPTER 5

CONCLUSION

Clinical Implications

Information regarding the earliest ages when behavioral concerns become problematic for children with CLP has implications for early intervention. Research suggests that social and emotional behaviors that continue to exist beyond school-age can lead to psychological concerns, such as anxiety and depression (Demir et al., 2011). The ITSEA was able to identify behavioral concerns in some toddlers with CLP in this study. To prevent the progression of these behavioral concerns, clinicians should monitor these behaviors through use of assessment tools, such as the ITSEA, to screen for social or emotional concerns and refer when necessary. The behavior types assessed by the ITSEA, particularly externalizing and dysregulation, increased as speech and language performance increased. This finding suggests that some aberrant behaviors are likely a result of typical development as they parallel speech and language development. Therefore, careful monitoring of the behaviors by the clinician is important to prevent the habituation of behaviors as the child ages.

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VITA

JENNA L. PUGH

- Personal Data: Date of Birth: June 7, 1986
- Place of Birth: Crossville, Tennessee
- Marital Status: Single
-
- Education: Public Schools, Crossville, Tennessee
- B.S. Concentration in Communication Disorders, Middle
 Tennessee State University 2011
- M.S. Communicative Disorders, Concentration in Speech-
 Language Pathology, East Tennessee State University 2013
-
- Professional Experience: Tuition Scholar, East Tennessee State University, Department of
 Audiology and Speech Language Pathology, 2011-2013
- Student intern, Spring 2010-Spring 2013
-
- Honors and Awards: Enrichment Scholarship, Middle Tennessee State University, Fall
 2010-Spring 2011
- Summa Cum Laude, Middle Tennessee State University, August
 2011