

University of Nevada, Reno

Peer Perceptions of Hypernasal Speech

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science in Speech Pathology and Audiology

by

MariaCecilia Mancini

Thomas Watterson, Ph.D./Thesis Advisor

December 2010



University of Nevada, Reno
Statewide • Worldwide

THE GRADUATE SCHOOL

We recommend that the thesis
prepared under our supervision by

MARIACECILIA MANCINI

entitled

Peer Perceptions Of Hypernasal Speech

be accepted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE

Thomas Watterson, Ph.D., Advisor

Kerry Lewis, Ph.D., Committee Member

Tami Brancamp, Ph.D., Committee Member

Gloria Svare, Ph.D., Graduate School Representative

Marsha H. Read, Ph. D., Associate Dean, Graduate School

December, 2010

Abstract

Peer judgments of speech may conflict with professional judgments, and influence peer relationships. The purposes of this study were: 1) to obtain ratings of nasality from peers of children, 2) to compare the peer ratings with ratings made by an expert judge, and 3) to obtain judgments of social acceptance and compare those with the peer nasality ratings. Ten speech samples were audio recorded from speakers aged 8 to 11 years. Four of the speakers had normal speech, and six had degrees of hypernasality. The listeners were 44 children ranging in age from 8 to 11. Listeners rated the samples on a 3-point scale with 1 = “not hypernasal”, 2 = “kind of hypernasal”, and 3 = “really hypernasal”. The expert judge rated the samples for nasality at a different time using the same scale. The peer listeners also made five social acceptance ratings about each speaker using a 3-point scale where 1 = “disagree”, 2 = “kind of agree”, and 3 = “totally agree”. The mean (n = 44) nasality rating for each sample was compared to the rating provided by the expert judge. Results revealed there was no difference between mean peer ratings and expert ratings. As hypernasality increased, social attitude ratings became progressively more negative. These data showed that even young children could discern degrees of nasality/hypernasality in the speech of other children and their ratings were the same as an expert judge. Furthermore, as peer ratings of nasality increased, social attitudes about the speaker became progressively less favorable.

Acknowledgments

First, let me begin by saying that the completion of my thesis has happened in many ways thanks to the support, encouragement, and motivation from my committee, my family, and my friends. This very important support network gave me strength, direction, and assistance throughout the entirety of this project from its beginning to its end. I will always be grateful for my committee's faith in me as a dedicated thesis student from the moment I walked into my master's program, and knew exactly what I wanted to do. Words cannot express my gratitude to my committee, who have changed my life and academic perspective through this process, and have also changed my future as I embark on a journey of furthering my research studies. I will always appreciate the expectations from my committee, as they continually pushed me towards excellence.

Dr. Watterson:

Thank you so much for your willingness to oversee my thesis study, and for being a phenomenal graduate advisor. Your knowledge, expertise, and availability were inspirational to me throughout my entire graduate studies, including this thesis. I have learned so much while working and spending time with you in the last two and a half years. Your quiet encouragement always motivated me to think on my own as well, even when I wasn't sure where my ideas were going.

Dr. Lewis:

I cannot express how thankful I am for all the moments you made time for me throughout the entire length of my master's studies. Your patience is admirable, and I could not help but look up to you as a rock-solid mentor in so many ways. I laughed so much with you and always felt so welcome. From the first day I walked into your office and said I

wanted to do a thesis I knew I wanted to collaborate with you. Thank you so much for being a part of this thesis, and for believing in me.

Dr. Brancamp:

There were so many times I thought to myself “I hope I seem half as calm as Dr. Brancamp always is.” Your cheery outlook and calming nature always helped me stay grounded when the amount of work seemed to pile around me. You always had some tidbit of advice that would clear up a mess of questions or worries I had. Thank you so much for being a part of this study, and for always being so willing to give me those gentle reality checks when it seemed that everything was getting away from me.

Dr. Svare:

Thank you so much for your participation in this thesis study. Your flexibility and suggestions were always helpful, and encouraged me to expand my line of thinking. I feel very lucky to have had you as a part of my committee.

Finally, thank you so much to my family and my friends. Without them, this would not have happened. There were a few punctuated moments where I thought I was not going to be able to survive the two years of overwhelming classes, studying, clinic work, and thesis work—but with the strength I found in my family and my friends, I was able to manage it all and find that fine balance. They believed in me from the moment I said I wanted to pursue a master’s and through the entire journey it has taken me on. Their support will never be forgotten or overlooked. Their unconditional love guided me through moments of sheer discouragement when I was simply not sure how I would ever do it all. Thank you so much from the bottom of my heart, as I am where I am today because of you.

Table of Contents

Abstract Page.....	i
Acknowledgments.....	ii
Table of Contents.....	iv
List of Tables.....	vi
List of Figures.....	vii
Chapter 1 Introduction.....	1
VPD.....	2
Hypernasal Speech.....	2
Background Information.....	3
Purpose.....	6
Chapter 2 Method.....	7
Participants.....	7
Speech Stimuli Samples.....	7
Instrumentation.....	8
Procedure.....	9
Participant Recruitment.....	9
Analysis of Data.....	10
Chapter 3 Results.....	12
Peer Nasality Ratings.....	13
Peer and Expert Nasality Ratings.....	15

Table of Contents (cont.)

Peer Social Judgments.....	16
Chapter 4 Discussion.....	19
Implications for Further Research.....	21
Conclusion.....	21
References.....	23
Appendix A.....	26
Appendix B.....	27
Appendix C.....	28
Appendix D.....	29
Appendix E.....	30
Appendix F.....	33

List of Tables

Table 1. Percentage of peer ratings by level of nasality for each speech sample.....	14
Table 2. “Not hypernasal” Speech Samples Compared to Social Judgments.....	16
Table 3. “Kind-of hypernasal” Speech Samples Compared to Social Judgments.....	17
Table 4. “Really hypernasal” Speech Samples Compared to Social Judgments.....	18

List of Figures

Figure 1. Mean Peer Nasality Ratings for Each Speech Sample.....	13
Figure 2. Mean Peer Nasality Ratings and to Expert SLP Nasality Ratings.....	15

Chapter 1

Introduction

Children with oral-facial clefts are perceived as different from the first day of life (Feragen, Borge, & Rumsey, 2009). The most obvious difference is altered physical appearance. Other less visually obvious characteristics include speech and resonance differences. Because physical appearance is a social trait, facial disfigurement may negatively affect emotional and social development, and it influences how the child perceives and interacts with the people in his/her environment (Tobiasen & Hiebert, 1993; Berger & Dalton, 2009). Facial deformity and appearance may have a negative impact on caregivers, siblings, peers, and health care providers, and this may, in turn, diminish the quality of social interaction and general development (Garth & Aroni, 2003; Reed, et al., 1999).

In addition to altered appearance, children with oral-facial clefts frequently have unique communication disorders (Stengelhofen, 1989; McWilliams, Morris, & Shelton, 1990; Bzoch, 1997). These disorders may be caused by dental abnormalities, facial skeleton dysmorphology, hearing impairment, impoverished interactions, and others (Feragen, Borge, & Rumsey, 2009; Kapp-Simon & McGuire, 1997). Oral-facial clefts may have a negative impact on children trying to produce intelligible speech sounds, and may in turn affect the listener's perception of the speaker.

One disorder that is common in children with oral clefts is velo-pharyngeal dysfunction (VPD). VPD is caused by failure of the velar and pharyngeal muscles to close off the nasal cavities during speech production and swallowing. This functional failure of the VP mechanism may result from various anatomical defects or neurological

impairment. But, regardless of the cause, the effect on speech is uniform and predictable. With VPD, speech is characterized by excessive nasal resonance and by reduced intraoral pressure. This gives the perceptual impression that the child is “talking through the nose.” This condition is commonly referred to as “cleft palate speech” (Leonard, Brust, Abrahams, & Sielaff, 1991). Thus, children with oral-facial clefts not only look different, they may sound different as well.

When the velopharyngeal valving mechanism fails due to a cleft palate, the speech airflow and sound wave are both altered and speech is negatively affected. Hypernasality, or excessive nasal resonance, is a disorder that occurs due to abnormal acoustic coupling (sharing of the sound wave) between the oral and nasal cavities during speech (Kummer, 2008). This causes hypernasal resonance. When airflow escapes into the nasal cavities during speech production it results in nasal air emission, and weakened pressure consonants, which reduces phoneme intelligibility. Both nasal air emission and hypernasality commonly occur in the same child.

In the health care setting, children with oral-facial clefts are typically managed by a team of professionals dedicated to evaluation and management of congenital clefts. This team would include a speech-language pathologist (SLP) who makes judgments about communication skills (Witt, et al., 1996). Typically, these judgments are formed after collecting and analyzing various kinds of assessment data. These data may include objective measures such as acoustic speech analysis, aerodynamic measurements, endoscopic visualization of the VP mechanism, and/or administration of standardized test instruments. Speech assessment will also include a more subjective, perceptual evaluation (Witt, et al., 1996). If hypernasality is perceived, it will be quantified on a perceptual

scale. However, hypernasality is resistant to behavior therapy (Kummer, 2008). When hypernasality is sufficient in degree to be objectionable, physical management may be recommended in the form of a speech appliance or a surgical procedure.

As children grow older, they naturally look to their peers for feedback, social support, and validation (Richardson, Goodman, Hastorf, & Dornbusch, 1961; Richman, 1997). This is a natural process that helps to define their self concept and to establish relationships with their expanding world. As children become old enough to participate in health care decisions, they will consider direct and indirect feedback from their peers (Feragen, Borge, & Rumsey, 2009). However, peer opinion may conflict with professional opinion. When children receive conflicting opinions from their peers, they may refuse to cooperate with treatment recommendations (Nowicki, 2006). Thus, it is important for professionals to know how peers view speech disorders.

A number of studies have shown that perceptions of personality characteristics of people with voice or resonance disorders are primarily negative (Blood & Hyman, 1977; Blood, Mahan, & Hyman, 1979; Gelacek & Neiman, 1994; Lass, Ruscello, Harkins Bradshaw, & Blankenship, 1991; Lass, Ruscello, Stout, & Hoffman, 1991; McKinnon, Hess, & Landry, 1986; Ruscello, Lass, & Podbesek, 1988; Lass, Ruscello, Harkins, & Blankenship, 1993). Studies have shown that speakers with voice disorders are perceived by listeners as less intelligent, less pleasant, less honest, and less attractive than normal-voiced speakers (Lallh & Rochet, 2000). Individuals with cleft lip and/or palate may experience negative social and psychological consequences from their speech or resonance that add to difficulties experienced because of physical differences (Lallh & Rochet, 2000). Listeners report preferring more social distance between themselves and

hypernasal speakers (McKinnon et al., 1986), and they are less likely to want to talk to people with hypernasal speech (Blood & Hyman, 1977).

Lallh and Rochet (2000) designed a study to determine if attitudes of adult listeners toward adult speakers with disorders of voice or resonance were different from their attitudes toward speakers with normal voice and resonance, and to determine whether written information describing voice and resonance disorders would influence listeners' attitudes about speakers with those disorders. Nine speakers were recorded. Three speakers had normal voice, three speakers had disordered voice, and three speakers had disordered resonance. The ages of the speakers ranged from 23 to 74 years. Eighty listeners were chosen to participate in this study, and were divided into two groups. One group was given information regarding voice and resonance disorders prior to the study and the other group received neutral information about communication. The information provided on voice and resonance disorders to the first group included definitions, causes of the disorders, effects of the disorders on one's life, and basic information regarding treatment. The neutral information provided to the second group was similar in length and reading level as the other information provided to the first group, and contained general information about human language, but no specific information regarding voice and resonance disorders. The listeners' ages ranged from 18 to 39 years, included men and women, and were recruited from the University of Alberta's undergraduate population. The attitudes of the listeners were assessed by a semantic differential instrument. Each listener was presented with 24 semantic differential scales after each speech sample was played, and was instructed to select the rating they felt was most relevant to the speech sample. Lallh and Rochet (2000) found that the listeners perceived

speakers from each of the three voice and resonance status conditions differently. The first finding revealed there was no significant difference between the attitudes of the listeners who were given neutral information about communication compared to listeners who were given information about voice and resonance disorders. Another finding in this study showed that the university students rated the women with normal voice and resonance more positively than women with disordered voice and resonance.

In another study, Blood and Hyman (1977) investigated how children perceived nasal resonance in other children. A total of 120 elementary school-aged children made up of kindergarteners, first graders, and second graders listened to four female children's voices which ranged from normal resonance to severe hypernasality (Blood & Hyman, 1977). Each participant listened individually to the four speech samples, and was then asked to answer a total of 20 questions. Responses were categorized as positive, negative, or neutral. Blood and Hyman (1977) found that all children responded negatively to severe hypernasality in other children. Additionally, they found that kindergarteners responded more positively to moderate hypernasal speech than the first and second graders. This study revealed that children showed patterns in responding negatively to hypernasal speakers as early as kindergarten. They concluded from their investigation that hypernasality could be considered a social handicap.

Few studies have compared the judgments of children with professional judgments, and only one study has compared peer and professional judgments of the speech of children with cleft palate. In that study, Witt et al. (1996), solicited judgments from peers of children with cleft palate and from a panel of Speech Language Pathologists (SLPs). The speech stimuli were audio recordings of children with

hypernasal speech and children with normal speech. The peer group made judgments of “speech acceptability” and the SLPs made judgments of the degree of hypernasality, pitch, intensity, rate, intelligibility, and quality. They found that the peers were “insensitive” to differences between the speech of the normal children and the cleft palate children. This could suggest that the peer judgments lacked validity. On the other hand, it may be that the sophisticated judgments made by the professionals do not translate into a concept of “acceptability,” and the judgments were therefore not comparable. Nevertheless, the authors concluded that “peer-group evaluations of speech may define the morbidity of cleft palate speech in terms that are most relevant to the patients themselves” (Witt et al., 1996, p.631).

It is not known if school-aged children have opinions about hypernasal speech, and, if they do make such judgments, it is not known if they regard hypernasality as objectionable. This would be important to know, because peers may influence the attitude of children with a cleft palate about receiving the invasive treatments for this disorder, and this, in turn, would directly impact treatment success (Feragen, Borge, & Rumsey, 2009). Therefore, the present study was designed to investigate the following questions:

1. How do school-age children judge nasality in the speech of children with hypernasal speech?
2. How do school age children’s judgments of nasality compare to judgments made by an expert listener, trained in treating children with hypernasal speech?
3. Do school-age children’s judgments of nasality affect their social attitudes towards children with hypernasal speech?

Chapter 2

Method

Audio recorded samples of children's speech were rated for degree of nasality and perceived social acceptability by peers and by an expert Speech-Language Pathologist (SLP) experienced in treating children with hypernasal speech. Peer and expert SLP nasality ratings were compared. The association between peer ratings of nasality and ratings of social acceptability were also assessed.

Participants

The participants in this study were 44 children, between the ages of 8 and 11 years from a local elementary school. The mean age of participants was 9 years; 6 months, with a standard deviation of approximately one month. The number of 8 year old participants was 3, the number of 9 year old participants was 19, the number of 10 year old participants was 12, and the number of 11 year olds was 10. Twenty one of the listeners were female and 23 of the listeners were male. This age range was chosen to mirror the ages of the speakers represented on the audio recorded speech samples, which ranged from 9 to 12 years of age. All data was collected under a protocol approved by the University of Nevada Institutional Review Board, the Washoe County School District, and Coral Academy of Science Elementary School. Parental informed consent was obtained prior to the study. Each participant's assent was also obtained. All participants were speakers of English.

Speech Stimuli Samples

Ten digitized speech samples of a short passage spoken by children between the ages of 9 and 12 years were used as stimuli. The 10 speech samples were selected to

represent a range of nasal resonance from normal nasality to severe hypernasality, and were selected from a larger pool of audio recordings obtained in a previous study (Brancamp, Lewis, & Watterson, in press). The short passage spoken was the Turtle Passage, which contains no nasal consonants, is 29 syllables in length, and is commonly used in clinical evaluations of speech. The speakers were not identifiable on the audio recordings.

Two SLPs experienced in treating hypernasal speech chose the ten speech samples from the larger pool by consensus. The SLPs listened to each speech sample and assigned a value of 1, representing “normal nasality,” to 5, representing “severe hypernasality,” depending on how much nasality was perceived. Consensus was achieved by comparing both sets of values to establish an acceptable agreement of nasality perceived in all ten speech samples. The 10 samples chosen for the listening task represented a range of nasality based on the 5 point rating scale.

The 10 speech samples were dubbed onto two digital audio discs for use in the rating tasks. The speech stimuli for each digital audio disc were in a randomized order. The same SLPs who selected the 10 speech samples also selected two additional speech samples to be used as anchors when instructing the peers on the rating procedures. One speech sample was considered “not hypernasal,” i.e. normal speech, and the second speech sample was considered “really hypernasal,” i.e. severe hypernasality.

Instrumentation

Two separate three-point rating scales were used for this study. The first rating scale was used to rate the severity of nasality. The second rating scale was used to rate peer social judgments. Both the peers and the expert SLP rated the degree of nasality in

the 10 speech samples using the Nasality Rating Scale with 1 representing “not hypernasal”, 2 representing “kind of hypernasal”, and 3 representing “really hypernasal” (Appendix A). Speech samples were rated for nasality by the expert SLP and by the peers. The peers also completed the second rating scale consisting of five social attitude questions, titled Social Attitude Rating Scale (Appendix B). Ratings were 1 representing “disagree”, 2 representing “kind of agree”, and 3 representing “totally agree.” The expert SLP did not make social attitude ratings.

Procedure

Packets were prepared and sent home with potential participants at Coral Academy of Science. Each packet contained one copy of the Parent Letter of Invitation (Appendix D) and two copies of the Consent to Participate Form (Appendix E). The researcher delivered the packets to each participating classroom teacher along with a letter to the classroom teacher (Appendix C). Each child between the ages of nine and twelve years received one packet from the classroom teacher, and was instructed to take the packet home to their parent(s). Parents who agreed to allow their child to participate in the study returned the signed consent form to the classroom teacher. The researcher then collected all returned consent forms.

At the time of data collection, the potential participants were escorted in small groups to a quiet room at the school. An envelope was provided to each potential participant containing the Nasality Rating Scale (Appendix A), the Social Attitude Rating Scale (Appendix B), and a Child’s Assent to Participate form (Appendix F). The researcher reviewed the Child’s Assent to Participate form, and invited all participants to sign the document. Any student who did not want to participate would have been thanked

for their time and escorted back to his/her classroom. All potential participants chose to remain and be part of this study.

The researcher explained the use of, and the different rating values of the Nasality Rating Scale to the participants. Then, the two audio recorded speech anchors were presented as examples of “Not Hypernasal” speech (rating of “1”) and “Really Hypernasal” speech (rating of “3”). Next, the participants listened to the first audio disk with the ten digitized speech samples, and rated each one using the Nasality Rating Scale. The completed forms were placed in a manila envelope provided to each participant.

Then, the researcher explained the use, and the different rating values, of the Social Attitude Rating Scale to the participants. The participants listened to the second audio disk with the same speech samples dubbed in a different order. For each speech sample, the participants responded to five statements on the Social Attitude Rating Scale. The completed Social Attitude Scales were placed in the manila envelope along with the given participant’s Nasality Rating Scale.

At a different time, the expert SLP rated each of the ten speech samples on the first audio disc using the same Nasality Rating Scale.

Statistical Analysis

Descriptive statistics were used to summarize and compare peer ratings and expert SLP ratings of nasality from the Nasality Rating Scale. Mean peer nasality ratings for each sample were computed. Speech samples were grouped as “not hypernasal,” “kind-of hypernasal,” and “really hypernasal” based on the mean peer nasality ratings. The distribution of social ratings across three responses “disagree,” “kind of agree,” and

“totally agree” was then assessed separately for each nasality classification, and displayed in tables.

Chapter 3

Results

The purpose of this study was to investigate how children judge varying degrees of nasality in the speech of their peers, how those judgments compare to expert SLP nasality ratings, and to determine if children's social judgments are influenced by hypernasal speech. The results are presented in the following order: a) mean peer nasality ratings, b) mean peer nasality ratings compared to the expert SLP nasality ratings, and c) peer social judgment ratings. To reiterate, the present study was designed to answer the following questions:

1. How do school-age children judge nasality in the speech of children with hypernasal speech?
2. How do school age children's judgments of nasality compare to judgments made by an expert listener, trained in treating children with hypernasal speech?
3. Do school-age children's judgments of nasality affect their social attitudes towards children with hypernasal speech?

Figure 1. Mean Peer Nasality Ratings for Each Speech Sample.

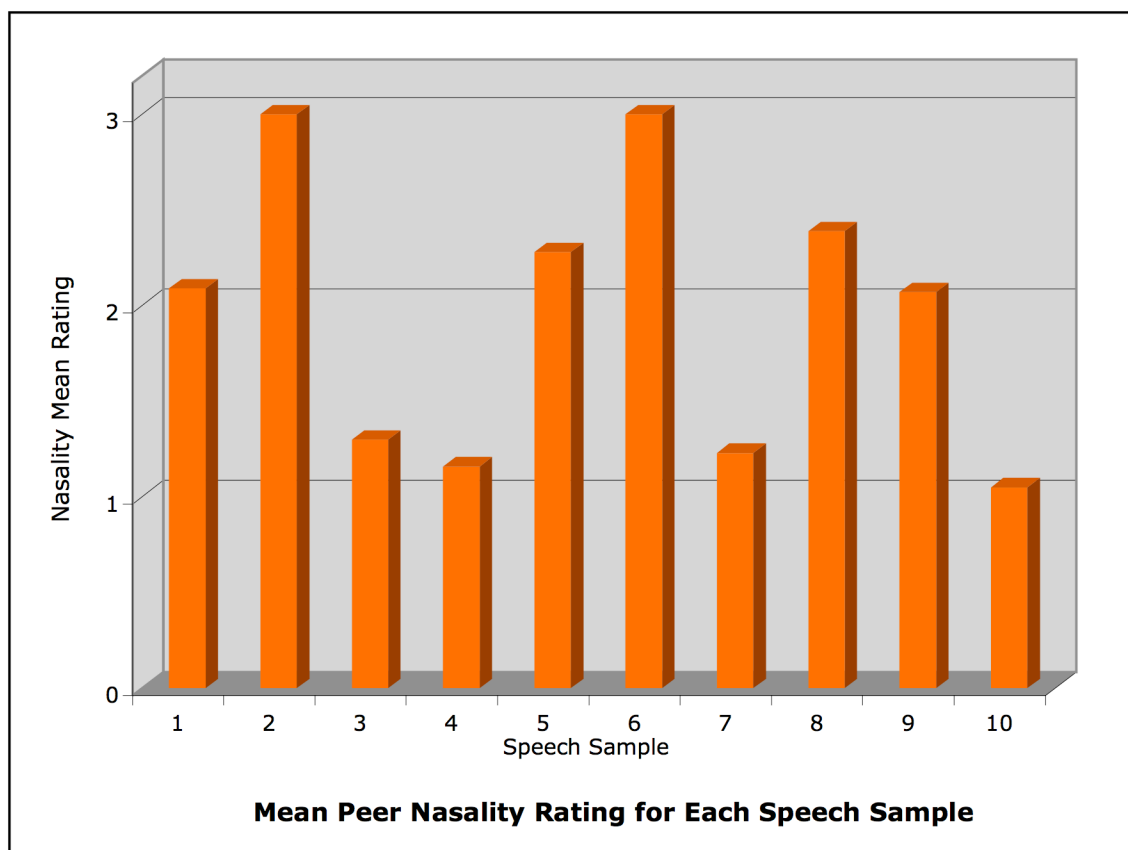


Figure 1 shows the mean peer ($n = 44$) nasality rating for each speech sample. Speech sample 5 was missing one peer rating ($n = 43$). It may be seen that speech sample 2 and 6 both received 100% peer agreement rating as “really hypernasal,” suggesting strong reliability in the peer ratings. Of the four samples chosen to represent “normal” resonance (speech samples 3, 4, 7, and, 10), the peer raters awarded an average rating of 1.19. Specifically, speech sample 3 was given a mean rating of 1.3, speech sample 4 was given a mean rating of 1.16, speech sample 7 was given a mean rating of 1.23, and speech sample 10 was given a mean rating of 1.05.

Table 1. Percentage of peer ratings by level of nasality for each speech sample.

Speech Sample	Nasality Rating		
	“Not Hypernasal”	“Kind of Hypernasal”	“Really Hypernasal”
1	0%	90.9%	9.1 %
2	0%	0%	100%
3	70.5%	29.5%	0%
4	84.1%	15.9%	0%
5	0%	72.1%	27.9%
6	0%	0%	100%
7	79.5%	18.2%	2.3%
8	0%	61.4%	38.6%
9	2.3%	88.6%	9.1%
10	97.7%	0%	2.3%

Table 1 displays the distribution of peer nasality ratings by percentages for degree of nasality. For example, for speech sample 3, it may be seen that 70.5% of the listeners (n = 31) rated the sample as “not hypernasal” and 29.5% rated it as “kind of hypernasal.” For all samples except 7, 9, and 10, peer ratings were either in exact agreement or within one nasality rating. Generally, it should be noted that for each sample there was excellent agreement among the raters. Speech sample 8 revealed the lowest agreement with peer ratings split approximately 60/40 between ratings of 2 and 3 respectively.

Figure 2. Mean Peer Nasality Ratings and to Expert SLP Nasality Ratings.

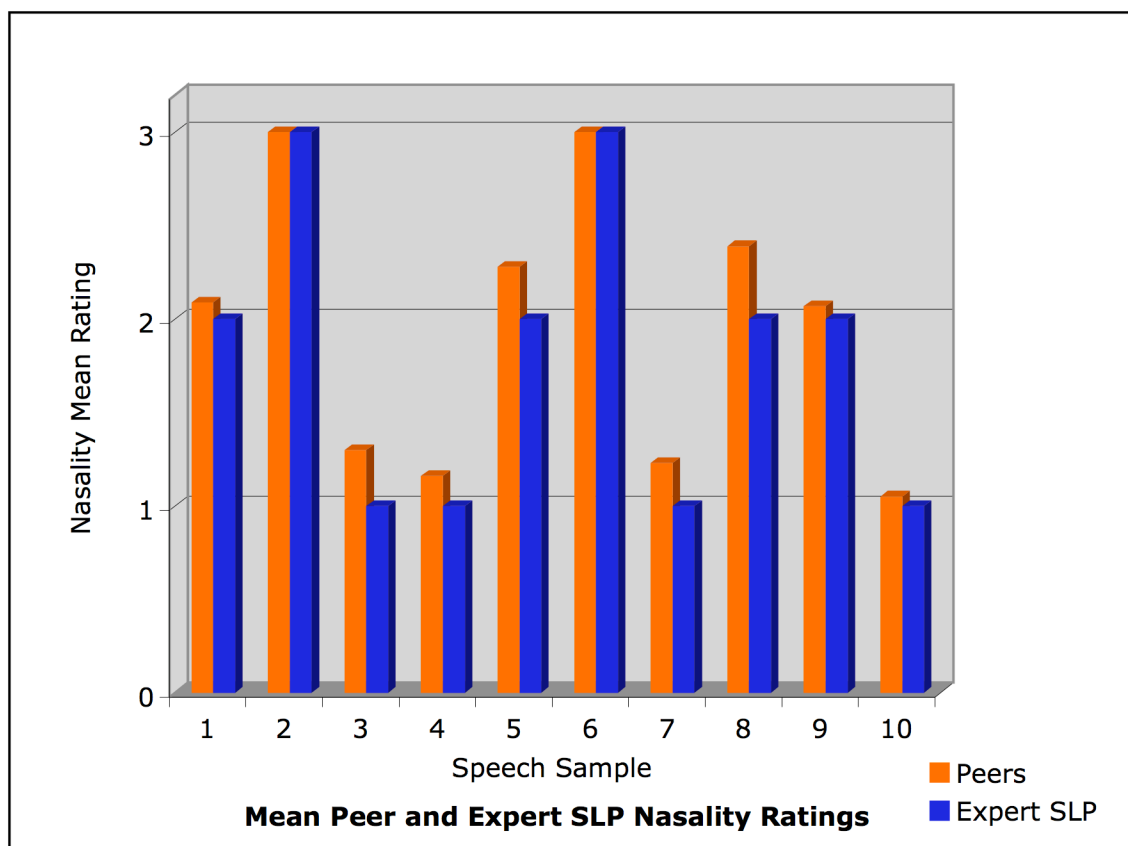


Figure 2 shows mean peer nasality ratings compared to the expert SLP's nasality ratings. Data were compared to determine the extent to which mean peer nasality ratings were the same as the expert SLP nasality ratings. In most every instance, mean peer nasality ratings were slightly higher than the single rating by the expert SLP. An exception to this trend was seen in speech samples 2 and 6, for which mean peer ratings were the same as expert SLP ratings. When rounded to the nearest whole number, there were no differences between mean peer ratings and the single rating by the expert SLP for any of the 10 speech samples.

Tables 2, 3, and 4 show Social Attitude Ratings grouped according to their concomitant nasality rating rounded up or down to the nearest whole number. For

example, speech samples 5 (mean rating = 2.33) and 8 (mean rating = 2.39) were both rounded to a rating of 2, “kind of hypernasal.”

Table 2. “Not hypernasal” Speech Samples Compared to Social Judgments

Social Attitude Question	Nasality Rating		
	Disagree	Kind of Agree	Totally Agree
Question 1 (Good partner)	7%	43%	51%
Question 2 (Fit in with friends)	13%	40%	47%
Question 3 (Would be teased)	72%	21%	7%
Question 4 (Making friends)	12%	43%	45%
Question 5 (Get good grades)	2%	52%	46%

Table 2 shows the percentage of peer ratings in each social judgment category (“Disagree,” “Kind of Agree,” and “Totally Agree”) for the four samples rated “not hypernasal.” It may be seen that “not hypernasal” speech samples were generally viewed with positive social judgments. This indicates that children whose speech is judged to be “not hypernasal” are more likely to be accepted by their peers as a friend, less likely to be teased, and are more likely to be viewed positively than children with any degree of hypernasality. Data also indicate that most listeners (52%) were unsure of how peers who sounded “not hypernasal” would perform academically, while other listeners (46%) felt the peer would get good grades.

Table 3. “Kind-of hypernasal” Speech Samples Compared to Social Judgments

Social Attitude Question	Nasality Rating		
	Disagree	Kind-of Agree	Totally Agree
Question 1 (Good partner)	46%	45%	9%
Question 2 (Fit in with friends)	63%	27%	10%
Question 3 (Would be teased)	14%	40%	49%
Question 4 (Making friends)	35%	56%	9%
Question 5 (Get good grades)	13%	74%	13%

Table 3 shows the percentage of peer ratings in each social judgment category (“Disagree”, “Kind of Agree,” and “Totally Agree”) for the four samples rated “kind of hypernasal.” Speech samples that were rated as “kind of hypernasal,” as compared to samples rated “not hypernasal,” were associated with an increased percentage of negative ratings for all five social attitude questions. For example, 51% totally agreed that a child with normal speech would make a good partner (Table 2), but only 9% totally agreed that a child who was “kind of hypernasal” would make a good partner. This indicates that children who sound “kind of hypernasal” are more likely to be viewed in a more negative way by their peers. Question 2 (this child would fit in with my friends) reveals that most peers felt these children with hypernasal speech would not be accepted as a friend (63%). Data also indicate that listeners were mostly unsure of how peers who sounded “kind of hypernasal” would perform academically. Seventy four percent (74%) chose the middle category of “kind of agree” rather than committing to the clear opinion of “agree” or “disagree”.

Table 4. “Really hypernasal” Speech Samples Compared to Social Judgments

Social Attitude Question	Nasality Rating		
	Disagree	Kind of Agree	Totally Agree
Question 1 (Good partner)	79%	16%	5%
Question 2 (Fit in with friends)	77%	13%	8%
Question 3 (Would be teased)	10%	15%	74%
Question 4 (Making friends)	72%	20%	8%
Question 5 (Get good grades)	43%	48%	9%

Table 4 shows the percentage of peer ratings in each social judgment category (“Disagree,” “Kind of Agree,” and “Totally Agree”) for the two samples rated “really hypernasal.” As compared to samples rated “not hypernasal” or “kind of hypernasal,” speech samples that were rated as “really hypernasal” were associated the greatest percentage of negative judgments across all social attitude questions. This indicates that children who sound “really hypernasal” are less likely to be accepted by their peers as a friend, more likely to be teased, and are viewed more negatively overall. For this group of “really hypernasal” speakers, nearly half of the listeners felt the speakers would “not get good grades.”.

Chapter 4

Discussion

Two objectives of this study were to determine if children could perceive degrees of nasality in the speech of their peers, and to compare those perceptions with those of an expert SLP rater. As previously noted in the “Procedures” section, each participant was asked to listen to 10 speech samples, and then rate the degree of hypernasality using a three-point rating scale and to make social judgments about the speakers (Appendix A).

The findings showed that the mean nasality ratings of the naive listeners were not significantly different than single nasality ratings of the expert SLP. These results suggest that children lacking experience with resonance disorders were still capable of accurately perceiving the degree of nasality in the speech of their peers. There was an initial question regarding validity of nasality ratings when using such a young population for listeners. However, it is interesting to note that the peer listeners were able to successfully use a three-point scale in order to represent the degree of nasality they perceived in the speech samples.

The findings from this study regarding peer nasality ratings are not commensurate with the findings from the Witt et al., 1996 study, which reported that peers were “insensitive” to differences between the speech of a sample of normal children and children with cleft palate. Data from the present study suggest that children are, in fact, sensitive to the differences between normal speech and hypernasal speech. Additionally, our data suggest that not only are peers able to detect the differences between cleft palate speech and normal speech, but they are also able to make reliable judgments about the degree of nasality in speech.

The final objective of this study was to explore how normal peers' social attitudes and judgments towards children are affected by varying degrees of nasality. Again, peers were asked to complete a second rating scale consisting of five social attitude questions (Social Attitude Rating Scale, Appendix B), with 1 representing "disagree", 2 representing "kind of agree", and 3 representing "totally agree." From inspection of Tables 2, 3, and 4, it can be seen that as nasality ratings increased from "not hypernasal" to "really hypernasal," the proportion of positive social judgments decreased. These findings are consistent with Blood and Hyman (1977), who reported that children listeners rated other children with severely hypernasal speech more negatively than normal speakers, and that these patterns begin as early as kindergarten.

Our findings are also consistent with Lallh and Rochet (2000) who reported that listeners rated speakers with normal voice and resonance more positively. These findings further support Blood, Mahan, and Hyman (1979), Gelacek and Neiman (1994), Lass, et al. (1991), Lass, Ruscello, Stout, and Hoffman (1991), McKinnon, Hess, and Landry (1986), and Ruscello, Lass, and Podbesek (1988), whose studies reported that listener perceptions of personality characteristics of people with voice or resonance disorders are primarily negative.

It is interesting to note on Table 3 that the speech samples rated "kind of hypernasal" received the greatest dispersion of attitude ratings across "disagree," "kind of agree," and "totally agree." This suggests that listeners were less opinionated about social attitudes when the degree of nasality was less severe.

Results further showed that peer listeners tended to show social attitude consensus across most social attitude questions. The exception was Question 5 (this child would get

good grades), which reflected uncertainty in how the peer listeners felt the speakers would be perform academically. In this case, the listeners' social attitudes clustered at "kind of agree" regardless of the degree of abnormality, which suggests that the listeners were unsure how peers would perform in the classroom setting on the basis of hypernasality alone.

The raters were clear, however, that a child with hypernasality would not be "a good partner" for an academic activity. For example, on Question 1 (this child would be a good partner for a group activity) 51% of responses were "totally agree" for the normal speech samples. But, for the sample rated as "totally hypernasal" only 7% of responses were "totally agree." This pattern can be seen for all five social judgment questions. There results are similar to McKinnon et al. (1986), which reported that adult listeners prefer more social distance between themselves and hypernasal speakers.

Implications for Further Research

Further research should include repeating this study with a larger population of children. A larger population would yield data that could be tested, and, therefore, provide more information regarding peer perceptions of hypernasal speech. In addition to studying larger groups, it would be necessary to study different age groups and grade levels in order to assess how peer perceptions of hypernasal speech and social attitudes fluctuate with age. Additionally, it would be interesting to expand the rating scale in order to gather more sophisticated information about reliability.

Conclusion

It was concluded that children ages 9 to 12 years can detect and rate varying degrees of nasality in the speech of their peers, and are capable of making reliable

accurate ratings regarding the amount of nasality perceived. Additionally, it was also determined that children do make social judgments of their peers who have hypernasal speech. The results from this study revealed that as children perceive more nasality in the speech of their peers, their attitudes toward them become more negative. This is consistent with previous research suggesting that listeners prefer more normal sounding speech. Furthermore, the results from this study will assist professionals by providing information regarding how peers feel about children with cleft palate speech, and how their influence about receiving the invasive treatments for this disorder may be affected; and, ultimately, the impact of treatment success.

References

- Berger, Z. J., Dalton, L. J. (2009). Coping With a Cleft: Psychosocial Adjustment of Adolescents With a Cleft Lip and Palate and Their Parents. *Cleft Palate Craniofacial Journal*, 46 No. 4, 435-443.
- Blood, G. W., & Hyman, M. (1977). Children's perceptions of nasal resonance. *Journal of Speech and Hearing Disorders*, 42, 446-448.
- Blood, G. W., Mahan, B. W., & Hyman, M. (1979). Judging personality and appearance from voice disorders. *Journal of Communication Disorders*, 12, 63-68.
- Brancamp, T. U., Lewis, K., Watterson, T. (2010). The Relationship Between Nasalance Scores and Nasality Ratings with Equa. *Cleft Palate Craniofacial Journal*.
 Appearing Intervals and Direct Magnitude Estimation Scaling Methods *The Cleft Palate Craniofacial Journal*, 47, 631 - 637.
- Bzoch, K.R., ed. *Communication Disorders Related to Cleft Lip and Palate*. 4th ed. Austin, TX: Pro-Ed; 1997.
- Feragen, K. B., Borge, A. I., Rumsey, N. (2009). Social Experience in 10-Year-Old Children Born With a Cleft: Exploring Psychosocial Resilience. *Cleft Palate Craniofacial Journal*, 46 No. 1, 66-74.
- Garth, B., Aroni, R. (2003). 'I Value What You Have to Say.' Seeking the Perspective of Children with a Disability, Not Just Their Parents. *Disability & Society*, 18, 561-576.
- Gelacek, M. T., & Neiman, G. S. (1994, November). *Listeners' perceptions of females with hoarse and normal voice quality*. Paper presented at the meeting of the American Speech-Language-Hearing Association, New Orleans, LA.

- Kapp-Simon, K. A., McGuire, D. E. (1997). Observed Social Interaction Patterns in Adolescents with and without Craniofacial Conditions. *Cleft Palate-Craniofacial Journal*, 34, 380-384.
- Kummer, Ann W. (2008). *Cleft Palate and Craniofacial Anomalies Effects on Speech and Resonance*. Clifton Park, NY: Delmar Cengage Learning.
- Lallh, Amarpreet K., Rochet, Anne P. (2000). The Effect of Information on Listeners' Attitudes Toward Speakers with Voice or Resonance Disorders. *Journal of Speech, Language, and Hearing Research*, 43, 782-795.
- Lass, N. J., Ruscello, D. M., Harkins, K. E., Blankenship, B. L. (1993). A Comparative Study of Adolescents' Perceptions of Normal-Speaking And Dysarthric Children. *Journal of Communication Disorders*, 26, 3-12.
- Lass, N. J., Ruscello, D. M., Harkins Bradshaw, K., & Blankenship, B. L. (1991). Adolescents' perceptions of normal and voice-disordered children. *Journal of Communication Disorders*, 24, 267-274.
- Lass, N. J., Ruscello, D. M., Stout, L. L., & Hoffman, F. M. (1991). Peer perceptions of normal and voice disordered children. *Folia Phoniatica*, 43, 29-35.
- Leonard, B. J., Brust, J. D., Abrahams, G., Sielaff, B. (1991). Self-Concept of Children and Adolescents with Cleft Lip and/or Palate. *Cleft Palate-Craniofacial Journal*, 28, 347-353.
- McKinnon, S. L., Hess, C. W., & Landry, R. G. (1986). Reactions of college students to speech disorders. *Journal of Communication Disorders*, 19, 75-82.
- McWilliams, B.J., Morris, H.L., Shelton, R.S. *Cleft Palate Speech*. 2nd ed. Philadelphia: BC Decker; 1990.

- Nowicki, E.A. (2006). A Cross-Sectional Multivariate Analysis of Children's Attitudes Towards Disabilities. *Journal of Intellectual Disability Research*, 50, 335-348.
- Reed, J., Robathan, M., Hockenhull, A., Rostill, H., Perrett, D., Lees, A. (1999). Children's Attitudes Toward Interacting with Peers with Different Craniofacial Anomalies. *Cleft Palate-Craniofacial Journal*, 36, 441-447.
- Richman, L. C. (1997). Facial and Speech Relationships to Behavior of Children with Clefts Across Three Age Levels. *Cleft Palate-Craniofacial Journal*, 34, 390-395.
- Richardson, S.A., Goodman, N., Hastorf, A.H., Dornbusch, S.M. (1961). Cultural Uniformity in Reactions to Physical Disabilities. *Am Social Rev*, 26, 241-247.
- Ruscello, D. M., Lass, N. J., & Podbesek, J. (1988). Listeners' perceptions of normal and voice-disordered children. *Folia Phoniatica*, 40, 290-296.
- Stengelhofen, J. The Nature and Causes of Communication Problems in Cleft Palate. In: Stengelhofen, J, ed. *Cleft Palate Journal*. Edinburgh: Churchill Livingstone; 1989.
- Tobiasen, J. M., Hiebert, J. M. (1993). Combined Effects of Severity of Cleft Impairment and Facial Attractiveness of Social Perception: An Experimental Study. *Cleft Palate-Craniofacial Journal*, 30, 82-86.
- Witt, P. D., Berry, L. A., Marsh, J. L., Grames, L. M., Pilgram, T., K. (1996). Speech Outcome Following Palatoplasty in Primary School Children: Do Lay Peer Observers Agree with Speech Pathologists? *Journal of Plastic and Reconstructive Surgery*, 98, 958-965.

APPENDIX A

Circle one: **Boy** **Girl**

Age: _____

Nasality Rating Scale

How does this child's speech sound to you? Please circle one.

#1	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#2	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#3	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#4	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#5	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#6	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#7	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#8	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#9	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal
#10	1 Not hypernasal	2 Kind of hypernasal	3 Really hypernasal

When you are finished, please put this sheet in the envelope given to you.

APPENDIX B

Circle one: **Boy** **Girl**

Age: _____

Social Attitude Rating Scale

For each speech sample, please circle the answer you feel is best.

Sample #1

This child would be a good partner for a group activity.	1 Disagree	2 Kind of agree	3 Totally agree
This child would fit in with my friends.	1 Disagree	2 Kind of agree	3 Totally agree
This child would be teased.	1 Disagree	2 Kind of agree	3 Totally agree
This child would have an easy time making friends.	1 Disagree	2 Kind of agree	3 Totally agree
This child would get good grades.	1 Disagree	2 Kind of agree	3 Totally agree

APPENDIX C

DATE

Dear Classroom Teacher:

The Department of Speech Pathology and Audiology at the University of Nevada, Reno, is conducting a study involving students at the Coral Academy of Science Elementary School. The study has been approved by the University of Nevada, Reno, Office of Human Research Protection, and by Mr. Yilmaz Ak. The intent of this study is to better understand children's opinions of hypernasal speech. Each participating student will be asked to listen to audio recordings of children's speech, and to rate the degree of nasality in each sample. This should take about 30 minutes, and will be scheduled at your convenience.

We are asking for your help in inviting participants for this study:

1. Please distribute one packet to each student in your class.
2. The envelopes are to be returned to your classroom and placed in the folder provided by the researcher by (date here).
3. We will collect the folder from you on (date).

You will be contacted regarding the scheduling time for this study. Thank you for your assistance. If you have any questions, please contact Thomas Watterson, Ph.D, Kerry Lewis, Ph.D., Tami Brancamp, Ph.D., or Mr. Yilmaz Ak.

Thomas Watterson, Ph.D., CCC-SLP
(775) 784-4887

Kerry E. Lewis, Ph.D., CCC-SLP
(775) 784-4887

Tami U. Brancamp, Ph.D., CCC-SLP
(775) 784-4887

Cecilia Mancini, Graduate Student

APPENDIX D

DATE

Dear Parent:

We are asking for your help with a research study by the Department of Speech Pathology and Audiology at the University of Nevada, Reno. This study may help us understand a child's opinion of hypernasal speech. Hypernasal speech is when extra sound comes out of the nose when talking. A child's opinion of hypernasal speech may differ from a Speech Language Pathologist's (SLP). Your child will rate how much hypernasal speech he/she hears in audio recordings. He/she will also answer social attitude questions about what they heard. Both ratings will be compared to an SLP's.

If you agree to allow your child to be in this study:

1. Please read, initial each page, and sign the last page of one copy of the "Consent to Participate in a Research Study."
2. Put the signed document in the provided manila envelope and have your child return it to his/her classroom teacher.
3. Keep the other copy for your own records.

If you have any questions, please contact us at (775) 784-4887. If you do not want your child to be in this study, please disregard this letter. Thank you for your help with this study.

Thomas Watterson, Ph.D., CCC-SLP
(775) 784-4887

Kerry E. Lewis, Ph.D., CCC-SLP
(775) 784-4887

Tami U. Brancamp, Ph.D., CCC-SLP
(775) 784-4887

Cecilia Mancini, Graduate Student
(775) 784-4887

APPENDIX E

**UNIVERSITY OF NEVADA, RENO, SOCIAL BEHAVIORAL INSTITUTIONAL
REVIEW BOARD
PARENTAL PERMISSION FOR CHILD TO PARTICIPATE IN RESEARCH
STUDY**

Title of Study: Peer Perceptions of Hypernasal Speech in Children

Investigators: Thomas Watterson, Ph.D. (775) 784.4887
Kerry E. Lewis, Ph.D. (775) 784.4887
Tami U. Brancamp, Ph.D. (775) 784.4887
MariaCecilia Mancini, B.A. (775) 784.4887

Protocol #: SA09/10-013

PURPOSE

You are being asked to allow your child to participate in a research study being conducted by the Department of Speech Pathology and Audiology at the University of Nevada, Reno. The purpose of this study is to understand how children evaluate hypernasal speech of their peers. Hypernasality, or hypernasal speech, is excess of sound resonated in the nasal cavity during speech production. Peer evaluations will be compared to the ratings of a Speech Language Pathologist (SLP) experienced in treating children with hypernasal speech.

PARTICIPANTS

You are being asked to allow your child to participate in this research study, because he/she is between 9 and 12 years of age. We are anticipating approximately 100 participants in this study.

PROCEDURES

Have your child return this signed document to their classroom teacher in the provided manila envelope. The researcher will provide a folder to collect the manila envelopes returned by the students, and will be collected from the school site by the researcher after the allotted time period. On the day of data collection, your child will be escorted by the researcher to a selected room at the school site. A Script for Obtaining Child Assent to Participate will be read by the researcher in the data collection room. Your child will then receive a Child's Assent to Participate document to read and sign if he/she agrees to participate in the study. If your child does not want to participate, then that is okay, and he/she will be escorted back to the classroom.

If your child volunteers to participate in the research study, he/she will listen to approximately 10 brief audio recordings of speech samples of children. Your child will rate the degree of nasality they hear in each sample on a three-point scale from 1 = not hypernasal to 3 = really hypernasal. When finished, he/she will put the completed hypernasal rating scale in the envelope provided by the researcher. Your child will then

listen to the same audio recordings in different order and will rate questions related to social attitudes on a separate social rating scale from 1 = disagree to 3 = agree. For example, "This child might have trouble making friends." Your child will put the second rating scale in the same envelope. After the envelopes are collected by the researcher, he/she will be escorted back to the classroom by the researcher. The response forms will contain no information that identifies your child.

DISCOMFORTS, INCONVENIENCES, AND/OR RISKS

The risks involved in this study are minimal. Your child will need to be removed from the classroom setting for approximately 30 minutes to participate in this study. Therefore, your child will be absent from classroom instruction during this time. This time slot will be at a time the teacher deems least disruptive to your child's school day, and scheduled at the teacher's convenience. Your child's grade will not be affected if he/she does not participate in this study.

BENEFITS

There may be no benefits to your child participating in this study. The information obtained may provide information to Speech Language Pathologists (SLPs) regarding speech acceptability in the target age group. The information may also help SLPs expand their understanding, assessment, and treatment of children with hypernasal speech. Your child's grade will not be affected by participating in this study.

CONFIDENTIALITY

Your child's identity will be protected to the extent allowed by the law. Your child will not be personally identified on any of the rating scales or in any reports or publications that may result from this study. All information and completed rating scales will be kept strictly confidential, and will only be made available to the investigator.

The US Department of Health and Human Services, other federal agencies as necessary, and the University of Nevada, Reno Social Behavioral Institutional Review Board may inspect your child's study records.

The information and rating scales collected will be kept in locked files in the Speech Pathology and Audiology Department at the University of Nevada, Reno. All information collected will be kept for five years from the time of collection and will then be destroyed. Any further use of the information and recordings will not occur unless written permission is obtained from you.

COSTS AND COMPENSATIONS

There will be no costs or compensation for you or your child for his/her participation in this study.

RIGHT TO REFUSE OR WITHDRAW

You may refuse to allow your child to participate or withdraw him/her from the study at any time without penalty. If your child does not want to participate in this study, or if

your child tires during the study procedures, then he/she will be escorted back to the classroom.

QUESTIONS

If you have questions about this study, please contact Thomas Watterson, Kerry Lewis, or Tami Brancamp at 775.784.4887.

You may ask about your child's rights as a research subject or you may report (anonymously if you so choose) any comments, concerns, or complaints to the University of Nevada, Reno Social Behavioral Institutional Review Board, telephone number (775) 327-2368, or by addressing a letter to the Chair of the Board, c/o UNR Office of Human Research Protection, 205 Ross Hall / 331, University of Nevada, Reno, Reno, Nevada, 89557.

CLOSING STATEMENT

I have read () this consent form or have had it read to me (). [Please check one]

I am aware that I had the opportunity to ask questions (see Questions above). I have been told of the risks or discomforts and possible benefits of this study.

If I do not give my permission for my child to take part in this study, my refusal will involve no penalty or loss of rights to which I am entitled. I may withdraw my child from this study at any time without penalty.

I have been told about my child's rights as a research subject, and I voluntarily give permission for my child to participate in this study. I have been told what the study is about and how and why it is being done. All of my questions have been answered.

I received a copy of this parental permission form to keep for my own records.

Print Child's Name	Child's Age	Birth Month and Year
--------------------	-------------	----------------------

Signature of Parent	Date
---------------------	------

Signature of Investigator	Date
---------------------------	------

APPENDIX F

Form for Obtaining Child's Assent to Participate (ages 9 to 12 years)

You are being asked to be in a study about children with hypernasal speech. Hypernasal speech is when extra sound comes out of the nose when talking. An example of this kind of talking will be played for you.

If you want to be in this study, you will listen to some recordings of children talking. Then you will give your opinion about what you heard. I will give you a rating scale where you will circle what you think about the speech. There are no right or wrong answers, just your opinion. This will take about 30 minutes.

If you do not want to be in this study, that is okay. No one will be upset with you. Being in this study will not help your grade. If you do not want to be in this study, it will not hurt your grade.

I had a chance to ask questions about this study. I want to be in this study. If I want to stop at any time, no one will be upset with me and I can go back to my classroom.

Name

Date