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A Comparison of Caregiver and Speech-Language Pathologist's Ratings of Speech Outcome in Oral Cleft Clinic

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Speech Ratings of Patients with Clefts:
Comparing Ratings by Caregivers with those of a Speech-Language Pathologist

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Abstract

Background: Cleft lip and/or palate is one of the most common congenital anomalies. The goal of treatment of cleft palate is normal speech, but a proportion of children with clefts exhibit speech disorders. Various outcome measures are used, but relatively few have focused on self-assessment or caregiver perception of outcome. The studies that have been done focus on comparing parents' and speech-language pathologists' ratings of speech outcome. These studies can be used to determine the degree to which caregivers are satisfied with speech outcome over time.

Purpose: The purpose of this study was to describe the relationship between speech ratings provided by caregivers and a speech-language pathologist for patients with clefts.

Methods: A caregiver rating scale to allow caregivers to report on speech outcomes was administered as part of routine clinical history and completed by 29 caregivers. The speech language assessment protocol provided ratings of intelligibility, articulation, receptive language, expressive language, oral structure and functions, voice, resonance, and nasal emission. Caregivers' ratings of their child's overall speech excellence were compared to the speech-language pathologist's ratings for intelligibility, articulation, and resonance.

Results: Relationships were identified between caregivers' responses to their child's overall speech excellence and the speech-language pathologist's ratings of intelligibility (r=.68), articulation (r=.88), and hypernasal resonance (r=.50).

Conclusion: Articulation and intelligibility were most related to caregiver ratings of speech outcome. Future studies should address bigger sample sizes, control groups, multiple treatment centers, and independent ratings.

Speech Ratings of Patients with Clefts:

Comparing Caregivers' Ratings to Speech-Language

Cleft lip and/or palate is present in 1 of every 711 live births (CDC, 2012). Classification of clefts depends on the features of the anomaly. Clefts of the lip or palate are incomplete fusion of tissues of the affected oral structure. Because cleft lip and/or palate is a relatively common congenital abnormality, research investigating the problems linked with the disorder as well as research investigating post-treatment opinions of patients, parents, and speech-language pathologists (SLP) is beneficial; from the results of these studies, professionals can modify their approaches to address the needs of future patients.

Primary areas of concern for children with cleft lip and/or palate are feeding, in early infancy, appearance, speech outcome, and psychosocial adjustment (Noor & Musa, 2007). Although considerable research has been conducted to evaluate functional outcomes through expert ratings, very little focus has been given to evaluating the satisfaction of children and their parents related to overall outcome (Broder et al., 1992, Van Lierde et al., 2012). Studies that focus on the relationship between caregiver and patient perception of outcome with functional measures would allow researchers to determine if, in actuality, speech performance has improved. Then, based on this information researchers can plan treatment procedures and therapy goals that are specific to each individual child (Van Lierde et al., 2012).

The work that has been done in caregiver perception of outcome has varied with respect to age range and cleft type. By examining the speech outcome of a broad range of children, researchers can discern if perceived improvement increases with the mean age of the control group. However, not every researcher has access to patient populations that are large enough to serve this purpose (Noor & Musa, 2007; Hunt, Burden, Hepper, Stevenson, & Johnston, 2006). Those that are able to acquire a greater number of participants vary the age ranges or the type of

cleft used in their control groups (Broder, Smith, & Strauss, 1992). Controlling for type of cleft allows researchers to determine whether the type of cleft influenced speech outcome. Using control groups allows researchers to verify if there is a relationship between speech outcome and the child's age and/or the child's cleft type.

The instruments used by researchers to measure satisfaction ratings from children with cleft lip and/or palate and their parents provided insight regarding which factors impact speech outcome. Two of the speech outcome self-evaluations used by researchers include The Cleft Evaluation Profile (CEP) (Van Lierde et al., 2012) and the 4-point Likert scale (Broder, Smith, & Strauss, 1992). The questions that they asked and the scaling they used differed. While some researcher made use of self-evaluations (Broder et al., 1992), others utilized personal interviews (Strauss, Broder, & Helms, 1988). Each researcher then calculated the degree to which a specific variable, rated in the self-evaluations or personal interviews, impacted speech performance. With knowledge of previous therapy and treatment, researchers could subsequently determine the level of success of that resulted from these medical procedures.

The way in which data are collected may introduce specific biases into the findings of a study. For example, some family-centered outcome studies have been conducted by mailing surveys to patients' homes (Noar, 1991) other studies are conducted in the clinical setting (Strauss, Broder, & Helms, 1988;), and still others require a separate visit to participate in an interview (Broder, Smith, & Strauss, 1992) or survey completion for research purposes (Van Lierde et al, 2012). Each of these approaches carries particular benefits and limitations. For example, surveys mailed to participants' homes may yield more thoughtful responses, but may diminish return rates among families with lower reading capacity or bias the sample toward those with particular concerns about a given functional outcome. In the clinical setting the authoritative figure of the speech-language pathologist and the overall atmosphere of the clinic may influence

the participants to be more generous or agreeable with their ratings, but feel validated for their participation in the study. In studies that require a separate visit, participants get a chance to process the previous appointments comments and results, but may also be less likely to return due to lack of time and/or money. Finally, surveys provided at the appointment allow the caregivers, patients, and the speech-language pathologist the opportunity understand one another's' level of satisfaction with speech outcome, but it also allows for some bias in the SLP ratings. The differences in materials provide researchers insight into what form of questioning works and what form does not. This allows future questioning techniques to be modified so that the results are clear and reliable. This in turn provides the information needed to create assessment and treatment techniques that are more satisfactory to clients with cleft lip and/or palate.

In research related to cleft lip and/or palate "there are few studies clearly identifying specific parent and child reports regarding satisfaction with speech" (Van Lierde et al., 2012, p. 193) and even fewer that compare parent and SLP evaluations of speech. The studies that do address these concerns provide researchers and craniofacial teams with the information needed to modify assessment and treatment techniques that better address the needs of the patients. Previous studies have found low levels of agreement when children's self-ratings were compared with those of their parents (Hunt et al., 2007; Turner et al., 1998). Some studies have found a narrow range of satisfaction among parents, who were either satisfied or very satisfied with speech outcome (Broder, Smith & Strauss, 1992; Noar, 1991; Strauss, Broder, & Helms, 1988; Van Lierde et al., 2012). More recently, Van Lierde et al. (2012) observed that patients with cleft lip and/or palate and their parents were either satisfied or very satisfied with the patient's speech. These finding are also in agreement with earlier studies by Broder et al. (1992), Noar (1991) and Strauss et al. (1988). Each researcher calculated the degree to which a specific variable impacted

speech performance. With knowledge of previous therapy and treatment, researchers could then determine the level of success that resulted from these procedures

In one of few studies that compared speech ratings by speech clinicians, parents, and children, Starr and colleagues (1984) found "no evidence that listener group ratings of nasality differ" based on "intergroup correlation of nasality ratings are moderate to high" (p. 289-292). There was also no evidence that ratings of articulation differed between listener groups. Studies that investigate relationships regarding speech outcome, allow researchers to determine if the resulting ratings hold true for multiple listeners. If so, then researchers use these relationships to predict future speech outcomes for children with clefts.

Previous research has identified the need to compare self-assessed speech outcome among individuals with and without cleft and their parents (Broder, Smith, and Strauss, 1992; Hunt, Burden, Hepper, Stevenson, and Johnston, 2006; Hunt, Burden, Hepper, Stevenson, and Johnston 2007; Noor and Musa, 2007; Van Lierde et al., 2012). It is still relatively unknown how children with CP compare to their peers without CP. Additionally, little is known about how children, regardless of whether they have cleft lip and/or palate, develop positive or negative attitudes about their communication (Havstam, Sandberg, & Lohmander, 2011). Havstam and colleagues (2011) concluded that developing a speech disorder does not dictate that an individual will feel negatively towards their communication abilities. Furthermore, Havstam et al. (2011) emphasized the need for further identification of qualitative research to not only "increase our understanding of the feelings and thoughts of, as well as strategies used by, individuals who do not let their speech disorder hinder their participation in society" (p. 163), but also to determine the factors that influence a child to develop these types of attitudes (Havstam et al., 2011). Finally, Havstam et al. (2011) stated that investigating environmental factors could establish new intervention methods that could improve participation for individuals with communication

disorders. Studies related to satisfaction with speech in children with cleft lip and/or palate may have their drawbacks. However, these drawbacks allow researches to adapt parameters in order to address them in future study designs.

Previous studies have also declared the need for universal parameters for evaluating the speech outcomes of children with clefts (Henningsson, Kuehn, Sell, Sweeney, Trost-Cardamone, & Whitehill, 2008). The results from these studies can then be used to develop speech rating protocols that apply across centers. Researchers, Turner, Rumsey, and Sandy (1998) reviewed CLP studies and noted their limitations with regards to lack of uniformity across investigative protocols. Turner and colleagues (1998) cautioned using one treatment to assess the opinions of patients and their parents due to the fact that this typically leads to biased responses. As a result, they recommended that the data should be collected from multiple treatment centers. While a multicenter was implemented in one study (Noar, 1991), it was then critiqued for using a small sample size, as was an additional study (Strauss, Broder, & Helms, 1988). A small sample size can reduce the validity of the study. Additionally, researchers fail to mention the length of time that it takes them to complete their investigation of patient and parent satisfactions levels (Turner et al., 1998; Strauss et al., 1988). This is a problem due to the fact that "if responses to interview questions have been categorized by an interviewer over several years of data collection, it is possible that the reliability of the categorization procedure will drift with the interviewer's experience and enthusiasm" (Turner et al., 1998, p. 413). Finally, researchers concluded that using the same material across a large age range would decrease the amount of relevant information provided for each age group. This is due to alterations to questionnaires and standardized tests that contain questions pertinent to participants' age group (Turner et al., 1998). Thus, future design plans should investigate a small age range with a large sample size or divide

the sample into age groups, with each age group receiving questions that are relevant to each particular group of participants.

The purpose of this study is to describe the relationship between caregivers' ratings and one SLP's clinical ratings of speech for patients with oral clefts. Specifically, caregivers' ratings of agreement with "overall, my child's speech is excellent" were compared with the SLP's ratings of speech intelligibility, articulation patters, and resonance.

Methods

Participants

Records for 29 patients with cleft lip and/or palate were included in this study. Caregiver ratings and SLP ratings were available for patients between the ages of 15 months and 20 years old.. Fourteen of the patients were males and fifteen were females. The primary language of the patients was English. Finally, a certified SLP at Western Michigan University's Unified Clinic completed the Oral Cleft Clinic Speech Screening Protocol included in Appendix A.

Materials

The Human Subjects Institutional Review Board (HSIRB) of Western Michigan University approved the study (12-03-10). The caregivers completed a questionnaire rating their child's speech. Two different surveys were collected: old form and revised form (Appendix A) With regard to resonance, this item was only asked of 9 people because the questionnaire was changed to include two new questions. The criterion measure is the responses to the question 1 (i.e., Strongly agree, agree…) and the factors under study are those completed by the caregiver. The SLP completed the Oral Cleft Clinic Speech Screening Protocol (Appendix B). The protocol assigns numerical values that corresponded to a written description in each area assessed: Intelligibility/Distinctiveness of Speech, Articulation/Consonant Inventory, and Resonance. These three categories represent the primary areas in which children with cleft lip and/or palate have difficulty Data were entered in Excel using scaled scores (+2 strongly agree, 1 agree, 0 neutral, -1 disagree, and -2 strongly disagree). Correlations between caregivers overall rating of speech excellence and the SLP's ratings of intelligibility, articulation, and resonance were calculated in SPSS. Spearman correlations were calculated because the data are categorical.

Results

Caregivers

Each caregiver completed an 8-iteam questionnaire "Speech Self-Assessment Survey-Adult." Only one item was used for the purpose of this study: "Overall, my child's speech is excellent." This statement served as a global rating of their child's speech (Figure 1).

Speech-Language Pathologist (SLP)

The SLP completed an Oral Cleft Clinic Speech Screening Protocol for each child. While there were eight speech-rating categories in the protocol only three categories, with their corresponding rating scale, were used for the purpose of this study: intelligibility, articulation, and resonance (Table 1).

Relationship

Caregivers' rating of their child's overall speech excellence and SLP's ratings of child's overall intelligibility, articulation, and resonance were compared using Spearman's Correlation. Correlation was used to determine the strength of the relationship between caregivers' ratings and those of a practicing SLP. Strong correlations between caregiver ratings of "overall, my child's speech is excellent" and intelligibility (r=), articulation (r=), and moderate correlation resonance (r=) were identified (Table 2). No measures of association were computed for the crosstabulation of hyponasal resonance because there were not enough data from which to compare caregivers' ratings of speech excellence to a SLP's ratings of hyponasality (n=7).

Discussion

These data suggest that caregivers' overall rating of their child's speech are strongly to moderately related to ratings completed by a certified SLP for intelligibility, articulation, and resonance. The strongest correlations were identified between caregiver's overall ratings of speech and the SLP's assessment of articulation (r = .88) and caregiver ratings of overall speech excellence and the SLP ratings of intelligibility (r = .68).

It is interesting to note that when the SLP rated the child as having a developmental error, the caregivers still tended to rate the child's overall speech as excellent, whereas the presence of dental distortions or compensatory errors were more likely to be related to caregivers disagreeing with the statement of overall speech excellence. This is consistent with the finding that caregiver ratings of "overall, my child's speech is excellent" were also strongly/moderately correlated with SLP ratings of intelligibility (r = .68). For future studies, it may be wise to conduct a more refined evaluation of specific speech sound error patterns to determine how specific speech-sound errors they relate to parents' expectations.

Caregiver ratings of speech excellence were less strongly correlated with SLP ratings of hypernasality (r = .50). It should be noted that only 10 caregivers responded to this question because it was only recently added to the questionnaire. Further accrual of data is planned to be able to evaluate this relationship further. As for hyponasality, not much can be concluded primarily related to the infrequency with which it was rated by the SLP. These preliminary findings suggest that more parents noted hyponasality "my child's speech sounds like…" (n=10) compared with only 7 from the SLP. The parents may be correct in their identification of the problem or it may be that they do not distinguish between hyper- and hypo-nasal speech.

While evaluating parent perception of speech outcome as a function of age was not the purpose of this study, it was observed that speech ratings and satisfaction increase as children

grow older. Whether this is the result of subsequent surgeries, therapy, parent adjustment, or the child's ability to cope is unclear. However, it is an interesting phenomenon that should be evaluated in future studies.

Limitations

While relationships were found between the caregivers' ratings of overall speech excellence and the SLP's rating of articulation, intelligibility, and resonance, in order to really do a comparison, the SLP should also complete items that more closely correspond to the outcomes assessed by caregivers. For that reason, a new protocol for recording the SLP's ratings should be implemented. Furthermore, the current clinical protocols were not always complete, so adherence to a more stringent clinical protocol is warranted if prospective studies of these evaluation tools are conducted.

An additional limitation is that the SLP was aware of the caregiver (and patient ratings, for patients 9 years and older). During the interview with the caregivers and patient, the SLP conducted the clinical evaluation and this included assessment of the caregiver's assessments. This may have resulted in some bias in the SLP ratings. In some cases, a graduate student completed the clinical evaluation and rating forms. Thus, inter-rater variability may also be a factor to consider for future studies.

Due to the size of the sample, a complex statistical model could not be used. For future studies, a larger pool would allow the three areas (intelligibility, articulation, and resonance) to be assessed in a single statistical model in order to determine which factors most affect the caregivers' overall rating of speech excellence.

The current study did not include comparisons with a control group of children without oral clefts or with other speech-language concerns. Future studies should not only evaluate children's ratings of speech outcome for different age groups and disorder type, but also the

caregivers' and clinicians' ratings of speech outcome (or performance). These results could then be used to conclude whether caregivers' ratings for children with are similar or different to their age matched peers. This study did not evaluate speech outcome according to cleft type or severity. Doing so would permit researchers the ability to determine if cleft type impacted caregiver views of speech outcome.

Conclusion

The purpose of this study was to describe the relationship between speech ratings provided by caregivers and a speech-language pathologist for patients with clefts. The relationships found between the caregivers' rating of overall speech outcome and the speech-language pathologist's rating of articulation and intelligibility were strong for articulation and moderate for intelligibility. As for the relationship between the caregivers' rating of overall speech outcome and the speech-language pathologist's rating of resonance, resonance was split into two categories: hypernasal speech and hyponasal speech. There was a moderate relationship for hypernasal speech, but no much could be concluded about the relationship for hyponasal speech. These results demonstrate that caregivers and speech-language pathologists are uniformly rating the child's speech for articulation, intelligibility, and hypernasal speech. The information gathered from this study can be used to predict future speech outcomes for children with clefts.

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Table 1. Speech-language pathologists' ratings of speech intelligibility

Speech rating category	Rating scale	n	%
Intelligibility (n=26)			
	Normal	8	30.8
	Mildly reduced	7	26.9
	Moderately reduced	6	23.1
	Moderately severe	3	11.5
	Severe	2	7.7
Articulation (n=25)			
	No concerns noted	8	32.0
	Developmental error	5	20.0
	Distortions observed	5	20.0
	Substitutions or omissions	1	4.0
	Compensatory articulation	6	24.0
Resonance			
Hypernasality (n=23)			
	Normal resonance	11	47.8
	Borderline	2	8.7
	Mild	2	8.7
	Moderate	7	30.4
	Severe	1	4.3
Hyponasality (n=20)			
	Normal resonance	17	85.0
	Mild	3	15.0
	Marked	0	0.0

Table 2. Speech-language pathologist's (SLP's) vs. parents' ratings of speech parameters

Variables	***n***	***r (se)***	r^2
SLP Intelligibility vs. Parent Speech Excellence	21	.68 (.17)	.46
SLP Articulation vs. Parent Speech Excellence	20	.88 (.06)	.78
SLP Hypernasality vs. Parent Speech Excellence	19	.50 (.35)	.25

Figure 1. Caregiver ratings of speech outcome.

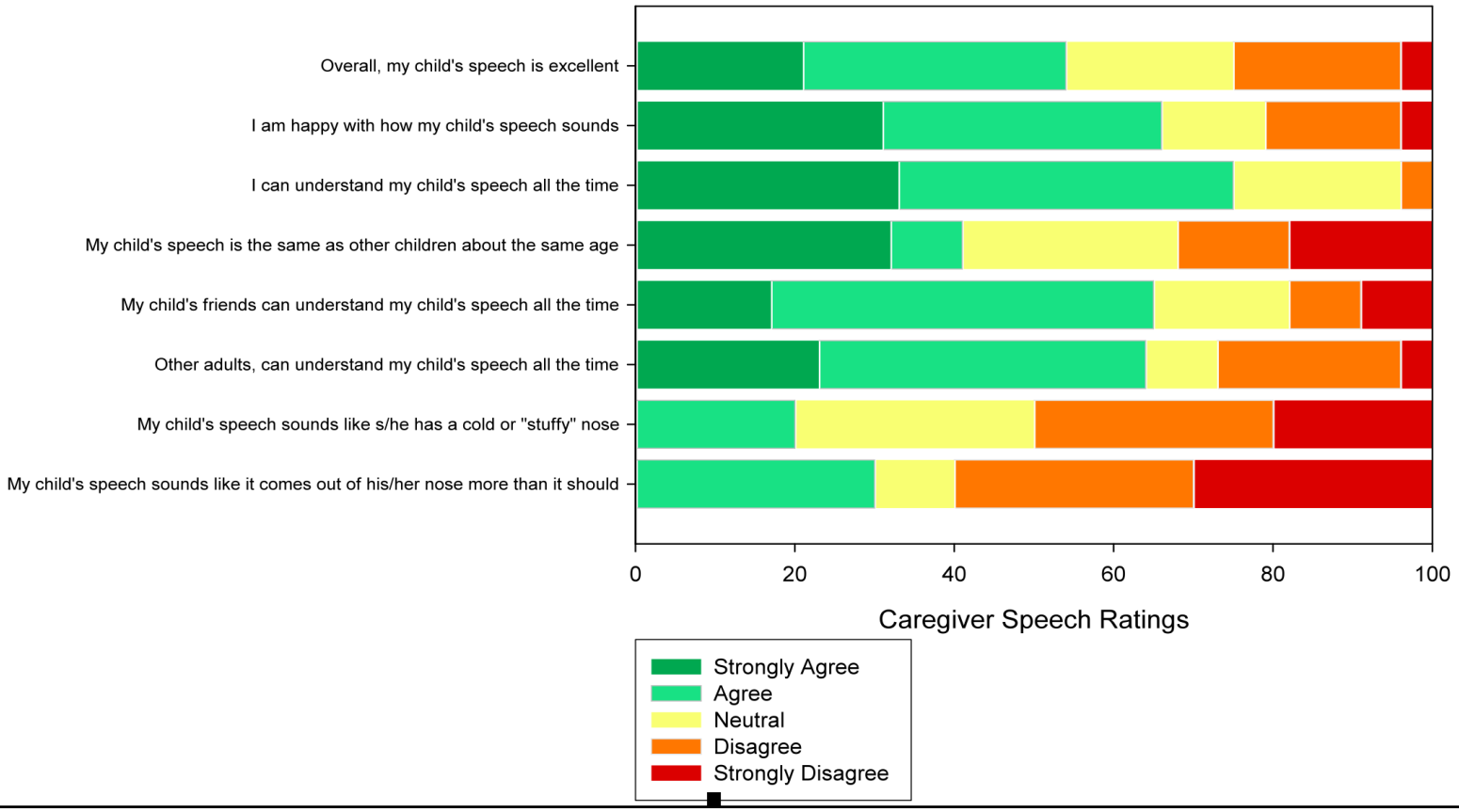


Figure 2. Intelligibility correlation plot

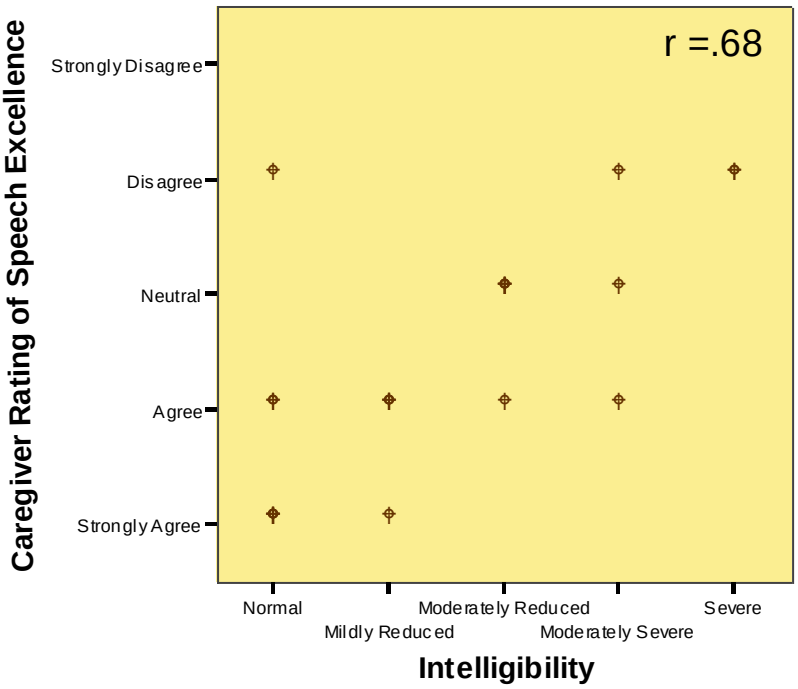


Figure 3. Articulation correlation plot

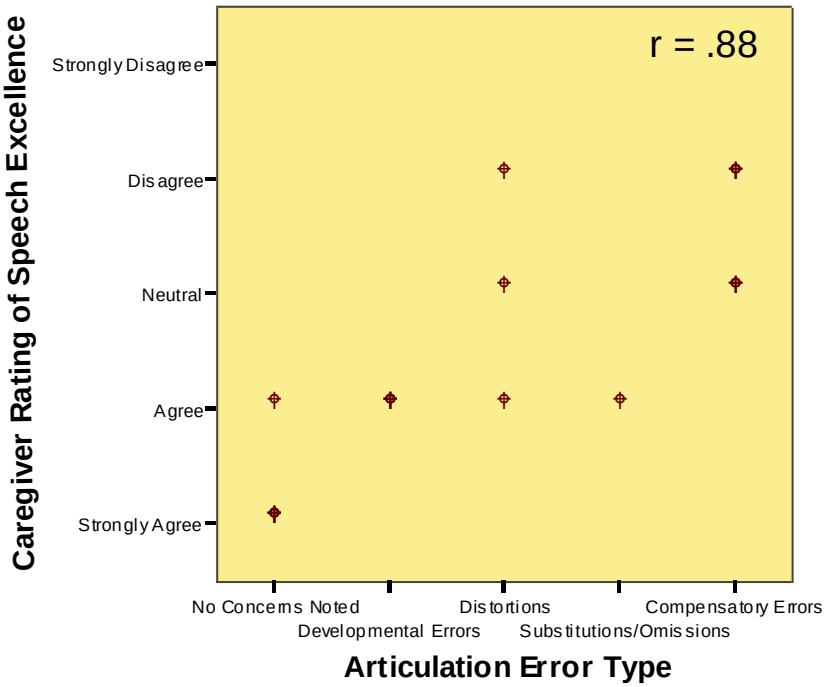
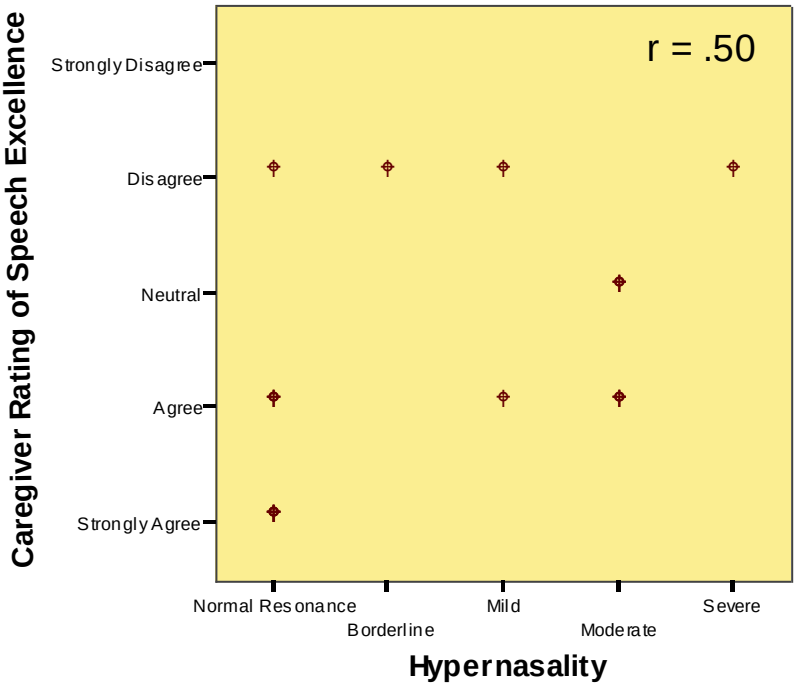


Figure 4. Hypernasality correlation plot



APPENDIX A

Child's Name: _____ Child's Age: ____ years Date: ___/ ___/ _____

1. I can understand my child's speech all the time

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

2. Other adults can understand my child's speech all the time

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

3. My child's friends can understand my child's speech all the time

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

4. My child's speech sounds the same as other children who are the same age

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

5. I am happy with how my child's speech sounds

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

6. Overall, my child's speech is excellent

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
☐	☐	☐	☐	☐

7. If I could change something about my child's speech it would be _____

_____

Child's Name: _____ Child's Age: ____ years Date: ___/ ___/ _____

8. I can understand my child's speech all the time

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

9. Other adults, such as teachers, can understand my child's speech all the time

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

10. My child's friends can understand my child's speech all the time

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

11. My child's speech sounds the same as other children who are the same age

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

12. My child's speech sounds like it comes out of his/her nose more than it should

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

13. My child's speech sounds like s/he has a cold or "stuffy" nose

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

14. I am happy with how my child's speech sounds

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	I Don't Know
☐	☐	☐	☐	☐	☐

15. Overall, my child's speech is excellent

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree

☐	☐	☐	☐	☐

16. If I could change something about my child's speech it would be _____

_____

Oral Cleft Clinic Speech Screening Protocol

Name:	Date:	Hospital ID#
Date of Birth:	Age:	Primary Language:
Gender: male female	Primary Diagnosis:	
Current S-L Therapy? Y N	School:	Grade:
Background/Notes (e.g., upper respiratory infection, known voice disorder or hearing loss)		

1. Intelligibility/Distinctiveness of Speech

Rating	Description
0	Normal
1	Mildly reduced (e.g., most people would not comment)
2	Moderately reduced (e.g., others can understand, but are likely to comment)
3	Moderately severe (e.g., most strangers have a hard time understanding)
4	Severe (e.g., almost no speech is understood by others)
99	Could not rate

2. Articulation / Consonant Inventory* (*may have more than one rating)

Rating	Description
0	No concerns noted
0a	Developmental errors consistent with same age peers (describe below)
1	Distortions observed (describe below)
2	Substitution or omission errors (describe below)
3	Compensatory articulation patterns (e.g., glottal stops, pharyngeal fricatives). (describe below)
99	Could not rate

3. Receptive Language

Rating	Description
0	No concerns noted
1	Suspect delay or disorder
99	Could not rate

4. Expressive Language

Rating	Description
0	No concerns noted
1	Suspect delay or disorder
99	Could not rate

5. Oral Structures and Functions

Rating	Description
0	No concerns
1a	Malocclusion
1b	Patent oronasal fistula. Describe location:
99	Did / Could not rate

6. Voice

Rating	Description

0	Normal
1	Distinctive or abnormal voice quality (describe below)
99	Could not rate

7. Resonance

Hypernasality

Rating	Description
0	Normal resonance
1	Borderline – minimal hypernasality
2	Mild - evident
3	Moderate – evident on open and closed vowels
4	Severe –evident on vowels and voiced consonants
99	Could not rate

Hyponasality

Rating	Description
0	Normal resonance
1	Mild – partial denasalization of nasal consonants and adjacent vowels
2	Marked – denasalization of nasal consonants and adjacent vowels
99	Could not rate

8. Nasal Airflow

Audible Nasal Air Emission

Rating	Description
0	None noted on pressure consonants
1	Heard occasionally on pressure consonants < 3 examples on different sounds
2	Heard frequently on pressure consonants 3 or more examples
99	Could not rate

Visible nasal air emission

Rating	Description
0	None noted on pressure consonants
1	Seen occasionally on pressure consonants < 3 examples on different sounds
2	Seen frequently on pressure consonants 3 or more examples
99	Could not rate

Nasal Turbulence Yes No

Nasal or Facial Grimace Yes No

9. Comments, include observations of spontaneous speech