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ABSTRACT

Advances in the diagnoses and treatment of pediatric voice disorders have evolved over the years, however little research has focused on the publics’ perceptions of individuals with a voice disorder. Establishing a better understanding of how the public perceives those with a voice disorder may provide increased insight into how the community’s views impact an individual with a voice disorder’s education, social and future outcomes. The primary aim of this study was to explore middle and high school teachers’ perceptions of personality traits and quality of life in female adolescents with varying degrees of voice disorders.

A web-based survey using Questionpro.com was created to collect data. Four voice samples, which had been previously rated by two experienced speech-language pathologists using the Consensus Auditory-Perceptual Evaluation of Voice, were downloaded into the survey (normal, mild, moderate, severe). Thirty-two teachers answered 25 questions per voice related to personality traits (18 attributes) and quality of life (6 questions). Analyses of variance were used to compare means with post-hoc testing, using the Dunnett test, to determine significant differences between groups. Each survey (personality traits and quality of life) was analyzed separately. Data for each survey were analyzed in the following ways: normal voice compared to combined voice disordered groups, normal compared to individual voice disorder type, and across voice disordered severity type (mild, moderate, severe).

The findings of the study indicate that personality traits and quality of life in adolescent females with moderate and severe voice disorders were rated more negatively by middle and high school teachers’ than those with a normal or mild voice disorder.
Importantly, the more severe the voice disorder, the more negative ratings of personality traits and quality of life became. Findings suggest that adolescent female students with a moderate and severe voice disorder have a hidden handicap and are most at risk for academic, social, and vocational difficulties stemming from ones negative perceptions. Informing teachers, speech-language pathologists, patients, and families about the subtle biases and perceptions of teachers’ may improve education, social, and vocational outcomes. Furthermore, teaching self-advocacy may be necessary to help students with a voice disorder obtain an optimal educational experience.
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CHAPTER I

INTRODUCTION

A voice disorder is defined as “a deviant vocal behavior(s) related to perceptual properties such as pitch, loudness, and overall quality of voice, which are inappropriate for an individual's age or gender” (Aronson, 1990). The incidence of pediatric voice disorders, including adolescents, is estimated to range from 6-40% (Senturia & Wilson, 1968; Silverman & Zimmer, 1975; Hoffman-Ruddy & Sapienza, 2004). It has been suggested that voice disorders negatively impact the educational, psychological, and social well-being of children through adolescence (Senturia & Wilson, 1968; Silverman & Zimmer, 1975; Hoffman-Ruddy & Sapienza, 2004). Adolescents with a voice disorder may be at increased risk, when compared to adolescents with no voice disorders, for negative academic, social, and occupational outcomes due to negative stereotyping by others, which may then disrupt their trajectory for well-being and optimal health.

Adolescence is a time of transition from childhood to adulthood, where physiological, anatomical, social, emotional, and psychological changes are rapidly occurring. An adolescent’s experiences, psychological adjustment, and self-perception during this developmental transition have a significant impact on her current (and future) decisions and behaviors (Berntsson et al., 2007). Adolescents are highly influenced by teachers, peers, and parents, care about what others think of them, and want to be accepted (Berzonsky & Adams, 2003). Negative impressions, perceptions, and expectations of others towards the adolescent may affect her identity.

A listener’s impressions and perceptions of an individual’s personality traits (which include decisiveness, happiness, character, sociability) are partially based on
sensory cues, such as a person’s voice. Social psychologists, exploring whether personality traits could be inferred from one’s voice, reported that voice influences a listener’s perceptions of a speaker, and affects his or her judgments of personality traits, a phenomenon they termed “vocal stereotyping” (Allport & Cantrill, 1934; Diehl, 1960; Kramer, 1963; Pear, 1931; Ross & Stanger, 1936). For example, individuals described as having a “babyish” voice were rated to be more warm and honest, with lower confidence and power, compared to those who were described as having a vocally mature voice (Berry, 1991, 1992, 1994; Pear, 1931; Diehl, 1960; Kramer, 1963). More recently, speech-language pathologists have applied the notion of vocal stereotyping to understand how people with voice disorders are perceived by others. Understanding how people perceive adolescents with a voice disorder is important because adolescents are a vulnerable population due to their age, and negative stereotyping may lead to a lower health related quality of life.

Teachers’ perceptions and stereotypes are known to have an effect on students’ academic achievement, quality of life, self perceptions, social interactions, and future occupation (Becker & Maiman; 1985; Overby, Carrell, Bernthall, 2007). Furthermore, teachers’ perceptions of their students lead to certain expectations that can have positive or negative influences on a student’s academic performance and achievement (Braun, 1976; Cherry, 1978). For example, negative teacher expectations typically lead to poor academic performance (Babad, 1993; Brophy, 1982; Cooper & Good, 1993). Communication-based factors such as not volunteering to speak in class, speaking out of turn, not attending to task, and inability to speak loudly in class have been shown to
influence a teacher’s development of negative expectations of students (Ripich, 1989; Silliman & Wilkinson, 1991).

Adolescents with a voice disorder have themselves reported a variety of negative effects in the classroom, such as limited classroom participation, decreased concentration, and embarrassment (Hoffman-Ruddy & Sapienza, 2004). When asked to identify the biggest problem with their voices, adolescents with a voice disorder reported physical and emotional factors to be the most prevalent concerns (Connor et al., 2008). Physical complaints include the inability to be heard clearly in class (Connor et al., 2008). The most frequently expressed emotional factors were feelings of anger, frustration, sadness, nervousness, or embarrassment (Connor et al., 2008). Furthermore, these adolescents may use inappropriate vocal strategies such as talking loudly or whining as a way to solve interpersonal problems or to gain attention, compounding their risk of being evaluated negatively by their teachers (Hoffman-Ruddy & Sapienza, 2004). Social-emotional implications resulting from negative perceptions include withdrawal and vocally-aggressive behaviors, leading to negative teacher reactions (Hoffman-Ruddy & Sapienza, 2004).

To date, research has focused on perceptions of college-aged students towards children and adults with voice disorders (Lass, Ruscello, Bradshaw, Blankenship, 1991; Lass, Ruscello, Stout, Hoffman, 1991; Ruscello, Lass, Podbesrk, 1988). Children and adults with voice disorders have been perceived as having both social and intellectual deficits when compared to aged-matched peers without voice disorders (Lass, Ruscello, Bradshaw, Blankenship, 1991; Lass, Ruscello, Stout, Hoffman, 1991; Ruscello, Lass, Podbesrk, 1988). Socially, people have reported feeling that children and adults with

Individuals with voice disorders have also been perceived as less intelligent, less competent, and less employable than normal-voiced speakers (Lass et al., 1991; Gelacek & Neiman, 1994; Ruscello et al., 1988). A limitation in previous research has been the tendency to focus on perceptions of college-aged students towards children and adults with a voice disorder; far less attention has been given to how teachers perceive adolescents with a voice disorder. Given the amount of time an adolescent spends at school and the role of their teachers in shaping their future directions and decisions, the next necessary step is to understand how teachers perceive adolescents with voice disorders.

Awareness of teachers’ perceptions of and biases towards adolescents with voice disorders is imperative to understand the possible effects a voice disorder may have on that young person’s education. Such knowledge could ultimately improve their education, school services, and quality of life outcomes. This study therefore aims to explore middle and high school teachers’ perceptions of personality characteristics including intelligence, self-esteem, friendliness, and quality of life in adolescents with normal voices and with varying degrees of voice disorders.

The subsequent chapter is organized in the following fashion: background of voice and voice disorders, expert perceptions of voice and voice-related quality of life
instruments, adolescent development, and impact of teacher’s expectations. The purpose of this study was to establish a better understanding of how middle and high school teachers’ perceive adolescent females with a voice disorder. Below are the research questions that were asked.

**Research Questions**

1) Do middle and high school teachers rate personality traits differently in female adolescents with a voice disorder compared to same aged females with no voice disorder?

2) Do middle and high school teachers rate personality traits differently in female adolescents with a voice disorder across severities (mild, moderate, severe) compared to same aged females with no voice disorder?

3) Do middle and high school teachers rate personality traits differently in female adolescents across severities of voice disorders: mild, moderate, and severe?

4) Do middle and high school teachers rate quality of life differently in female adolescents with a voice disorder compared to same aged females with no voice disorder?

5) Do middle and high school teachers rate quality of life differently in female adolescents with a voice disorder across severities (mild, moderate, severe) compared to same aged females with no voice disorder?

6) Do middle and high school teachers rate quality of life differently in female adolescents across severities of voice disorders: mild, moderate, and severe?
CHAPTER II

REVIEW OF THE LITERATURE

This chapter provides an overview of the various cognitive and socio-emotional changes an adolescent is undergoing and why these changes together with a voice disorder may increase an adolescent’s vulnerability. The definition and prevalence of voice disorders followed by a review of the various adolescent voice disorders is described next (for a complete review of voice and voice disorders, please refer to Appendix A). What contributes to the formation of perceptions of others and the impact teachers may have on their students based on their perceptions and expectations of them will be examined. The chapter concludes with the statement of purpose, research questions, and hypotheses.

Adolescent Development: Biological, Cognitive, and Psychosocial Considerations

Adolescence is a time of transition from childhood to adulthood when biological development along with social, emotional, and cognitive maturity occurs. These changes often lead to moments of awkwardness, anger, depression, and self-consciousness. The presence of a voice disorder in combination with these changes may affect the education, identity, and overall quality of life of an adolescent.

Puberty begins as rapid physical growth and sexual maturity occurs. These physical changes are triggered by hormones, resulting in a growth spurt, primary sex characteristics, and secondary sex characteristics (Marshall, 1978). Hormonal changes may also contribute to emotional instability such as quick shifts in extremes of emotions.
However, dealing with rapid outward physical changes, including changes in pubertal development, may have a more psychological impact on the adolescent (Marshall, 1978).

During these years, advances in cognition and more complex thinking begin to emerge. The ability to think and reason begins to shift from concrete to hypothetical and abstract. The use of more complex thinking is focused on personal decision making in school and home environments, including questioning authority and society standards, and verbalizing one’s own thoughts and views on a variety of topics in her life (Keating, 2004). Consequently, adolescents become increasingly aware of and interested in the opinions and judgments of adults and peers, leading to self-consciousness (Steinberg, 2005). If an adolescent has a physical difference such as a voice disorder, the feeling of self-consciousness may intensify, impacting academic, social, and occupational outcomes.

Adolescence is also a time when one searches for self-understanding and insights regarding their identity. Social adjustment and peer relationships represent early developmental tasks and are important milestones for functioning in adulthood. Social rejection in early life has been associated with socioemotional adjustment problems in late adolescence and adulthood (Parker & Asher, 1987). During this time there can be an increase in various social and athletic activities that may lead to an increase in yelling, speaking over noise, and cheering, all of which have the potential to be vocally abusive behaviors leading to development of a voice disorder. Furthermore, unhealthy eating habits such as high intake of fatty foods and caffeinated and carbonated beverages and risky behaviors (e.g., smoking, alcohol and drug use) are all increased during this time of development and all may elevate the likelihood of laryngopharyngeal reflux (LPR) or
exacerbate an already chronic voice disorder (French, Story, Fulkerson, Gerlach, 2003). Presence of a voice disorder has the potential to interfere with opportunities for normal socio-emotional development by limiting age-appropriate social interaction leading to difficulty with establishing and maintaining healthy relationships.

**Definition and Prevalence of Adolescent Voice Disorders**

*Voice Disorder Defined by the American Speech-Language-Hearing Association (ASHA).* The American Speech and Language Association (ASHA) define a voice disorder as “the abnormal production and/or absences of vocal quality, pitch, loudness, resonance, and/or duration, which is appropriate for an individual’s age and/or sex” (American Speech-Language-Hearing Association, 1993). More specifically, ASHA defines dysphonia as:

“an impairment of the speaking or singing voice…aris[ing] from an abnormality of the structures and or functions of the voice production system and can cause bodily pain, a personal communication disability, and an occupational or social handicap” (American Speech-Language-Hearing Association, 1993).

Voice disorders may occur over the life-span, however, the instability of the developing voice together with development of social, cognitive, and emotional domains during adolescence places teens at particular risk for developing laryngeal pathologies and subsequent voice disorders (Dejonkere, 1984; Dobres, Lee, Stemple, Kummer, Kretschmer, 1990).

*Prevalence of Voice Disorders.* Pediatric voice disorders (defined as up to age 21) are common. The estimated incidence has been in the range of 6-40% and has been
suggested to negatively impact a child’s educational, psychological, and social well-being (Senturia & Wilson, 1968; Silverman & Zimmer, 1975, Hoffman-Ruddy & Sapienza, 2004). The precise distribution of voice disorders across the pediatric period is not known, but over one million children and adolescents may have a voice disorder in the United States (Choi, Zalzal, 1999).

**Adolescent Voice Disorders**

Adolescence is a time of rapid change in social activities (parties, select sports, etc) and behaviors (drinking, smoking) which may place adolescents at an increased risk for a variety of vocal pathologies. Additionally, voice disorders are typically multifactored and may include additional medical diagnoses, psychological issues, and communication needs. The rapid change in development together with a voice disorder may increase an adolescent’s vulnerability for negative outcomes related to health-related quality of life due to their developing personality and identity. The following describes the pathophysiology of dysphonia followed by explanations of both high and low incident voice disorders in the adolescent population.

*Pathophysiology of Dysphonia.* Injury or alteration to the vocal mechanism changes its sound production, resulting in an abnormal voice quality. There are numerous etiologies of dysphonia including abnormal pulmonary subglottal air pressure, vocal fold lesions, scarring, movement restrictions, or abnormal function (use) of the vocal mechanism. Altered or reduced subglottal air pressure problems are related to changes in pulmonary function, commonly due to neurological, muscular, or functional disorders. These patients typically will have poor motor control, anatomic alterations or a
specific deficit in pulmonary function. Vocal fold lesions or irregularities of the vocal fold cover and/or body may be the result of tumors, benign growths (e.g., nodules, cysts), and vocal fold atrophy. Movement restrictions can include vocal fold paralysis or paresis, cricoarytenoid joint fixation or dislocation, tremors and spasms. Scarring of the vocal folds (from intubation and/or surgical intervention) usually creates stiffness, causing the patient to use excessive subglottal air pressure to set into vibration. Voice disorders resulting from an inappropriate posture or use of the vocal mechanism (e.g. chronic shouting or screaming) are functional voice disorders. Changes in the vocal fold structure and movement results in various glottic closure configurations and altered vibratory characteristics. Specific etiologies and descriptions of common adolescent dysphonia are discussed below.

*Nodules and Cysts.* Vocal fold nodules are benign lesions occurring bilaterally, within the lamina propria, at the anterior one-third portion of the vocal folds. Prevalence rates are estimated between 3-9% of the adolescent population (Verdolini, Rosen, Branski, 2006, p. 39). Nodules interfere with the vibratory characteristics of the vocal folds, creating an abnormal vocal quality. The extent of abnormal voice quality is dependent upon the size of the nodules. Adolescent girls are at greatest risk due to heavy voice use combined with loud voice activities (e.g., cheerleading) (REF). Nodules are thought to be the direct result of phonotraumatic behaviors such as yelling, speaking over noise, and chronic throat clearing. Precipitating factors may include allergies, acid reflux, tobacco use, and alcohol.

Individuals with vocal fold nodules, cysts, and respiratory papillomatosis present with various perceptual voice qualities consisting of but not limited to hoarseness,
breathiness, and decrease in pitch range. Initially, ear, nose, and throat surgeons believed that surgical removal of vocal fold nodules was the most effective treatment. Although this approach quickly solved the immediate dysphonia, there was a large recurrence rate of the nodules. In view of this, behavioral intervention together with vocal hygiene therapy is the current treatment of choice.

Cysts are congenital or acquired with no clear etiological factors. They are fluid filled, sessile growths that may occur anywhere on the membranous portion of the vocal folds, laryngeal vestibule, or ventricular folds. Vocal fold cysts typically occur unilaterally on the medial edge of the superficial layer of the lamina propria. Because cysts are unilateral, contralateral thickening may occur as a result of phonation. As with nodules, the size of the cyst influences the extent of dysphonia. Though surgery is the best option, pre-surgical behavioral voice therapy may be beneficial in order to get the vocal mechanism into best condition. Then post-surgical voice therapy may be implemented to help with recovery.

Papillomatosis. Recurrent respiratory papillomatosis (RRP) is the most common benign neoplastic disease of the larynx in children and adolescents, affecting 4 in 100,000 individuals (Colten & Casper, 1996). Papilloma’s are a chronic medical condition, often recurring throughout childhood and into adulthood. These lesions may occur in various locations throughout the airway. Surgical excision is necessary because papillomas proliferate extensively, causing airway obstruction and at times dysphonia. Multiple surgeries may be required for some individuals with papillomas due to high recurrence rate.
Studies report that adolescents with RRP have statistically lower health-related quality of life measures when compared to healthy children (Lindman, Lewis, Accortt, Wiatrak, 2005). This may be a reflection of the numerous surgical interventions and abnormal voice quality. Papillomas affect vocal fold vibration by increasing the mass and stiffness, and altering the biomechanical properties of the true vocal folds. Voice quality in individuals with papilloma progressively becomes worse, secondary to the growths and multiple airway surgeries.

**Unilateral vocal fold paralysis.** Unilateral vocal fold paralysis (UVFP) can either be congenital or acquired and occurs from recurrent or superficial laryngeal nerve damage. Most common etiologies in the adolescent population are: laryngeal trauma, cardiothoracic surgery, and infections. There are two types of UVFP: adductor and abductor. Adductor paralysis is the most common and presents with the paralyzed vocal fold in an abducted/paramedian position. Abductor paralysis occurs when the position of the paralyzed vocal fold is at midline. These 2 types of paralysis typically present with very different voices. Adductor paralysis complaints include: breathiness and poor vocal projection. Abductor paralysis typically results in normal conversational speech; however trying to increase volume of voice may be difficult. Speech therapy may be useful in treating some cases; however others require surgery.

**Laryngeal Trauma.** Laryngeal trauma occurs when an adolescent is in an accident that injures the larynx. These types of injuries typically result in severe airway damage and require intubation with subsequent airway reconstruction. Intubation is necessary when the airway is compromised (i.e., unable to breath due to severe airway injury). A breathing tube is placed in (which lies between the vocal folds) so the individual is able
to breathe. In the majority of the cases in order for the tube to be removed, airway reconstruction (e.g., enlarging the airway, removing injured section of airway) is required. In view that the vocal folds lay above the airway, and air pressure help move them, adolescents’ post-airway reconstruction typically present with abnormal voice qualities. Refer to subglottic stenosis section for further voice characteristics post airway reconstruction.

Subglottic Stenosis. Subglottic stenosis can either be congenital or acquired, and is defined as narrowing of the subglottic region. Airway reconstruction may be necessary in order for the individual to breathe more efficiently. Subglottic stenosis is most prevalent among the pediatric population; and has been reported that approximately 50% of this population have a dysphonic voice (Krival et al., 2007). Depending on the type of airway surgery, there are a variety of voice characteristics: roughness, breathiness, reduced average fundamental frequency (lower pitch), reduced pitch range, and reduced maximum phonation time.

Although limited longitudinal research in the post airway reconstruction population has been completed; clinically we know an adolescent with a history of airway reconstruction and subsequent dysphonia continues to tackle voice issues through adolescence and beyond.

Puberphonia. Puberphonia is diagnosed when there is a persistent use of a high-pitched voice, without a known cause, during or after puberty. Males are more commonly diagnosed but it may also manifest in females. Psychosocial factors may be involved such as difficulty with male identification or acceptance of adulthood. Furthermore, because males experience such significant laryngeal growth during this
time, frequent pitch beaks are not uncommon, leading to lack of control of the voice. Therefore, some individuals may attempt to hold onto the known voice to attain control (Colton & Casper, 1996). The voice is typically characterized by a falsetto-like voice with frequent downward pitch breaks. Other vocal symptoms may include hoarseness and/or breathiness.

**Paradoxical vocal fold dysfunction.** Paradoxical vocal fold dysfunction (PVFD) is the inappropriate adduction (closure) of the true vocal folds during inspiration or expiration, leading to airway obstruction (Andrianpoulos, Gallivan, Gallivan, 2000; Mathers-Schmidt, 2001). This results in tightness of the throat and consequently feeling as if one is not able to breathe. Episodes last approximately 5-10 minutes. Individuals with PVFD are frequently misdiagnosed with exercise induced asthma, leading to unnecessary drug use (Ibrahim, Gheriani, Raza, 2007). Although PVFD has been reported in all ages, it mainly affects children and young female adults, with an average of diagnosis at 14.5 years (Ibrahim, Gheriani, Raza, 2007; Powell, Karanfilov, Beechler, 2000).

Reports of abnormal voice quality have been seldom reported in individuals with PVFD. Mirasola et al. (2008) are the first to report on overall voice-related quality of life (VR-QoL) in individuals with PVFD. They reported no significant decline in the self-reported VR-QoL according to the pediatric voice outcome survey (PVOS). This may be due to the fact that PVFD occurs in episodes, and typically does not occur during speaking. Contrary to Mirasola et al. other reports suggest that individuals diagnosed with PVFD demonstrate strained, rough, and/or breathy voice quality, when compared to healthy normal controls (Vertigan, Theodoros, Winkworth, Gibson, 2007). This may be...
because these individuals have cofactors such as laryngopharyngeal reflux (LPR), sensitivity to laryngeal irritants, chronic cough, and/or post nasal drip, leading to tissue change.

**Treatment of Voice Disorders**

The main objectives of voice therapy are to maximize vocal effectiveness through education and exercise, and reduce the handicapping effects the dysphonia may have caused (Ramig & Verdolini, 1998). Success with voice therapy in patients diagnosed with vocal fold nodules and other disorders has been documented (Lee & Son, 2005; Mori, 1999; Trani, 2006). However, treatment specifically focused on for adolescents with a voice disorder outside of and within the school system is lacking (Andrew & Summers, 2002; Hoffman-Ruddy & Sapienza, 2004).

Providing voice therapy services during adolescence has been argued among clinicians and researchers. Some believe due to cognitive development (discussed later) in adolescence that this is an ideal time to for voice therapy, while others remark there is decreased motivation because of the numerous changes they are encountering, resulting in less attention given to improving their voice (Andrews & Summers, 2002; Wilson, 1995). Andrews and Summers (2002) argue that adolescents have the ability to think abstractly, to develop hypothetical solutions to problems, and test these solutions. This allows the adolescent with a voice disorder to help generate a variety of options to behavioral and interpersonal skills and become more involved in the therapy process. Furthermore, motivation of the adolescent may be increased if his/her peers and other influential adults have reacted negatively to their voice (Wilson, 1995).
However, voice therapy for middle and high school students with a voice disorder continues to be underemphasized by both SLP’s and training institutions, even though the Individuals with Disabilities Education Act (IDEA) Amendments of 2004 (PL 108-446) provide parameters for services to be upheld in the education system. Individuals with Disabilities Education Act state that a child is eligible for services if the impairment “adversely impacts educational performance.” This Act further defines any school-age child who has a voice disorder affecting physical, communication, social-emotional, and/or adaptive development to receive school services. Currently, many school clinicians express apprehension and fear when treating individuals with a voice disorder, which may be due to limited exposure at the graduate-level (which may be caused from limited experience due to fewer students with a voice disorder), the lack of evidenced based treatment, and/or decreased motivation of adolescents (Andrew & Summers, 2002; Hoffman-Ruddy & Sapienza, 2004; Wilson, 1995).

Additionally, students with voice disorders may often fail to receive services due to the misperception that their disability will not adversely affect academic performance or achievement. Therefore, it is possible that numerous students with a voice disorder fail to receive therapeutic services, which in fact may be impacting their education, socialization, extracurricular activities, and eventually career. Documenting how teachers perceive individuals with various severities of voice disorders may help strengthen or weaken this perception that voice disorders do not affect academic performance. Awareness of the possible negative perceptions teachers have about adolescents with a voice disorders, may provide enough evidence to help establish improved school services for adolescents with a voice disorder.
Clinician attitudes, knowledge, and experiences contribute to the effectiveness of voice therapy outcomes (Andrews & Summers, 2002). To improve voice therapy effectiveness, adequate information regarding intervention and resources will aid the clinician in the design and implementation of successful programs. A critical element is targeting the role of teachers and what they do and do not know about various voice disorders they may encounter in the students they teach. Teachers are the ones that may influence educational, social, and occupational outcomes (Revis, 1999). Research regarding their perceptions toward adolescents with a voice disorder may yield possible educational handicaps adolescents may encounter. If indeed there are negative views towards adolescents with a voice disorder, then timely intervention is necessary.

**Perceptions and Voice-Related Quality of Life**

Both experts and the public use voice quality when assessing an individual. This assessment may be for diagnosis and treatment (expert) or for developing impressions of the individual (public). Perceptual examination describes what the voice sounds like, and is often considered the gold standard for experts during clinical assessment of subjective parameters of voice quality. Perceptions of voice quality may also impact how individuals are perceived by the public or how they perceive themselves (Allard & Williams, 2008; Berry, 1991; McCoy, 1996; Stagner, 1936).

*Expert ratings of perception.* Clinically, perceptual examination has traditionally used a variety of parameters such as roughness, breathiness and pitch to describe what the voice sounds like. Multiple perceptual tools are used by professionals working with individuals with a voice disorder. Two of the most commonly used tools are the global
dysphonia, roughness, breathiness, asthenia, and strain scale (GRBAS) and the Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V). Yet, it has been argued that no tool can take place of a “trained ear” due to the fact that perceptual judgments have been criticized for poor inter and intra-judge rater reliability. However, expert judgments have been traditionally based on a sustained vowel. Sustained vowel results in the underestimation of vocal quality due to deletion of onset and offset phases which eliminate important perceptual analysis (Baken & Orlikoff, 2000). Samples of connected speech versus sustained vowel are more accurate in interpreting perceptual voice quality (Revis, 1999).

With the development of the CAPE-V researchers have reported good inter and intra-rater reliability with some vocal parameters (Kelchner et al., 2009). Inter-rater reliability was strong for the parameters of breathiness, roughness, pitch, and overall severity and was lower with respect to strain and loudness. There was a moderate-strong intra-rater correlation with all parameters except strain. This instrument portrays expert perceptions of voice quality based on six standardized sentences. The CAPE-V was developed to be used both as a clinical and research tool, to help promote a standardized approach to evaluate auditory-perceptual judgment of voice quality. Here, the meaning of “standardized” refers to a procedure that is administered and scored in a consistent way, not norm-referencing (Kempster, Gerratt, Verdolini Abbott, Barkmeier-Kraemer, Hillman, 2009). The inter and intra rater reliability of the CAPE-V has been assessed in children, adolescents and adults (Karnell et al., 2007; Kelchner et al., 2009). Collectively, the authors reported a strong inter-rater reliability and moderate-strong intra-rater reliability on the majority of the voice parameters. Kelchner et al. (2009)
reported that breathiness and roughness had the strongest intra-class correlation coefficient whereas strain and loudness had the weakest.

Although the above tools are necessary to help clinicians assess current overall vocal function and are used for pre and post voice intervention; they do not aid with assessing an adolescents own perception of how the voice disorder may affect their quality of life. Below are several self and parent proxy QoL and handicapping instruments.

*Quality of Life Assessments.* Several commonly-used voice–related quality of life measurements exist and are validated for the pediatric and adult voice disordered population. These include the pediatric Voice Handicap Index (pVHI), pediatric voice outcome survey (PVOS), Voice Handicap Index (VHI), Voice Outcome Survey (VOS), and Voice-Related Quality of Life (Hartnick, C, 2002; Hogikyan & Sethurman, 1999; Jacobson, et al., 1997; Zur et al., 2005). Although the age range of validation studies for the aforementioned pediatric and adult surveys have included adolescents, none have been validated specifically on an adolescent population.

Numerous health-related quality of life instruments have been developed to measure the effect of illness and disability on adolescent activities of daily living; however, their focus is on general concepts related to physical abilities, growth and development, general health perception, autonomy, and cognition (Vogels, Verrips, Verloove-Vanhorick, 1998; Klassen, Landgraf, Lee, 2003). Current tools may be limited in their ability to detect QoL changes if they are not administered at the time of the episodes. Although the impact of voice disorders on quality of life has been documented
in young pediatric patients (via parent proxy) and adults, limited data exist for adolescents.

Impact of Voice Disorders on Quality of Life. No voice-related quality of survey has been validated on the adolescent population; however, adolescents with mild to serious chronic medical conditions, such as a voice disorder, are at an increased risk for negative experiences (Cohen, Dupont, Courey, 2006). Adolescents with chronic medical conditions have reported a negative impact on their health related quality of life in areas such as: education, attitudes, importance of peers, family, and occupation opportunity (Raphael, 1996). Furthermore, a link between dysphonia and a diminished quality of life has been reported to adversely affect adults with a voice disorder, and have been associated with depression, social withdrawal and occupational handicaps (Benninger, Ahuja, Gardner, Grywalski, 1998; Cohen et al., 2006; Hoffman-Ruddy & Sapienza, 2004; Smith et al., 1996). Self perceptions may contribute to these views and feelings of decreased health-related quality of life.

Adolescent quality of life may to be linked to perceptions of health and well-being (Mueleners, et al., 2002). Self perceptions of voice problems by dysphonic individuals have been reported to limit social outings and increase psychological distress, negatively affecting quality of life (QoL) (Deary et al., 2003; Ma & Yiu, 2001). Individuals with a voice disorder reported a limitation in vocal activities (e.g. singing, public speaking, etc.) and restricted participation in physical and social activities (Ma & Yiu, 2001). Additionally, a reported relationship exists between the age of the patient and their self perception of their voice, psychological distress, and quality of life (Deary et al., 2003; Pack, unpublished Thesis). Adolescents with a voice disorder rated
psychological distress as more severe than adults with a similar voice disorder. Furthermore, adolescents with a voice disorder self-rated QoL in education, social, and physical domains as more negative than their healthy peers (Pack, unpublished Thesis). A potential contributing factor may be response of listeners such as teachers and peers.

**Forming perceptions: Speech-Language Pathologists and Social Psychologists Views**

Perceptions are the act or process of becoming aware of something or someone via the senses (Webster’s dictionary, 1990). One common basis for forming an impression of an individual is their speech and language production including voice, articulation, fluency, and content of production (de Klerk & Bosch, 1995). Numerous studies have examined attitudes and perceptions of the public toward individuals with communication disorders and found the existence of negative stereotypes such as: less intelligent, employable, and decisive, with decreased self-esteem, reliability, emotional stability, and social adjustment (Allard & Williams, 2008; Ebert, Prelock, 1994; Garenflo & Garenflo, 1991; Lass, Ruscello, Lakawicz, 1988; Lass, Ruscello, Bradshaw, Blankenship, 1991; Lass, Ruscello, Harkins, Blankenship, 1993; Lass, et al, 1994; Love, 1981; Overby, Carrell, Bernthal, 2007). Furthermore, there was an increase in nervousness and shyness towards individuals with communication disorders when compared to those without (Allard & Williams, 2008; Ebert, & Prelock, 1994; Garenflo & Garenflo, 1991; Lass, Ruscello, Lakawicz, 1988; Lass, Ruscello, Bradshaw, Blankenship, 1991; Lass, Ruscello, Harkins, Blankenship, 1993; Lass, et al., 1994; Love, 1981; Overby, Carrell, Bernthal, 2007). There are two main approaches that have been used to judge personality traits of individuals presenting with normal speech
characteristics compared to those with disordered speech. These are written description and audio samples.

Studies using written descriptions of an individual with a language, articulation, fluency, and voice disorder as the methodological approach, have not reported overall negative ratings of personality traits. However, differences in types of ratings were observed for various rater characteristics including location, gender, and age (Lass, et al., 1994; Williams & Dietrich, 1996, 2001). Geographically, when rating an individual with a voice disorder, raters from the east coast rated the personality trait of ambition more positively than raters from the south coast. Women raters tend to rate more positive than men; however there are conflicting results (Lass, et al., 1994; Williams & Dietrich 1996, 2001). Williams and Dietrich (1996) reported no difference between gender raters, although in their 2001 study male raters rated individuals with a communication disorder as more stressed than did female raters. Lastly, age of the rater was reported to be a factor when rating individuals with a communication disorder. Younger raters rated individuals with a communication disorder as less stressed, more employable, and having higher self esteem when compared to older-aged raters. However, overall the mere mention of a communication disorder did not result in significantly lower rating of personality or negative perceptions towards an individual with a communication disorder.

Importantly, there is a documented increase in negative ratings of personality traits when raters listened to clips of simulated or actual communication disorders (Addington, 1968; Allard & Williams, 2008; Lallh & Richert, 2000; Lass, Ruscello, Lakawicz, 1988; Lass, Ruscello, Bradshaw, Blankenship, 1991; Lass, Ruscello, Harkins, Blankenship, 1993; Ray, 1986). Allard & William (2008) recorded an actor who
portrayed a language, articulation, fluency, voice disorder, and normal speech and 
language (no disorder). The “no disorder” condition was rated more favorable than the 
communication disordered conditions for: intelligence, self-esteem, reliability, 
decisiveness, emotional stability, social adjustment, employability, and ambition. When 
actual individuals with diagnosed language impairment have been the subject of ratings, 
listeners consistently judged personality traits of intelligence, kindness, and appearance 
more negatively in individuals with a speech and language disorder than those without 
(Crowe & Hall, 1991; Silverman, 1976; Patterson & Pring, 1991; Gilmore, 1974; Lass et 
(1986) noted that listeners reported feeling more socially distant from the individuals 
with speech disorders (stuttering, hypernasality, and lateral lisping) compared to the 
individuals with normal speech parameters.

These studies demonstrate that the direction of ratings of personality traits 
become more negative when raters actually hear some type of communication disorder. 
However, no study reported soley on the perspectives of others towards individuals with 
any severity of voice disorder.

Social psychologists began seeking how people react to various voices and the 
attributes, such as personality traits, voice may carry. Sapir (1927) stated that voice is an 
unconscious symbol of one’s general attitude and therefore, listeners are able to use voice 
to confirm judgments of personality traits of the speaker such as: sentiment, sympathy, 
and cruelty. Yet, no research backed-up his statements. Early researchers recruited radio 
listeners to judge personality traits of voices of radio broadcasters (Allport & Cantril, 
1932; Pear, 1931). The broadcasters rated themselves on the same personality trait survey
as the public. The public’s ratings were then compared to the self-ratings and it was indicated that there was a lack of accurate judgment. In other words, how the public judged the personality traits, was different than how the individuals rated themselves. This resulted in what social psychologist termed “vocal stereotyping” (Pear, 1927; Stanger, 1936).

Within the last 30 years, improved recording devices have become available, and with this, more reliable voice recordings. Studies assessing the public’s perceptions of other’s voices have found that certain vocal parameters are reliably associated with various personality characteristics (Berry, 1991, 1992, 1994). Two independent areas of vocal quality: vocal maturity and vocal attractiveness were used to assess what characteristics of the voice influence the formation of stereotypes (Berry, 1990, 1991; Dion, Berscheid, Walter 1972; Montepare & Zebrowitza-McArther, 1987). Voices were recorded and rated separately on two adjective scales: 1) attractiveness – unattractiveness and 2) maturity – immature (babyish). Those voices rated in the top 25% of attractive voice were defined as attractive and voices falling within the lower 25% were defined as unattractive. The same procedure was used for vocally mature and immature voices. Researchers reported individuals rated with more attractive voices were judged to be warmer, likable, honest, dominant, and more likely to achieve than those rated to have less attractive voices. Additionally, individual voices rated as more immature (babyish) were judged to be warmer, more honest, and less powerful and competent than those rated as more mature sounding voice.

Vocal image is the impression that listeners form based on voice (McCoy, 1996). Speech-language pathologists have recently begun to investigate how people with voice
disorders are perceived by others through examination of “vocal stereotyping”. Although there is no research specific to adolescents with a voice disorder, numerous studies have reported negative perceptions of personality characteristics in elementary-age children and adults with a voice disorder by naïve listeners (Lass, Ruscello, Bradshaw, Blankenship, 1991; Lass, Ruscello, Stout, Hoffman, 1991; Ruscello, Lass, Podbesrk, 1988). When rating voice disordered young adults, same aged peers do attribute certain personality traits (e.g., intelligence, self-esteem, decisiveness, and character) based on how a person sounds. Researchers that have conducted ratings of normal and disordered voices based on audio samples report an increase in negative attitudes toward the disordered samples. Negative attitudes toward speakers with voice disorders may affect a speaker’s education, social life, psychological well-being and occupational opportunities (Aronson, 1991; Boone & McFarlene, 1988; Cannito, Murry, Woodson, 1994).

Collectively, listeners of adults with a voice disorder have reported an increase in negative attitudes toward adult speakers with a voice disorder versus those with normal voice qualities (Altenberg & Ferrand, 2006; Lallh, Putnam Rochet, 2000; McKinnon Hess, Landry, 1986). The raters judged adults with a voice disorder significantly lower in intelligence, self-esteem, ambition, and employability than adults with no voice disorder. Additionally, the overall perceptions, of adults with a voice disorder became more negative as the severity of the voice disorder increased (Altenberg & Ferrand, 2006).

In general, literature exploring children with abnormal voice characteristics is similar to adults. There is evidence to indicate that a voice disorder adversely affects public’s perceptions of certain personality and physical appearance traits of children
Perceptions of college-aged and adolescent raters toward children with a voice disorder were more negative in the areas of personality, social, and physical factors, compared to those with no voice disorder. Specifically, adolescents rated children with a voice disorder to be dirtier, foolish, boring, unintelligent, and nervous compared to children with a normal voice (Lass et al., 1993).

Researchers then began expanding the idea that certain vocal parameters are linked to various personality characteristics and relating it to the idea of a self full-filling prophecy (Berry, 1991, 1992, 1994). Theorists propose that individuals interact differently with people as a function of others expectations (Good, 1987). Therefore it may be possible that behaviors toward individuals with a voice disorder evoke precisely the behavior that is expected because the speaker will internalize expectations that have been subtly communicated to them. In the case of a student who has had an abnormal voice quality for several years, teachers may assume she is ill and not call on her in class. This may lead to diminished expectations of her. In return she begins to perform more poorly (e.g., not turning in homework assignments) because this is what the teachers expect. Identifying if and how teachers’ impressions are affected by a voice disturbance may be critical to understanding the formation of perceptions and expectations toward adolescents with a voice disorder.

Teachers’ perceptions and stereotypes are known to have an effect on students’ academic achievement, quality of life, self perceptions, social interactions, and future occupational choices and can lead to certain student expectations (Becker & Maiman; 1985; Overby, Carrell, Bernthal, 2007). Such expectations on the part of the teachers can
have positive or negative influences on a student’s academic performance and achievement (Braun, 1976; Cherry, 1978). Given the amount of time an adolescent spends at school and the role of their teachers in shaping their future directions and decisions, teachers are an important component in determining perceptions of the public towards adolescents with a voice disorder.

**Impact of Teachers’ Perceptions and Expectations on Education**

There are data to support the concerns that perceptions of teachers and school administrators are influenced by a child’s communication disorder such as speech sound disorder, pitch of voice, and language disorder (Ebert & Prelock, 1996, Lass, Ruscello, Pannbacker, et al., 1994, Overby, Carrell, Bernthal, 2007). School administrators and teachers are known to rate personality traits of children with a communication disorder more negatively than those with no communication disorder (Erbert & Prelock, 1996; Lass, Ruscello, Pannbacker, et al., 1994, Overby, Carrell, Bernthal, 2007). However, studies that provided educational programs with speech-language pathologists or reported that teachers had education/increased knowledge in working with students with a speech and language disorder, found a decrease in negative perceptions.

Ebert and Prelock (1994) reported that teachers who were trained within a collaborative service delivery model with a speech-language pathologist were more accurate and positive in their ratings of children with speech and language disorders. However, teachers with limited knowledge or interactions with children diagnosed with a communication disorder, ranked students with a communication disorder lower in their class and believed they were more at a disadvantage academically compared to those
with no disorder (Ebert & Prelock, 1994). Additionally, teachers perceived elementary grade students diagnosed with a moderate speech sound disorder to have lower academic, social, and behavioral competencies when compared with healthy peers (Overby, Carrell, Bernthal, 2007). Elementary teachers who were asked to judge students on pitch (low pitch versus high pitch) of the voice associated different personal attributes (Apple, Streeter, Krauss, 1979; Overby, Carrell, Bernthal, 2007). Children with lower pitched voices were perceived to have more behavioral problems and an increase in acting out when compared to those with higher pitched voices whereas the higher pitched voices were associated with hard working, well-behaved, and shy (Overby, Carrell, Bernthal, 2007). These negative perceptions may then become a self-fulfilling prophecy where teacher’s views and expectations influence the child’s academic performance.

Teachers’ expectations have been reported to lead to the teacher acting differently toward certain students. This differential treatment is perceived by the students, who respond accordingly, and exhibit behavior that reinforces the teachers’ expectations (self-fulfilling prophecy). Although previous research has not focused specifically on teachers’ expectations in adolescents with voice disorders, the trend determined in the literature leads us to suspect that teacher expectations have an effect on student achievement (Babad, 1993; Brophy, 1982; Rubie-Davis, Hattie, Hamilton, 2006). In particular, expectations can positively and or/negatively affect a student’s performance and achievement in and out of the classroom. Teachers’ expectations are partially shaped by their perceptions. Therefore, it may be possible that if a teacher has a negative perception of a student, he/she may also have negative expectations, resulting in poor academic accomplishment.
Summary of Literature

People commonly form stereotypes of others, often assuming that those who present certain overt characteristics also possess additional traits not directly observed (Banaji & Greenwald, 1994). Such negative stereotypes may result in discrimination of educational, social and career areas, affecting an individual’s general well-being (Lallh & Rochet, 2000; Love, 1981). Understanding the perceptions and attitudes of listeners regarding individuals with speech-language disorders has been a research focus for the last 50 years. Within seconds of hearing the tone and quality of a voice, listeners begin to make inferences about the individual (McCoy, 1996). Assumptions are made about personality characteristics, intellectual level, and physical appearance (McCoy, 1996). When testing attitudes towards individuals with a voice disorder using actual voice samples, listeners rate people of all ages, younger children and adults, more disadvantaged educationally and socially than those without a voice disorder. Yet there is limited research directed at the adolescent population (McKinnon, Hess, Landry, 1986; Perrin, 1954; Silverman & Paulus, 1989). This is an oversight considering that adolescents must cope with the circumstances of a voice disorder together with the developmental challenges associated with their age.

Reports of perceptual judgments of children and adults with a voice disorder have led listeners to assume certain negative qualities of the individual speaking, including; personality characteristics, QoL, and overall well being. Therefore unknown stigmas may be placed on adolescents with voice disorders which may have an adverse affect on their education, communicative effectiveness, social relationships, psychological well-being, and eventually vocational opportunities (Boone & McFarlane, 1988; Cannito, Murry,
Woodson, 1994; Cohen, Dupont, Courey, 2006; Smith et al., 1996). Given the documented evidence that perceptions heavily influence teachers overall view of their students, knowing their specific impressions and stereotypes of a voice disordered student would benefit clinical and educational care. While literature has established a link between naïve listeners of children and adults with a voice disorder and increase negative perceptions of personality, teachers’ perceptions of adolescents with a voice disorder are unknown.

**Statement of Purpose**

The purpose of this project is to determine how middle and high school teachers perceive the personality characteristics and quality of life of adolescents with a voice disorder. Knowledge of educators’ attitudes toward adolescents with a voice disorder will provide increased awareness regarding how these individuals are viewed within the educational framework, the impact this may have on their academic performance and ultimately enhance clinical, educational, and career achievement of these students.

**Research Questions and Hypothesis.**

1) Do middle and high school teachers rate personality traits differently in female adolescents with a voice disorder compared to same aged females with no voice disorder?

   **Null Hypothesis.** Teachers will rate female adolescents with a voice disorder the same as than their non voice disordered peers with regard to personality traits.

2) Do middle and high school teachers perceive personality traits differently in female adolescents with a voice disorder across severities (mild, moderate, severe) compared to same aged females with no voice disorder?
Null Hypothesis. Teachers will rate female adolescents with a mild, moderate, and severe voice disorder the same as their non voice disordered peers with regard to personality traits.

3) Do middle and high school teachers perceive personality traits differently in female adolescents across severities of voice disorders: mild, moderate, and severe?
   Null Hypothesis. As a voice disorder becomes more severe, teacher ratings of personality traits will be rated the same.

4) Do middle and high school teachers rate quality of life differently in female adolescents with a voice disorder compared to same aged females with no voice disorder?
   Null Hypothesis. Teachers will rate female adolescents with a voice disorder the same as their non voice disordered peers with regard to quality of life.

5) Do middle and high school teachers perceive quality of life differently in female adolescents with a voice disorder across severities (mild, moderate, severe) compared to same aged females with no voice disorder?
   Null Hypothesis. Teachers will rate female adolescents with a mild, moderate, and severe voice disorder the same as their non voice disordered peers with regard to quality of life.

6) Do middle and high school teachers perceive quality of life differently in female adolescents across severities of voice disorders: mild, moderate, and severe?
   Null Hypothesis. As a voice disorder becomes more severe, teacher rating quality of life will be the same.
CHAPTER III

METHODS

Overview of Methods

A web-based survey using Questionpro.com was created to collect data. The survey included four voice samples (normal, mild, moderate, severe) and two surveys. The voice samples were previously rated by two experienced speech-language pathologists using the Consensus Auditory-Perceptual Evaluation of Voice, prior to downloading into web survey. The two surveys were related to personality traits and quality of life, and contained a total of twenty-five questions per voice.

Participants

Personal contacts were made in 8 area Cincinnati middle and high schools. After the development of the web survey, a flyer was e-mailed out to the personal contact (appendix C). E-mails were then sent out via school intranet e-mail to the teachers. The flyer briefly described the study and provided a link to the online survey. Each survey contained 25 questions per voice sample. One-hundred twenty-four middle and high school teachers viewed the survey, 46 began the survey, 32 answered the majority of the questions, and 27 answered all the questions. From this sample, the responses of the 32 teachers who answered the majority of the questions were used for analyses.

Participant selection. The participants in this study were teachers who teach grades 6 through 12 (student ages 12-18). Participants met the following inclusion criteria: no history of a speech, language, voice, or hearing impairment. No participant was excluded on the basis of sex or race.
Listener-rater Demographics. A total of 32 teachers’ answers were used. The cohort of listeners included 11 (34%) males and 21 (66%) females, ranging in age from 22 to 70 years, (mean age =40.09; SD = 11.07). Mean years of teaching experience was 12.95 (SD = 9.46) with 17 (53%) teaching middle school (grades 6-8) and 15 (47%) teaching high school (grades 9-12).

Procedures

Disordered Voice Samples. Recorded voice samples were selected from a database of voice disordered adolescents whose recordings are part of the Cincinnati Children’s Hospital Pediatric Voice Clinic database (N= 561). At the time of selection, the database contained 248 samples in this age range, 202 of which lived out of town. The final samples were selected from those who lived out of town. This ensured that local teachers would not recognize the young person’s voice. The study samples varied in voice disorder types (nodules and airway reconstruction) and included those diagnosed as mild to severely dysphonic, by two experienced certified speech-language pathologists (SLPs) per the Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V) (Appendix D). All voice samples were chosen by overall severity ratings with roughness rated as the main abnormal voice characteristic.

From this selection, four anchor voices depicting normal and various voice disorder types (nodules, cysts, airway reconstruction) and four female adolescent disordered voice samples (stimulus voices) were then randomly selected. The use of an anchor voice against which to compare another voice is common practice in perceptual
studies. The voice samples were then recorded onto a CD and uploaded to the online website. The website was accessible only by the participants and investigator.

*Control Voice Samples.* Control speakers with normal voices were selected from the Cincinnati Children’s Hospital, Pediatric Voice Clinic database. As with the voice disordered population, all voice and resonance patterns were rated according to the CAPE-V and judged by two experienced SLP’s to be within normal range. Again, only speakers from out of town were chosen from the database to ensure local teachers did not recognize the voice. The normal voice samples belonged to speakers who had no reported history of a voice, resonance, fluency, language, or articulation disorder. These speakers were chosen from a group of adolescents females who had complaints of a voice disorder or were assessed for vocal cord dysfunction, but were subsequently not diagnosed with a voice disorder.

*Online voice personality and QoL rating.* Each teacher-rater participant was asked to complete the following -

1. Waive written consent (Appendix F)
2. Answer demographic questions (Appendix G)
3. Listen to 4 anchors prior to completing the survey (participants were asked to listen to both the anchor and stimulus voices at a volume determined as comfortable by them).
4. The following instructions were provided- “You will hear a total of 6 female adolescents read six sentences. Often, we get an impression of someone just by listening to his or her voice. Following each voice, you
will fill out 25 questions, giving us your first impression of the individual speaking”.

5. For each of the four voice samples, the teachers responded to the following surveys:

Personality traits survey. The personality traits survey (Appendix F) contained eighteen personality traits (Flamer, 1983; Norman, 1969; Ofir, Reddy, & Bechtel; 1987, Osgood, Suci, & Tannerban, 1957). The polar opposite adjective placed on the other end of a visual analog scale (e.g., decisive – indecisive). After listening to the anchor samples, the teacher-rater participant listened to each of the four disordered voice samples ranking their response (after each voice sample) on each 18 personality traits on a 7 point adjective scale. The rater chose an area along the line they felt was most representative of the individual they were rating. The positive and negative adjective end points were randomly assigned to the right or left in order to avoid potential bias. All ratings of one sample were completed prior to listening and rating the next.

The development and validation of the personality traits instrument has been reported using a factor analysis (Osgood, et al. 1958). Osgood and colleagues used a large collection of semantic differential scales and found three recurring attitudes that people use: evaluation, potency, and activity. These three dimensions of affective meaning were found to be cross-cultural universals in a study of dozens of cultures. The studies of Osgood et al. (1958,1967) revealed that the evaluative factor accounted for most of the variance and should be used when assessing attitudes. However, since that time it has been reported that use of only evaluative factors limits overall perception of personality. Currently, semantic differential scales are one of the most widely used in
measurement of attitudes, due to the versatility of the items. Voice disorders research has set a precedent in using this scale to assess public attitudes toward individuals with a voice disorder and has shown reliability across age and gender (Lass, Ruscello, Bradshaw, & Blankenship, 1991; Lass, Ruscello, Stout, Hoffman, 1991; Ruscello, Lass, & Podbesrk, 1988).

The quality of life survey (Appendix H) concerns attitudes toward school achievement, quality of life, self-image, prospects in adult life, family life, and future social difficulties (Brook & Galili, 2001). The survey is a six question survey adapted from Brook & Galili (2001) who used it to assess knowledge and attitudes of high school teachers towards students with chronic disease. As in the personality traits survey, teachers ranked their responses using a 7 point adjective scale. The positive and negative adjective end points were randomly assigned to the right or left in order to avoid potential bias. Although published, to date it does not have documented reliability and validity data. At the time this study began, this was the only documented survey that had been used to assess teachers’ perceptions of students with chronic conditions.

Statistical Analysis

Results were analyzed using the Statistical Analysis Software (Version 9.2). Separate analyses were performed for the personality trait and the quality of life surveys. Each response of the survey was converted on the semantic differential scales to a number from 1-7 with 1 representing the positive end. For each survey, listener-rater responses were totaled for all attributes and questions and then again for each individual attribute and question. Analyses were performed to discover any differences between
normal and combined disordered groups (collapsed mild, moderate, and severe voice disordered groups), normal and each individual voice disordered group, and across severities.

**Personality traits survey.** To discover if there was any difference between the normal voice and combined voice disordered groups for total score of the survey, a single test comparison was completed. Next, analyses were completed to observe if any difference occurred between normal voice to each separate voice disordered group using an analysis of variance (ANOVA) using a mixed procedure (PROC MIXED: an extension of general linear model GLM). When statistical significance was found post-hoc tests were performed using the Dunnet test. The Dunnet test for multiple comparisons was used because there was one reference group (normal) against which all other voice disordered groups were being compared. In the case of conducting multiple tests, as in this study, there is an increase risk of making a type I error, therefore the Dunnet adjustment alpha level of .05 per test was used. The Dunnet test was used to indicate statistically significant differences between scores of the normal adolescent voice compared to those with voice disorders for total score of the survey as well as individual attributes. To inspect the direction of the data, a trend analysis was completed to discover if as a voice disorder became more severe, ratings of personality traits became more negative. The post-hoc test the Tukey-Kramer was used to determine which traits were significant. The Tukey-Kramer was used because it looks specifically at which two groups differ. Conducting multiple tests increase type I error, therefore the Tukey-Kramer adjusted alpha level of .05 was used.
Quality of Life survey. To discover if there was any difference between the normal voice and combined voice disordered groups for total score of the survey, a single test comparison was completed. Next, analyses were completed to observe if any difference occurred between normal voice to each separate voice disordered group using an analysis of variance (PROC MIXED). Post-hoc tests were performed using the Dunnet test. The Dunnet test for multiple comparisons was used because there was one reference group (normal) that all other voice disordered groups were being compared to. In the case of conducting multiple tests, as in this study, there is an increase risk of making a type I error, therefore the Dunnett adjustment alpha level of .05 per test was used. The Dunnet test was used to indicate statistically significant differences between scores of the normal adolescent voice compared to those with voice disorders for total score of the survey as well as individual questions. Last, to discover if as a voice disorder became more severe, ratings of personality traits became more negative, a trend analysis was completed for each QoL question. The post-hoc test the Tukey-Kramer was used to determine which QoL questions were significant. The Tukey-Kramer was used because it looks specifically at which two groups differ. Conducting multiple tests increase type I error, therefore the Tukey-Kramer adjusted alpha level of .05 was used.
CHAPTER IV
RESULTS

To determine how middle and high school teachers perceived adolescent females who have a voice disorder, an online teacher rating survey consisting of 25 questions and a QoL questionnaire designed using recorded adolescent female voice samples (normal and disordered) and a personality traits and QoL questionnaire. Four voices were presented (1 healthy control, 3 voice disordered). The voice disordered voices included varying degrees of voice disorders (mild, moderate, and severe). A total of 32 respondents for 25 tasks yielded 708 entries available for analysis.

The presentation of results will begin with the personality traits questionnaire and its association with the control and disordered voices. Data will be described for both the total scores on the entire survey and the ratings for individual personality traits. Next, a trend analysis will be presented to demonstrate that, as a voice disorder became more severe, ratings of personality traits became more negative. Finally, analyses of the quality of life questionnaire will be presented. Data are described for both the total survey scores and the individual ratings for QoL questions. Another trend analysis will then be presented to demonstrate that, as a voice disorder became more severe, ratings of QoL became more negative.

Personality Traits Questionnaire

Research Question #1:
Do middle and high school teachers perceive personality traits differently in female adolescents with a voice disorder compared to same aged females with no voice disorder?

Null Hypothesis. Teachers will rate female adolescents with a voice disorder the same as
The total score for all 18 personality attributes of teacher-ratings were averaged and a single comparison test completed for normal voice (control) and combined voice disordered groups. Results revealed significant difference between normal voice and voice disordered groups, \((M = 1.20, SEM = 0.57), t(114) = 2.09, p = .03\). The null hypothesis was rejected.

Research Question#2:
Do middle and high school teachers perceive personality traits differently in female adolescents with a voice disorder across severities (mild, moderate, severe) compared to same aged females with no voice disorder?

**Null Hypothesis.** Teachers will rate female adolescents with a mild, moderate, and severe voice disorder the same as their non voice disordered peers with regard to personality traits.

The personality traits survey was analyzed using an ANOVA to determine if there was a significant difference between the groups and the post hoc test, the Dunnett, was used to determine what was significantly different. In the case of conducting multiple tests, as in this study, there is an increase risk of making a type I error, therefore the Dunnett adjustment alpha level of .05 per test was used. Results of ANOVA and post-hoc Dunnet test for entire sample is located in Table 1. An ANOVA was conducted to determine if there were any differences between the normal voice and each individual voice disorder \(F(4, 114) = 189.37, p < .001\). A post-hoc test using the Dunnett test
indicated a statistically significant difference between ratings of personality traits attributed to adolescent females with a normal voice compared to those with a severe voice disorder ($M = 0.64$, $SEM = 0.22$), $t(114) = 2.87$, $p = .004$, but not between normal voice and mild voice disorder ($M = 0.12$, $SEM = 0.24$), $t(114) = .50$, $p = .06$ and normal and moderate voice disorder ($M = 0.43$, $SEM = 0.23$), $t(114) = 1.85$, $p = .62$.

A Cronbach’s alpha was used to assess the internal consistency of the personality traits survey in the normal group, individual disordered groups and combined disordered groups. All groups had good to high reliability: normal voice (.95), mild voice disorder (.97), moderate voice disorder (.97) and severe voice disorder (.92), combined voice disordered groups (.95).

<table>
<thead>
<tr>
<th>Voice Type</th>
<th>Mean (SEM)</th>
<th>Range</th>
<th>Confidence Interval</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>1.91 (.17)</td>
<td>1.00-3.79</td>
<td>1.58</td>
<td>2.24</td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>2.03 (.17)</td>
<td>1.00-3.94</td>
<td>1.69</td>
<td>2.38</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>2.34 (.16)</td>
<td>1.17-4.05</td>
<td>2.02</td>
<td>2.67</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>2.56 (.15)</td>
<td>1.28-4.67</td>
<td>2.26</td>
<td>2.86</td>
<td></td>
</tr>
</tbody>
</table>

Second, to determine if specific personality traits were consistently rated more negative, each personality trait was analyzed separately (studies assessing perceptions of personality traits of individuals with a voice disorder have analyzed the personality traits survey in this fashion). No statistically significant difference between the normal and mild voice disorder was detected; yet several traits were significantly different between control and moderate voice disorder and control and severe voice disorder. Table 2
displays results for the ANOVA analyses and post-doc Dunnett tests used to examine the
differences in listeners’ ratings of the individual 18 personality attributes assigned by
listeners to individuals with moderately dysphonic speakers. The Dunnett test indicated
that for 6 of the 18 attributes (33.3%) there were statistically significant differences in the
listener’s ratings between normal and moderate disordered adolescent female speakers.
Table 3 displays the results of the 18 attributes for severely dysphonic voices. The
Dunnett test indicated that for 7 of the 18 attributes (39.0%) there were statistically
significant differences between normal and severely dysphonic voices. The null
hypothesis was rejected because the total score of the personality trait survey for the
severe voice disorder did reveal a significant difference when compared with the control
voice. Furthermore, 6 of the 18 parameters for the moderate voice disorder and 7 of the
18 attributes for the severe voice disorder did reveal a significant difference when
compared to the normal voice.
Table 2. Mean, standard error of measurement, range, and confidence intervals at 95% for listener ratings of individual Personality Traits for moderately dysphonic voices:

<table>
<thead>
<tr>
<th>Personality Traits</th>
<th>Mean (SEM)</th>
<th>Range</th>
<th>Confidence Intervals</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
<td>2.26 (.22)</td>
<td>1-5</td>
<td>1.82</td>
<td>2.70</td>
<td></td>
</tr>
<tr>
<td>Decisive</td>
<td>2.48 (.22)</td>
<td>1-5</td>
<td>2.04</td>
<td>2.92</td>
<td></td>
</tr>
<tr>
<td>Emotionally adj**</td>
<td>2.35 (.16)</td>
<td>1-5</td>
<td>2.04</td>
<td>2.67</td>
<td></td>
</tr>
<tr>
<td>Employable*</td>
<td>2.61 (.17)</td>
<td>2-5</td>
<td>2.26</td>
<td>2.96</td>
<td></td>
</tr>
<tr>
<td>Flexible</td>
<td>2.32 (.25)</td>
<td>1-5</td>
<td>1.82</td>
<td>2.82</td>
<td></td>
</tr>
<tr>
<td>Friendly</td>
<td>2.19 (.26)</td>
<td>1-6</td>
<td>1.67</td>
<td>2.71</td>
<td></td>
</tr>
<tr>
<td>Happy**</td>
<td>2.67 (.17)</td>
<td>1-5</td>
<td>2.32</td>
<td>3.02</td>
<td></td>
</tr>
<tr>
<td>Healthy***</td>
<td>3.39 (24)</td>
<td>2-6</td>
<td>2.90</td>
<td>3.87</td>
<td></td>
</tr>
<tr>
<td>Intelligent</td>
<td>2.09 (.24)</td>
<td>1-5</td>
<td>1.61</td>
<td>2.58</td>
<td></td>
</tr>
<tr>
<td>Likeable*</td>
<td>2.16 (.17)</td>
<td>1-4</td>
<td>1.83</td>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td>Mentally stable</td>
<td>2.22 (.19)</td>
<td>1-5</td>
<td>1.85</td>
<td>2.60</td>
<td></td>
</tr>
<tr>
<td>Nice</td>
<td>1.77 (.16)</td>
<td>1-4</td>
<td>1.44</td>
<td>2.10</td>
<td></td>
</tr>
<tr>
<td>Pleasant</td>
<td>1.87 (.18)</td>
<td>1-4</td>
<td>1.50</td>
<td>2.23</td>
<td></td>
</tr>
<tr>
<td>Reliable</td>
<td>2.32 (.14)</td>
<td>1-4</td>
<td>2.02</td>
<td>2.61</td>
<td></td>
</tr>
<tr>
<td>Sincere</td>
<td>2.26 (.25)</td>
<td>1-6</td>
<td>1.75</td>
<td>2.76</td>
<td></td>
</tr>
<tr>
<td>Sociable*</td>
<td>2.61 (.18)</td>
<td>1-5</td>
<td>2.26</td>
<td>2.97</td>
<td></td>
</tr>
<tr>
<td>Strong Character</td>
<td>2.48 (.20)</td>
<td>1-5</td>
<td>2.08</td>
<td>2.88</td>
<td></td>
</tr>
<tr>
<td>Trustworthy</td>
<td>2.06 (.21)</td>
<td>1-6</td>
<td>1.65</td>
<td>2.47</td>
<td></td>
</tr>
</tbody>
</table>

*=p<.05, **=p<.01, ***=p<.001
Table 3. Mean, standard error of measurement, range, and confidence intervals at 95% for listener ratings of individual Personality Traits for severely dysphonic voices:

<table>
<thead>
<tr>
<th>Personality Traits</th>
<th>Mean (SEM)</th>
<th>Range</th>
<th>Confidence Intervals Lower</th>
<th>Confidence Intervals Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
<td>2.28 (.24)</td>
<td>1-5</td>
<td>1.81</td>
<td>2.76</td>
</tr>
<tr>
<td>Decisive</td>
<td>2.21 (.24)</td>
<td>1-5</td>
<td>1.74</td>
<td>2.67</td>
</tr>
<tr>
<td>Emotionally adj**</td>
<td>2.57 (.20)</td>
<td>1-4</td>
<td>2.17</td>
<td>2.97</td>
</tr>
<tr>
<td>Employable***</td>
<td>3.04 (.17)</td>
<td>1-5</td>
<td>2.70</td>
<td>3.38</td>
</tr>
<tr>
<td>Flexible</td>
<td>2.61 (.28)</td>
<td>1-5</td>
<td>2.05</td>
<td>3.16</td>
</tr>
<tr>
<td>Friendly</td>
<td>2.28 (.26)</td>
<td>1-6</td>
<td>1.77</td>
<td>2.80</td>
</tr>
<tr>
<td>Happy*</td>
<td>2.68 (.20)</td>
<td>1-7</td>
<td>2.28</td>
<td>3.07</td>
</tr>
<tr>
<td>Healthy***</td>
<td>4.21 (.25)</td>
<td>2-7</td>
<td>3.71</td>
<td>4.72</td>
</tr>
<tr>
<td>Intelligent</td>
<td>2.14 (.19)</td>
<td>1-4</td>
<td>1.77</td>
<td>2.52</td>
</tr>
<tr>
<td>Likeable*</td>
<td>2.17 (.18)</td>
<td>1-4</td>
<td>1.82</td>
<td>2.53</td>
</tr>
<tr>
<td>Mentally stable</td>
<td>2.46 (.21)</td>
<td>1-6</td>
<td>2.05</td>
<td>2.88</td>
</tr>
<tr>
<td>Nice</td>
<td>2.03 (.23)</td>
<td>1-5</td>
<td>1.56</td>
<td>2.50</td>
</tr>
<tr>
<td>Pleasant</td>
<td>2.26 (.28)</td>
<td>1-5</td>
<td>1.84</td>
<td>2.68</td>
</tr>
<tr>
<td>Reliable</td>
<td>2.82 (.27)</td>
<td>1-6</td>
<td>2.29</td>
<td>3.36</td>
</tr>
<tr>
<td>Sincere</td>
<td>2.0 (.21)</td>
<td>1-5</td>
<td>1.58</td>
<td>2.42</td>
</tr>
<tr>
<td>Sociable***</td>
<td>3.26 (.25)</td>
<td>1-6</td>
<td>2.76</td>
<td>3.76</td>
</tr>
<tr>
<td>Strong Character*</td>
<td>2.78 (.24)</td>
<td>1-5</td>
<td>2.30</td>
<td>3.27</td>
</tr>
<tr>
<td>Trustworthy</td>
<td>2.21 (.25)</td>
<td>1-7</td>
<td>1.72</td>
<td>2.71</td>
</tr>
</tbody>
</table>

* = p<.05, ** = p<.01, *** = p<.001

Research question #3:
Do middle and high school teachers perceive personality traits differently in female adolescents across severities of voice disorders: mild, moderate, and severe?

Null Hypothesis. As a voice disorder becomes more severe, teacher ratings of personality traits will be the same.

A post-hoc trend analysis was performed to determine if as a voice disorder became more severe, teacher-ratings of personality traits became more negative. The post-hoc test the Tukey-Kramer was used to determine which traits were significant.

Figures 1-3 display results of the significant trend analyses. All 18 personality traits
showed a trend; however, only three: healthy, sociable, and employable were statistically significant. The healthy trait was significant between all three groups: mild to moderate ($M = 1.60, SEM = 0.30$), $t(85) = 5.31, p = <.001$, mild to severe ($M = 2.4, SEM = .30$), $t(85) = 7.86, p < .001$, and moderate to severe ($M = .83, SEM = 0.35$), $t(85) = 2.35, p = .05$. Sociable was significant between mild to moderate ($M = .68, SEM = 0.25$), $t(84) = 2.71, p = .02$ and mild to severe ($M = 1.32, SEM = 0.31$), $t(84) = 4.28, p < .001$, but not moderate to severe ($M = .64, SEM = 0.30$), $t(84) = 2.09, p = .09$. Employable was significant between mild to severe ($M = 1.0, SEM = 0.32$), $t(85) = 3.05, p = .008$, but not between mild to moderate ($M = .57, SEM = 0.33$), $t(85) = 1.75, p = .19$ or moderate to severe ($M = .42, SEM = 0.24$), $t(85) = 1.7, p = .21$ The null hypothesis was rejected because 3 of the 18 parameters did reveal a significant difference.

Figure 1. Results for the Trend analysis: Personality Trait Healthy.
Figure 2. Results for the Trend analysis: Personality Trait Sociable.

Figure 3. Results for the Trend analysis: Personality Trait Employable.

Quality of Life Questionnaire

Research Question #4:

Do middle and high school teachers perceive quality of life attributes differently in female adolescents with a voice disorder compared to same aged females with no voice disorder?
Null Hypothesis. Teachers will rate female adolescents with a voice disorder the same as their non voice disordered peers with regard to quality of life.

The QoL survey was analyzed using an ANOVA to determine if there was a significant difference between the groups and the post hoc test, the Dunnett, was used to determine what was significantly different. In the case of conducting multiple tests, as in this study, there is an increase risk of making a type I error, therefore the Dunnett adjustment alpha level of .05 per test was used. The total score for all 6 questions of QoL survey for teacher-ratings were averaged and a single comparison test completed for normal voice (control) and combined voice disordered groups. Results revealed significant difference between normal voice and voice disordered groups ($M = 3.45$, $SEM = 0.41$), $t(114) = 8.39$, $p < .001$. The null hypothesis was rejected.

Research Question #5:
Do middle and high school teachers perceive quality of life differently in female adolescents with a voice disorder across severities (mild, moderate, severe) compared to same aged females with no voice disorder?

Hypothesis. Teachers will rate female adolescents with a mild, moderate, and severe voice disorder the same as their non voice disordered peers with regard to quality of life.

Results of ANOVA for entire sample is located in Table 4. Statistically significant differences were found between ratings of the normal voice and each individual voice disorder $F(4,114) = 253.47$, $p < .001$. Post-hoc test using the Dunnett test indicated a statistically significant difference between ratings of personality traits attributed to adolescent females with a normal voice compared to those with a mild voice disorder ($M = 0.51$, $SEM = 0.20$), $t(114) = 2.55$, $p = .03$), a moderate voice disorder ($M = 1.25$, $SEM$
A Cronbach’s alpha was used to assess the internal consistency of the QoL survey in the normal group, individual disordered groups and combined disordered groups. All groups except the normal voice group had acceptable to good reliability normal voice (.54), mild voice disorder (.84), moderate voice disorder (.66) and severe voice disorder (.75), combined voice disordered groups (.82).

Table 4. Means, standard error of measurements, ranges and confidence intervals at 95% for each voice group of the quality of life survey:

<table>
<thead>
<tr>
<th>Voice type</th>
<th>Mean(SEM)</th>
<th>Range</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>1.41 (.10)</td>
<td>1.00 – 3.00</td>
<td>1.21</td>
</tr>
<tr>
<td>Mild</td>
<td>1.93 (.17)</td>
<td>1.00 – 3.60</td>
<td>1.58</td>
</tr>
<tr>
<td>Moderate</td>
<td>2.66 (.14)</td>
<td>1.17 – 4.67</td>
<td>2.39</td>
</tr>
<tr>
<td>Severe</td>
<td>3.09 (.17)</td>
<td>1.83 – 4.83</td>
<td>2.76</td>
</tr>
</tbody>
</table>

Next, each individual QoL question was analyzed separately. Analyses indicated that 2/6 were statistically significant in the listener’s ratings between normal and mild (Table 5), 6/6 were statistically significant for normal and moderate (Table 6), and 6/6 were statistically significant normal and severe (Table 7). The null hypothesis was rejected because there was a significant difference between total scores of the QoL survey between the normal voice and the moderate and severe voice. Additionally, for individuals QoL questions, two of the six questions for the mild voice disorder and all six questions for the moderate and severe voice disorder did reveal a significant difference when compared to the normal voice.
<table>
<thead>
<tr>
<th>Quality of Life Question</th>
<th>Mean(SEM)</th>
<th>Range</th>
<th>Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the quality of life of this adolescent lower in comparison with his peers in class?***</td>
<td>1.4 (.14)</td>
<td>1-4</td>
<td>1.2 2.5</td>
</tr>
<tr>
<td>Is the self image of this adolescent lower than that of his peers?***</td>
<td>1.9 (.18)</td>
<td>1-5</td>
<td>1.5 2.2</td>
</tr>
<tr>
<td>Do you believe this adolescent will be able to work in the future in any profession that they desire as will their peers?</td>
<td>1.8 (.18)</td>
<td>1-5</td>
<td>1.40 2.11</td>
</tr>
<tr>
<td>The achievement of this adolescent is lower in comparison to their peers</td>
<td>2.45 (.35)</td>
<td>1-6</td>
<td>1.75 3.15</td>
</tr>
<tr>
<td>Do you think this adolescent will be able to live a normal family life in the future as will their peers</td>
<td>1.38 (.11)</td>
<td>1-3</td>
<td>1.15 1.60</td>
</tr>
<tr>
<td>Do you think this adolescent will have more social difficulties including controversy and quarreling with their peers?</td>
<td>2.58 (.34)</td>
<td>1-5</td>
<td>1.90 3.27</td>
</tr>
</tbody>
</table>

* = p<.05, ** = p<.01, *** = p<.001
Table 6. Mean, standard error of measurement, range, and confidence intervals at 95% for listener ratings of individual quality of life questions for moderately dysphonic voices:

<table>
<thead>
<tr>
<th>Quality of Life Question</th>
<th>Mean (SEM)</th>
<th>Range</th>
<th>Confidence Intervals Lower</th>
<th>Confidence Intervals Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the quality of life of this adolescent lower in comparison with his peers in class?</td>
<td>2.32 (.13)</td>
<td>1-4</td>
<td>2.06</td>
<td>2.59</td>
</tr>
<tr>
<td>Is the self image of this adolescent lower than that of his peers?</td>
<td>2.45 (.14)</td>
<td>1-4</td>
<td>2.16</td>
<td>2.73</td>
</tr>
<tr>
<td>Do you believe this adolescent will be able to work in the future in any profession</td>
<td>2.42 (.15)</td>
<td>1-6</td>
<td>2.11</td>
<td>2.72</td>
</tr>
<tr>
<td>that they desire as will their peers?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The achievement of this Adolescent is lower in comparison to their peers</td>
<td>3.03 (.31)</td>
<td>1-6</td>
<td>2.41</td>
<td>3.66</td>
</tr>
<tr>
<td>Do you think this adolescent will be able to live a normal family life in the future</td>
<td>2.20 (.17)</td>
<td>1-5</td>
<td>1.87</td>
<td>2.53</td>
</tr>
<tr>
<td>as will their peers?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think this adolescent will have more social difficulties including controversy</td>
<td>3.51 (.34)</td>
<td>1-7</td>
<td>2.84</td>
<td>4.20</td>
</tr>
<tr>
<td>and quarreling with their peers?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*=p<.05, **=p<.01, ***=p<.001
Table 7. Mean, standard error of measurement, range, and confidence intervals at 95% for listener ratings of individual quality of life questions for severely dysphonic voices:

<table>
<thead>
<tr>
<th>Quality of Life question</th>
<th>Mean(SEM)</th>
<th>Range</th>
<th>Confidence Intervals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the quality of life of this adolescent lower in comparison with his peers in class?</td>
<td>2.86 (.22)</td>
<td>1-5</td>
<td>2.42 3.29</td>
<td></td>
</tr>
<tr>
<td>Is the self image of this adolescent lower than that of his peers?</td>
<td>3.1 (.19)</td>
<td>1-5</td>
<td>2.72 3.50</td>
<td></td>
</tr>
<tr>
<td>Do you believe this adolescent will be able to work in the future in any profession that they desire as well as their peers?</td>
<td>3.00 (.19)</td>
<td>1-5</td>
<td>2.62 3.40</td>
<td></td>
</tr>
<tr>
<td>The achievement of this Adolescent is lower in comparison to their peers</td>
<td>3.40 (.35)</td>
<td>1-7</td>
<td>2.70 4.01</td>
<td></td>
</tr>
<tr>
<td>Do you think this adolescent will be able to live a normal family life in the future as well as their peers?</td>
<td>2.50 (.17)</td>
<td>1-4</td>
<td>2.15 2.85</td>
<td></td>
</tr>
<tr>
<td>Do you think this adolescent will have more social difficulties including controversy and quarreling with their peers?</td>
<td>3.71 (.40)</td>
<td>1-7</td>
<td>3.07 4.36</td>
<td></td>
</tr>
</tbody>
</table>

*=p<.05, **=p<.01, ***=p<.001

Research Question #6
Do middle and high school teachers perceive quality of life differently in female adolescents across severities of voice disorders: mild, moderate, and severe?

Hypothesis. As a voice disorder becomes more severe, teacher rating quality of life will be the same.

A trend analysis was performed to discover if as a voice disorder became more severe, ratings of an adolescent’s QoL became more negative. The post-hoc test the Tukey-Kramer was used to determine which QoL questions and between which groups were significant. All six QoL questions showed a trend, however not all were statistically significant. Questions 2 and 3 were statistically significant between all three groups, (mild-moderate, mild-severe, and moderate-severe) (Tables 8 & 9) (Figures 4 & 5), questions 1 and 5 were statistically significant between mild- moderate and mild-severe (Tables 10 & 11) (Figures 6 & 7), and question 6 showed a difference between mild-severe (Table 12) (Figure 8). There was no significant difference for QoL question 4. The null hypothesis was rejected because five of the six questions showed a statistically significant difference.

<table>
<thead>
<tr>
<th>Voice Groups</th>
<th>Mean(SEM)</th>
<th>t-value</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild &amp; Moderate</td>
<td>0.83(.19)</td>
<td>4.24</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mild &amp; Severe</td>
<td>1.37(.26)</td>
<td>5.27</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Moderate &amp; Severe</td>
<td>0.53(.25)</td>
<td>2.10</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Table 8. Means, standard error of measurements, t-values, and p-values for the results of the Trend analysis of QoL question #1.

df=85
Figure 4. Results for the Trend analysis: Question 1 of Quality of Life Questionnaire

Table 9. Means, standard error of measurements, t-values, and p-values for the results of the Trend analysis of QoL question #2:

<table>
<thead>
<tr>
<th>Voice Groups</th>
<th>Mean(SEM)</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild &amp; Moderate</td>
<td>0.58(.22)</td>
<td>2.57</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Mild &amp; Severe</td>
<td>1.24(.26)</td>
<td>4.73</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Moderate &amp; Severe</td>
<td>0.65(.24)</td>
<td>2.70</td>
<td>.008</td>
</tr>
</tbody>
</table>

Note: df=85
Figure 5. Results for the Trend analysis: Question 2 of Quality of Life Questionnaire:

![Figure 5](image)

Table 10. Means, standard error of measurements, t-values, and p-values for the results of the Trend analysis of QoL question #3:

<table>
<thead>
<tr>
<th>Voice Groups</th>
<th>Mean(SEM)</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild &amp; Moderate</td>
<td>0.66(.23)</td>
<td>2.81</td>
<td>.006</td>
</tr>
<tr>
<td>Mild &amp; Severe</td>
<td>1.25(26)</td>
<td>4.71</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Moderate &amp; Severe</td>
<td>0.58(.24)</td>
<td>2.37</td>
<td>.02</td>
</tr>
</tbody>
</table>

\[ df=84 \]

Figure 6. Results for the Trend analysis: Question 3 of Quality of Life Questionnaire
**Table 11.** Means, standard error of measurements, t- values, and p-values for the results of the Trend analysis of QoL question #5: Results of Trend Analysis

<table>
<thead>
<tr>
<th>Voice Groups</th>
<th>Mean(SEM)</th>
<th>t-value</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild &amp; Moderate</td>
<td>0.82(.20)</td>
<td>4.01</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mild &amp; Severe</td>
<td>1.12(.20)</td>
<td>5.36</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Moderate &amp; Severe</td>
<td>0.30(.24)</td>
<td>1.24</td>
<td>0.43</td>
</tr>
</tbody>
</table>

*Note: df=84*

**Figure 7.** Results for the Trend Analysis: Question 5 of Quality of Life Questionnaire
Table 12. Means, standard error of measurements, t-values, and p-values for the results of the Trend analysis of QoL question #6:

<table>
<thead>
<tr>
<th>Voice Groups</th>
<th>Mean(SEM)</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild &amp; Moderate</td>
<td>0.92(.48)</td>
<td>1.92</td>
<td>0.14</td>
</tr>
<tr>
<td>Mild &amp; Severe</td>
<td>1.12(.47)</td>
<td>2.38</td>
<td>0.05</td>
</tr>
<tr>
<td>Moderate &amp; Severe</td>
<td>0.19(.47)</td>
<td>0.42</td>
<td>0.90</td>
</tr>
</tbody>
</table>

Note: df=85

Figure 8. Results for Trend analysis: Question 6 of Quality of Life Questionnaire
Severity of Voice Disorder

Means of Listeners

Severity of Voice Disorder

Mild
Moderate
Severe
CHAPTER V
DISCUSSION

This study explored middle and high school teachers’ perceptions of personality characteristics and quality of life of female adolescents with normal voices compared to those same personality traits in students who have a voice disorder. An additional aim was to discover if, as the severity of a voice disorder becomes more severe, teacher ratings of personality traits and QoL would become more negative. Results from the present study revealed that middle and high school teachers rated multiple personality traits and overall attitudes more negatively for voice disordered female adolescents when compared to those with no voice disorder. Furthermore, as a voice disorder became more severe, ratings of personality traits and QoL were more negative.

Previous research investigating listener perceptions of personality characteristics for persons with a voice disorder have focused on young children and adults (Altenberg, Ferrand, 2006; Lass, Ruscello, Bradshaw, & Blankenship, 1991; Ruscello, Lass, & Podbesrk, 1988; Lallh, Putnam Rochet, 2000; McKinnon Hess, Landry, 1986). Findings reported by those studies indicate that personality traits such as intelligence, social ability, self-esteem, and employability of voice disordered individuals were perceived more negatively when compared to those with a normal voice.

The discussion of findings is organized as follows: Findings related to the personality traits survey, Findings related to the quality of life survey, Implications for current practice, Limitations of study, Directions for future research, and Conclusion.
**Personality Traits Survey**

The central research question of this study asked: Do middle and high school teachers perceive personality traits differently for female adolescents with and without voice disorders? The middle and high school teachers participating in this project rated certain personality traits of adolescent females with a moderate and severe voice disorder more negatively. There were statistically significant differences between the ratings of the following attributes: *emotional adjustment, happy, healthy, likeable, sociable,* and *employable* for the non voice disordered and voice disordered female voices. Additionally, voices that were severely disordered were rated more negatively for the attribute *character*. This suggests that middle and high school teachers view adolescent females who have a moderate and severe voice disorder more negatively than those with no voice disorder, with regard to several important social aspects that may impact vocational choices.

Human voice carries a variety of attributes about a speaker: emotions, personality traits, attractiveness, maturity, and likely profession (Aronovitch, 1976; Berry, 1996; Linville, 1996; Scherer, 1979; Yogo, Ando, Hashi, Tsutsui, Yamanda, 2000). The ability to correctly infer emotions from a voice sample has been found, on average, to be 60% accurate (well above chance - 12%) (Scherer, 1995). The most accurate emotions judged by listeners are sadness and anger. Specific vocal cues have been found to be used in the process of making judgments about emotions, personality, and maturity (McCoy, 1994). When acoustic parameters (e.g., average fundamental frequency, tempo) of voice samples were correlated with specific emotions, happiness and pleasantness (likeability) were
highly affected by an individual’s pitch variation and tempo (Scherer, 1995). In other words, if an individual presented with a slow, monotone voice, they were more likely to be rated as less happy and pleasant. Clinically, individuals diagnosed with a moderate to severe voice disorder will likely have a more difficult time varying their pitch and typically have a lower average fundamental frequency (pitch). Therefore, it is not surprising that the personality traits of emotionally adjusted, happiness, and likeability were rated more negatively in voice disordered females. Without even being aware of it, an individual with a voice disorder may subtly convey negative emotions and traits, thus hindering their social and possible educational and vocational opportunities.

It is well known that stereotypes have an effect on students’ academic achievement, quality of life, self perceptions, social interactions, and future occupation. As teachers rated certain key attributes more negatively, one may expect the student with a voice disorder to have a more difficult time in school both academically and socially (Becker, Maiman; 1985; Overby, Carrell, Bernthall, 2007). Social adjustment and peer relationships represent early developmental tasks and are important milestones for functioning in adulthood. Since teachers rated likeable, sociable, happy, and emotional adjustment more negatively, the risk for social rejection may increase. Social rejection is known to be later associated with socio-emotional adjustment problems in late adolescence and adulthood, affecting social, educational and possible vocational opportunities (Parker & Asher, 1987).

Although peer attitudes were not directly assessed in this study, examination of adolescent social standings and peer acceptance has identified several key factors for successful socialization: education, self-worth, psychological distress, ego development,
secure attachment and adaptations with friends (Allen, Porter, McFarland, Marsh, McElhaney; 2005; Larson, Whitten, Hauser, Allen; 2007). If an individual is viewed by others as unhappy or less emotionally adjusted, they may view this individual as having less self-worth and increased psychological distress. The individual may feel less likeable by her peers and consequently be less sociable (due to the decrease in social opportunities), preventing secure attachment and adaptations with friends. However, attitudes of others are not the sole contributor to social acceptance. Adolescents who feel positively about their own social interactions do well socially (Allen, Porter, McFarland, Marsh, McElhaney; 2005). Therefore, an important component in discovering true social difficulties is assessing an individual’s own personality traits.

The personality traits rated more negatively in this study are similar to those previously reported (Allard & William, 2008; Altenberg, Ferrand, 2006; Lass, Ruscello, Bradshaw, & Blankenship, 1991; Ruscello, Lass, & Podbesrk, 1988; Lallh, Putnam Rochet, 2000; McKinnon Hess, Landry, 1986) with the exception of intelligence. In previous studies, this trait has been consistently rated more negatively, but that finding was not supported by this study (Altenberg, Ferrand, 2006; Lass, Ruscello, Bradshaw, & Blankenship, 1991; Ruscello, Lass, & Podbesrk, 1988; Lallh, Putnam Rochet, 2000; McKinnon Hess, Landry, 1986).

Intelligence influences various aspects of personality (APA, 2006). Personality traits such as openness, extroversion and independence may have an influence on an individual’s rating of intelligence. Individuals who were considered to be highly intelligent were rated by older individuals to be more independent and aloof, versus younger raters who rated intelligence more on openness and extroversion (APA, 2006).
The middle and high school teachers in this study are older than previous studies participant raters who were children and college-age students; this may have a bearing on why the rate of intelligence was not rated more negatively. An additional explanation may be because teachers have had more exposure to adolescents in general in additional to those students with chronic illness or voice disorders throughout their profession, than the listeners in previous studies, who do not have the experience or knowledge thus understand that intelligence is based on other factors than just how a person sounds.

Other traits that were not judged to be more negative are consistent across studies: cleanliness, decisiveness, flexibility, niceness, and trustworthiness. These traits may not be judged more negatively because they represent attributes that are relevant to physical characteristics (cleanliness) or to those that require more knowledge of an individual (decisiveness, flexibility, niceness, and trustworthiness). Individuals may feel that they are not able to rate others on physical appearance or on traits that may take more time to assess in others. Additionally, when assessing another’s personality via voice, acoustically none of these traits have been identified in any acoustic cues (e.g., decreased average fundamental frequency). Therefore, they may not be traits that can be rated accurately from ones voice. These may be traits that would be removed when generating a future survey to further knowledge of the community’s perceptions of personality traits of individuals with a voice disorder (discussed in later section).

The second question relating to specific personality traits was: Do middle and high school teachers perceive personality traits differently in adolescents across various severities of voice disorders mild, moderate, and severe? Current results support the hypothesis that as the severity of the voice disorder worsens, perceptions of personality
traits became more negative. The personality traits (*emotional adjustment, happy, healthy, likeable, sociable, and employable*) were rated most negatively for those young girls who had a severe disorder, followed by those with a moderate voice disorder. This is consistent with previous findings that demonstrated that as a voice disorder becomes more severe, perceptions of the individual become more negative (Altenberg & Ferrand; 2006). However, Altenberg & Ferrand (2006) did not identify which traits were rated more negatively across the disorders. Therefore, simply having a severe voice disorder may be a global risk factor for having one’s personality traits perceived negatively.

The results of this study raise concerns about teacher perceptions particularly if a student’s voice disorder worsens. Although personality traits of the mild voice disorder were not rated significantly more negative, they were rated more negatively than normal voice. This implies that even a mild voice disorder should be taken seriously by clinicians. If some intervention is not provided, there could be a greater risk for being negatively perceived, especially if the voice disorder worsens. Consequently, students with any degree of voice disorder should be a priority for school SLP’s because of the negative attitudes of middle and high school teachers towards those with a moderate to severe disorder adversely affecting the students’ education, social, and vocational achievements and outcomes.

**Quality of Life Survey**

This study also assessed teacher’s views of quality of life and overall attitudes toward adolescent females who have a voice disorder. This theme has been researched in students with chronic illness, but not specifically voice disorders. The main question was:
Do middle and high school teachers perceive quality of life differently in female adolescents with and without voice disorders?

All responses related to the QoL domain were found to be statistically significant, when comparing normal voice to all voice disordered samples, showing that middle and high school teachers in this study perceived these adolescent females who had any degree of voice disorder to have a decreased QoL. There has been some disagreement regarding the fact that others are not really able to accurately assess another’s QoL; however, this study was not looking for accuracy, rather the teachers’ perceptions and attitudes toward the students. Teachers’ perceptions help form expectations, which have been reported to lead the teacher acting differently toward certain students. This differential treatment is perceived by the students, who respond accordingly, and exhibit behavior that reinforces the teachers’ expectations (self-fulfilling prophecy) (Babad, 1993; Brophy, 1982, Cooper & Good, 1983; Rubie-Davis, Hattie, Hamilton, 2006). Therefore, if a teacher has a negative perception of a student, the student may also have negative expectations, resulting in poor academic accomplishment. Therefore, there is a need to provide timely voice intervention to help these students achieve academic and social success.

A second question relating specifically to QoL was: Do middle and high school teachers perceive quality of life differently in female adolescents across various severities of voice disorders mild, moderate, and severe? Results of this study indicate that as the severity of the voice disorder increases (becomes more severe) middle and high school teachers perceptions of the student’s quality of life decreases. As with personality traits, the severity of the voice disorder is a predictor of adverse perceptions of QoL.
Quality of life and more specifically health related quality of life (HR-QoL) encompasses both objective (e.g., health) and subjective (e.g., happiness) aspects. Questions in the QoL survey encompass certain attributes of the personality traits survey: happy, healthy, employability, and social ability. Considering that both QoL questions and personality trait questions in these specific areas were rated more negatively, it is clear that these students are viewed more negatively with respect to these specific areas and are at greater risk for educational, social, and occupational disadvantages.

**Implications for current practice**

Findings suggest that adolescent female students with moderate and severe voice disorders have a hidden handicap and are most at risk for academic, social, and potential vocational difficulties. Although those with a mild voice disorder may not be currently viewed as more negative, they too may be at risk. If intervention is not provided, their voice disorder may progress into a more severe disorder, thus placing them into the moderate to severe range. Consequently, students with a voice disorder should be a priority for school SLP’s because of the negative attitudes of middle and high school teachers adversely affecting the students’ education, social, and vocational achievements and outcomes. Currently, many school clinicians express apprehension and fear when treating individuals with a voice disorder, which may be due to limited exposure at the graduate-level (caused from limited experience due to fewer students with a voice disorder), the lack of evidenced based treatment, and/or decreased motivation of adolescents (Andrew & Summers, 2002; Hoffman-Ruddy & Sapienza, 2004; Wilson, 1995). Therefore there is a need to increase the comfort level of school SLP’s in treating adolescents with voice disorders.
Educating teachers about voice disorders is also warranted. Teacher biases and experiences determine their beliefs and attitudes, shaping their expectations of students. Studies that provided educational programs with speech-language pathologists concerning students with a speech and language disability or reported that teachers had education/increased knowledge in working with students with a speech and language disorder found a decrease in negative perceptions (Erbert, Prelock, 1996, Lass, Ruscello, Pannbacker, et al. 1994, Overby, Carrell, Bernthal, 2007). In view that there were overall negative perceptions of adolescent females with a voice disorder, increasing teachers awareness about voice disorders is necessary and would be beneficial to the students.

Given that there is an increase in negative perceptions and negative attitudes towards female adolescents with a voice disorder, being able to advocate their needs during class is necessary. Middle and high school is a time of transition from parent/teacher to self advocacy and teaching students how to advocate for their needs as young adults should be emphasized. This may include asking the school SLP for help if they notice teachers or other individuals are not treating them the same as others or if teachers are not calling on them in class. The SLP then may decide to come into the classroom and observe the setting, provide feedback to the teacher and students, and educate the class on what a voice disorder is and how it is affecting the student. Of course it would be a good idea for the student to be closely involved with this educated piece. Further, the schools SLP may be approached to help the student with college applications, job interviews, etc.
Limitations of Study

There were several limitations to this study. The voice samples used were not controlled for rate of speech. Researchers have suggested that when an acoustic parameter such as tempo of voice sample is not controlled, this will have an affect on others’ perceptions of an individual (Scherer, 1995). Consequently, teachers may have used not only voice quality but tempo of the voice when rating personality and QoL.

With regard to the personality traits survey, the attributes chosen to be assessed were thought to be most important, and were similar to previous voice research of perceptions, certain personality traits may not have been addressed in the survey (e.g., ambition, confidence, and assertiveness). These attributes may provide additional information on how teachers perceive adolescent female students with a voice disorder. With regard to the QoL survey, the survey has only been used in the assessment of teachers’ perceptions of students with chronic illness. A student with a voice disorder was not one of the chronic illnesses assessed, although it can be argued that a voice disorder is a chronic illness.

The growth of the internet has provided convenience for distribution of surveys; however there are several disadvantages which may have contributed to overall response rate: sample validity, non-response biases, stakeholder biases, and unverified respondents (Bosnjak & Tuten, 2001; Sax, Gilmartin, Bryant, 2003; Solomon, 2007). Sample validity was affected because not all teachers of all middle and high schools were asked to participate in this study. Further, only those who had internet access, knew about the survey, and decided to take the survey participated. With regard to non-response biases, those who did respond may have had ulterior motives such as a high interest in the
subject, more enthusiastic about research (e.g., science teachers), and therefore more willing to participate and take the survey. Spam filters may have automatically deleted the request for participation or teachers may have just deleted the e-mail themselves without opening because they were not interested. Stake-holder biases may have occurred; especially those participants who have a high interest in the topic area (have a student or child with a voice disorder), and took the survey several times. A final downfall to web based survey is the inability to control who has access to the survey. Although precautions were taken to ensure only middle and high schools received the e-mail flyer, the flyers may have been forwarded onto others who were not necessarily target population. Furthermore, the amount of time to complete the survey, 25 minutes, may have been a factor. Although the survey was easily accessible, the completion rate was low with 124 teachers viewing the survey, 46 beginning it, and 32 answering the majority of the questions

**Directions for future research**

Several areas for future research are indicated. Generating a reliable and validate survey to gauge community perceptions of individuals with a voice disorder would be the next step. Additional personality traits may need to be evaluated, while others are removed from the current survey. Traits such as assertiveness, confidence, and ambition may help create a more complete view of how the teacher views the student, while those traits that did not have any significance could be considered to be eliminated. Furthermore, creating a pamphlet/training for teachers may help determine if education about children and adolescents with a voice disorder improves teacher perceptions and expectations of their students.
With regard to the populations, further assessment of both the voice disordered population and listener-rater population is warranted. First, the need to assess male adolescent speakers to determine if they too are perceived more negatively as are females is important. With regard to listener-rater population, evaluation of elementary school teacher perceptions is implicated. As there are numerous elementary school aged children with a voice disorder negative teacher perceptions may indicate early intervention in the school. Other community raters need to be included: peers, college admission officers, human resource personnel, and employers to establish a better understanding of how the community perceives individuals with a voice disorder.

In order to fully understand how the student may be affected socially, academically, and vocationally, an adolescent patients’ self-assessment of personality and QoL is essential to discover who may be at most risk and to determine if the community perceptions are accurate.

Additionally, the above studies should include pre-post therapy voice samples. It is the theory that the voice is the feature that is creating these negative perceptions; therefore, voice therapy that improves the voice should also improve the perceptions of the teachers. We do not know this for certain; therefore, the need to evaluate perceptions pre and post therapy is indicated.

Conclusion

This study set out to establish a better understanding of how the community perceives individuals with a voice disorder. Specifically how middle and high school teachers perceive adolescent females with a voice disorder with regard to personality traits and quality of life. Findings of the current study suggest middle and high school teachers
perceive female students with a moderate and severe voice disorder more negatively when compared to a same-aged peer in a variety of social, emotional, and occupational domains. Therefore, one may expect that a female adolescent with a voice disorder may negatively impact expectations of teachers, placing the student at risk for negative educational, social, and occupational outcomes. Educating teachers, SLPs, patients, and families about the potential subtle biases others may have toward those with a voice disorder is important for the individual's overall well-being and optimal health. Furthermore, improved interactions between school SLP and teacher regarding risks and needs of students with a voice disorder is needed to help provide enhanced educational experience. An increase awareness of the school SLP to help provide services and help students with voice disorder advocate is also implied. Overall, a need to help future SLPs feel more comfortable in providing voice therapy to adolescents and establish a better understanding of how voice disorders may negatively affect teachers’ perceptions and expectations is evident.
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APPENDIX A

ANATOMY AND PHYSIOLOGY OF VOCAL MECHANISM

Anatomy and physiology of the vocal mechanism is important to understand as it determines the manner in which the larynx functions. The larynx is a dynamic organ that is multifunctional and includes respiration, airway protection, pressure valving, and phonation. Physical production of voice requires the highly coordinated interactions of three subsystems: respiration, phonation, and the resonating cavities, collectively known as the vocal mechanism. The vocal mechanism is under sophisticated neural control and changes across time as an individual grows and develops, with the most striking changes occurring during adolescence, particularly for males.

Anatomy. Normal, healthy phonation or voicing requires adequate respiratory support, optimal vocal fold closure, normal vocal fold cover, control of vocal fold length and tension, and intact resonating cavities. The respiratory system includes the diaphragm, lungs and large (bronchial and tracheal) airway. This system provides the energy source (airflow), and the valving of the larynx regulates the subglottal airflow and pressures to initialize and sustain vocal fold vibration. Phonation requires a minimal amount of subglottal air pressure or phonatory threshold pressure (PTP) to set the vocal folds into sustained oscillation. This varies dependent on the pitch (average fundamental frequency) and loudness (intensity) ranging from 3 – 6 cm H2O (Titze, 2000). The larynx is positioned at the superior end of the lower airway and divides the lower airway from upper airway.

There are a variety of structures that make up the larynx: cartilages, muscles, ligaments, joints and mucous membranes. Cartilages of the larynx include: thyroid,
cricoid, epiglottis, and arytenoids. The arytenoid cartilages are paired cartilages with two projections: lateral and medial. The lateral or muscular process is attached to the muscular portion of the vocal fold and supports intrinsic laryngeal muscles. The medial or vocal process is attached to the vocal ligament and supports the medial edge of the vocal fold. The cricoarytnoid joint allows for three basic movements: sliding on the medial-lateral axis, sliding on the dorsoventral axis, and rotating about the craniocaudel axis (Frable, 1961). These movements alter the orientation of the vocal process to assist in opening and closing of the vocal folds.

The vocal folds are paired, layered tissues that project from the laryngeal wall. Hirano (1981) first described these layers as the: epithelium, superficial lamina propria (a.k.a. Reinke’s space), intermediate lamina propria, deep lamina propria, and the vocalis muscle (Figure 9).
As with any other body structure the vocal folds develop from infancy through adulthood. Although the exact timing of the normal development of the vocal fold layers continues to be controversial there is a common consensus of overall development (Table 13). It has been hypothesized that phonation (vocal fold vibration) has an important role in the growth and development of the human vocal fold (Sato, 2008). Tension created by phonation is thought to stimulate stellate cells which helps metabolize extracellular matrices (ECM). The ECM is important for the development of the various layers as well as the biomechanical properties of the vocal fold. The extracellular matrix (ECM) is comprised of two main types of proteins: fibrous (collagens and elastins) which provide ECM support, and interstitial (proteoglycans and glycoproteins) which provide tissue and cellular functions (Table 14).
Table 13. Development of true vocal folds

<table>
<thead>
<tr>
<th>Age</th>
<th>Layers of the vocal folds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborns</td>
<td>Monolayer (no distinctive layer)</td>
</tr>
<tr>
<td>2-5 months</td>
<td>A bilayer forms</td>
</tr>
<tr>
<td>Childhood (between 3-7 years of age)</td>
<td>Bilayer develops with some differentiation of a third layer</td>
</tr>
<tr>
<td>Adolescent (10-13 years of age)</td>
<td>Differentiation of the lamina propria layers</td>
</tr>
<tr>
<td>Adult</td>
<td>Epithelium, superficial lamina propria (a.k.a. Reinke’s space), intermediate lamina propria, deep lamina propria, and the vocalis muscle.</td>
</tr>
</tbody>
</table>

*Bosley, 2006; Hartnick, 2005; Ishii, 2000; Sato & Hirano, 2001

Table 14. Histology of the mature true vocal folds

<table>
<thead>
<tr>
<th>Layer</th>
<th>Fibrous proteins</th>
<th>Interstitial proteins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epithelium (Squamous epithelium)</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Superficial layer of LP (aka, Reinke’s space)</td>
<td>Loosely organized fibrous matrix: low amounts of elastin fibers</td>
<td>Yes - proteoglycans and glycoproteins</td>
</tr>
<tr>
<td>Intermediate layer</td>
<td>Organized fibrous matrix: High amounts elastin fibers and low amounts of collagen fibers</td>
<td>None</td>
</tr>
<tr>
<td>Deep layer</td>
<td>High concentration of Collagen</td>
<td>None</td>
</tr>
<tr>
<td>Muscle (muscle)</td>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>

*Hirano (70’s & 80’s)
Laryngeal muscles play an important role in vocal fold vibration. Length and tension of the vocal fold edges as well as their opening (abduction) and closing (adduction) across the glottic airway result from the associated muscles and nerves that are under executive neural control. Coordinated manipulations of the intrinsic muscles allow humans to produce sounds with a variety of intensities and pitches. The intrinsic muscles attach to the cartilages of the larynx and are responsible for specific movements of the vocal folds. Muscles that help adduct the vocal folds include: lateral cricoarytenoid (LCA), thyroarytenoid (TA), and interarytenoid (IA). The posterior cricoarytenoid muscle (PCA) is the only muscle that abducts the vocal folds allowing respiration. Vocal fold length (long/short) is related to pitch and is controlled, in part, by the cricoarytenoid muscle (CT) (Figure 10).

Figure 10. Intrinsic Muscles of the Larynx
The neurological supply to the larynx includes bilateral peripheral innervations, laryngeal reflexes, and central nervous system controls. The vagus nerve (cranial nerve X) provides the primary peripheral innervation. This nerve exits the brainstem, descends in the neck between the carotid artery and jugular vein, and continues down into the gut. Along its way it innervates various muscles, including the muscles of the larynx (discussed above). There are three branches of the vagus two of which are laryngeal: recurrent and superior. The recurrent nerve provides sensory information below the vocal folds and motor information to the PCA, TA, LCA, and the IA muscles. The superior laryngeal nerve has two branches, internal and external. The internal branch provides all sensory information above the vocal folds and the external branch provides motor to the CT muscle (Figure 11)

Figure 11. Neurological supply to the larynx

Resonance occurs when a “vibrating system is driven by a periodic force at the natural frequency of the system” (Kent p. 33). In other words, once the vocal folds (the
vibrating system) are set into vibration (discussed below in physiology section), the resonating system changes what would be a harsh, buzz type sound into a person’s unique individual voice quality. The system is comprised of cavities and chambers above the true vocal folds or the supraglottic structures. Specifically the system includes the tube shaped muscular-membranous structures of the laryngopharynx, oropharynx, and nasopharynx (Andrews & Summers, 2002). Across individuals, these structures differ by length, width, and shape, as well as muscular tension. As the sound waves reflect off the supraglottic structures, voice takes on its own traits and allows for individual voice characteristics that distinguishes one voice from another. Any alternation in the configuration of these structures may change voice quality (Sataloff, 1997).

Physiology. The classical theory of vocal fold physiology (oscillation) consists of the myoelastic-aerodynamic theory which describes the Bernoulli Effect (Van den Berg, 1958). The standard theory states that phonation is dependent upon the interaction of the subglottal air pressure, elasticity of the vocal folds, and deformation of the vocal folds. Simply put, there is a buildup of air pressure beneath the vocal folds (subglottic). Once the pressure is strong enough, the pressure pushes the vocal folds apart (move laterally) inferiorly to superiorly, deforming the vocal folds. As the vocal folds are pushed apart, the subglottic pressure is released and moves across the glottis at a high velocity. This transglottal air stream creates a negative pressure then sucking the folds together (medially) inferiorly to superiorly. The subglottal pressure builds up again and the cycle repeats (Van den Berg, 1958). Although the myoelastic-aerodynamic theory including the Bernoulli Effect have been the foundation for explaining vocal fold vibration Titze (1994) reports that there are several unexplained phenomena. For one, self-sustain
oscillation needs continual energy transfer from air stream to the tissue (vocal folds) which depends on more than just the Bernoulli Effect. Second, the Bernoulli Effect does not distinguish between direction (inward and outward movement) of the vocal folds which is important for air flow. Third, coupling of the vocal tract is needed to allow for the Bernoulli Effect to lower during glottal closing and rise for glottal opening. Fourth, subglottal pressure applied to the vocal folds during glottal closure may serve as a driving force for sustained oscillation, which cannot be explained by the Bernoulli Effect. Last, the myoelastic-aerodynamic theory only applies to vocal folds that collide but it has been observed that oscillation can occur without collision. Due to the numerous inadequacies of the classical theory, Titze clarified the theory of vocal fold vibration.

In the early 1990’s Titze expanded the theory into a multi-mass. The expanded model explains how the supraglottic air column produces a pressure asymmetry which assists in self-sustained oscillation. When the glottis is opening, the air stream passes through the vocal folds, increasing intraglottal and air column air pressure. Energy is transferred from the airstream (fluid) to the vocal folds (tissue). When the glottis closes due to the suction and recoil, the upward drive of the air column pressure continues, while the intraglottal air pressure is decreasing, creating suction above the vocal folds assisting in closing the glottis. In other words, a delay occurs between the buildup and release of the supraglottic air pressure and the opening and closing of the glottis. Titze’s expanded theory helps explain holes in the classical theory, however it does not fully explain how and why the negative pressure help with sustained vocal fold vibration.

Recent theories of vortices within the glottis and supraglottis have been reported to play an important role in the initiation and sustaining of vocal fold vibration (Khosla,
Muruguppan, Gutmark, Scherer, 2007). Vortices are areas of concentrated rotational movement and have been associated with negative and positive pressure. Khosla et al. (2007) hypothesized that vortices associated with negative pressure within the intraglottic area may add an additional force during vocal fold closure and aid in sustaining vocal fold vibration.

Anatomical and Physiological Changes during Adolescent. Adolescence is a time of physical and functional changes. The body begins to grow and develop into its mature state. During this rapid growth period, laryngeal structures also grow, leading to a corresponding voice change. Growth and maturation of the larynx typically begins between 10-12 years of age and is caused by sex hormones. The hormones involved in alternation of vocal function are androgen, progesterone, and estrogen. Androgen and progesterone receptors may be found in the cytoplasm and nuclei of the laryngeal gland, respectively; whereas the estrogen receptors are found in the epithelial cells of the larynx. As these hormonal changes occur, laryngeal development takes place (Sataloff, 1997).

The typical adolescent voice is characterized by instability of both pitch and loudness. Authors have attributed this instability to the rapid growth of the vocal mechanism and the gradual adjustment of the nervous systems for control of these structures (Sataloff, 1997). In both males and females, there is a maturation of the lamina propria and vocal ligament as well as vocal fold length, width, thickness, and biomechanical properties (Sataloff, 1997). Although laryngeal development occurs in both males and females during adolescence, voice changes are typically more pronounced in males.

The angle of the females’ thyroid cartilage remains the same (120 degrees), while the males decrease to 90 degrees (Sataloff, 1997). Additionally, male vocal folds undergo
nearly twice as much growth to reach maturity compared to those of the female (Hirano, Kurita, Nakashima, 1983). The consequence of this rapid growth leads to pitch lowering, voice quality alteration, and occasional vocal instability. This voice mutation typically lasts 1.5 years but can last as long as 3 years (Hagg & Tarranger, 1980).

**Assessment of Voice Disorders**

A comprehensive voice evaluation is conducted by a speech-language pathologist and optimally a multidisciplinary team including an ear, nose and throat physician, audiologist and at times psychologist. Current standards in the assessment of adolescent voice patients include both indirect and direct measurements. Following the history intake, objective and subjective assessment takes place including: acoustic, aerodynamic, visual documentation, perceptual judgment.

After a thorough evaluation of the patient with indirect and direct visualization of the vocal mechanism (e.g., flexible and/or rigid scope), appropriate treatment recommendations are provided. The following section provides an explanation of the various measurements used for a voice evaluation followed by treatment of adolescent voice disorders.

*Case History.* An initial case history will help the clinician explore the cause(s) of the voice disorder and its contributing factors. Certain medical, behavioral and possible psychological conditions may place children at risk for developing a voice disorder. Dysphonia alone can affect the intelligibility of connected speech, generating an educational, social and emotional handicap (Andrews & Summers, 2002).
Evaluations start with an interview of both the adolescent and the parent to obtain crucial information including: medical history (vocal abuses, intubation, blunt trauma, etc) and previous voice therapy. This will provide a substantial amount of information towards the etiology and diagnosis of the voice disorder.

**Acoustic measurements.** Acoustic measurements provide objective, noninvasive measurements of vocal function. These measurements are an important part of the evaluation (and treatment) because the tasks indirectly provide information about the severity of the voice pathology and provide information regarding the status of vocal function (Pausewang, 1995). The most common measurements are the average fundamental frequency of sustained /ah/ and connected speech, intensity (comfortable and loud), and pitch range. Additionally, to measure the efficiency of the adolescent’s phonatory or respiratory system, maximum phonation time is used. Although there are gaps in acoustic normative data (deficits and inconsistencies in pediatric normative data), the tool provides guidelines for comparison between normal and disordered patients so the clinician may be able to discriminate normal abnormal voice quality. Acoustic measurements have been successful in measuring changes in vocal production during their course of treatment (evaluation through discharge) (Garrett, Healey, 1987; Nittrourer, McGowen, Milenkovic, Behaler, 1990; Scherer, Vail, Guo, 1995; Stone, Rainly, 1991).

**Aerodynamic measurements.** Aerodynamic measurements also provide objective, noninvasive measurements of vocal function. Phonatory flow rates and subglottal pressure are used to measure intraoral airflow and pressures. This is usually obtained by three to five trials of a long /ah/ for airflow and three to five trials of /papapapa/ for
subglottal pressure. These measurements are helpful to discriminate normal from disordered vocal function, assess severity of pathology, and suggest how the vocal mechanism is using pressure and airflow to vibrate the structures for voice production (Stemple, 2000).

*Perception of voice.* Experts (those who assess and treat voice disorders) use voice quality when assessing a voice disorder. Perceptual examination describes what the voice sounds like, and is often considered the gold standard for experts during clinical assessment of subjective parameters of voice quality. There are various instruments being used to assess voice, Consensus of Auditory-Perceptual Evaluation of voice (CAPE-V) and BRABS. This will be further addressed in Perceptions of and Voice-Related Quality of Life section.

*Visual documentation.* Direct visualization of the larynx via flexible laryngoscope or a rigid scope is necessary to accurately diagnose a voice disorder. Imaging allows the speech-language pathologist and ear, nose and throat physician to assess vocal fold appearance, arytenoid movement, and the vibratory characteristics of the vocal folds. Various parameters rated for laryngeal function include: glottic closure, laryngeal closure, supraglottic activity, degree of supraglottic activity, vertical level of approximation, appearance of vocal fold edge, arytenoid mobility, and source of vibration. Vibratory characteristics that are able to be observed via scope are: mucosal wave, amplitude of vibration, phase symmetry, and phase closure. The accumulation of this information helps determine the nature of dysphonia and provides the diagnosis for the voice disorder.
Once a comprehensive voice evaluation has been completed, dependent upon the diagnosis, therapy may be recommended. There is a paucity of evidence-based research in the effectiveness of treatment of adolescents with a voice disorder. Furthermore it continues to be an area of debate among voice clinicians as to whether adolescents should receive voice therapy at this age, due to their growth and maturation of various social, emotional, and cognitive skills.

To accurately diagnose and care for the adolescent dysphonic patient, a thorough evaluation is required. To date, there are numerous subjective, instrumental and objective measurements used to evaluate these patients. However, a missing piece of the evaluation and subsequent treatment process is the professionals’ understanding of the public’s perceptions towards adolescents with a voice disorder. With this added piece of information, a more accurate evaluation and treatment plan may be set in place.
APPENDIX B
RECRUITMENT FLYER

Middle and High School Teachers
Impressions of Adolescent Voices

Often, we get an impression of someone just by listening to his or her voice. This study is assessing impressions and perceptions of middle and high school teachers towards voices of adolescents. After listening to each voice, you will be asked to fill out 25 questions per voice, giving us your first impression of the individual speaking. The survey will take approximately 20 minutes to complete.

A computer survey was designed for you to access. You will be asked to complete the following -

- Answer demographic questions
- Listen to 6 adolescents read 6 sentences
- Following each voice sample, fill out a survey consisting of a total of 25 questions

**Interested in participating?**

Possible participants are:

1. Middle and High school teachers (grades 6 -12).
2. Must have no history of a speech, language, or hearing disability.

If interested, please log onto [http://adolescentvoice.questionpro.com](http://adolescentvoice.questionpro.com)

For more details regarding the study please contact Stephanie RC Zacharias, M.S., CCC-SLP at 513-520.5070 or via email stephanie.zacharias@cchmc.org.

Thank you for your time and interest!
APPENDIX C

CONSENSUS AUDITORY-PERCEPTUAL EVALUATION OF VOICE (CAPE-V)

Overall Severity: mild; mild\moderate; moderate; moderate\severe; severe ___\100
Roughness: mild; mild\moderate; moderate; moderate\severe; severe ___\100
Breathiness: mild; mild\moderate; moderate; moderate\severe; severe ___\100
Strain: mild; mild\moderate; moderate; moderate\severe; severe ___\100
Pitch: mild; mild\moderate; moderate; moderate\severe; severe ___\100
Loudness: mild; mild\moderate; moderate; moderate\severe; severe ___\100

Definitions of Vocal Attributes (on continuum of 0-100 (0=normal-100= most severe)

OVERALL SEVERITY: Global, integrated impression of voice deviance.
Roughness: Perceived irregularity in the voicing source.
Breathiness: Audible air escape in the voice.
Strain: Perception of excessive vocal effort (hyperfunction).
Pitch: Perceptual correlate of fundamental frequency. This scale rates whether the individual's pitch deviates from normal for that person's gender and, age,
Loudness: Perceptual correlate of sound intensity. This scale indicates whether the individual's loudness deviates from normal for that person's gender, and age.
APPENDIX D
EXAMPLE OF SURVEY

**Personality Traits**

On the continuum below, please click radio button you feel best identifies the traits of this person.

<table>
<thead>
<tr>
<th>Trait</th>
<th>Always true</th>
<th>Never True</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sick (unhealthy)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Employable</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Unreliable</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sincere</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Untrustworthy</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Decisive</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Happy</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

*Powered by QuestionPro*
APPENDIX E

WAIVER OF WRITTEN CONSENT

Hello:
You are invited to participate in our survey to assess voice. In this survey, approximately 52 (up to 100) middle and high school teachers will be asked to complete a survey that asks questions about impressions of various voices. It will take approximately 25 minutes to complete the questionnaire.

Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for us to learn your opinions.

If you have ever been diagnosed with a speech or language disorder, or have a hearing impairment please do not complete the survey.

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Stephanie RC Zacharias, MS, CCC-SLP at 513.803.2801 or by email at the email address specified below.

Thank you very much for your time and support. Please start with the survey now by checking the 'I agree' box and clicking continue.

☐ I Agree

Please contact stephanie.zacharias@cchmc.org if you have any questions regarding this survey.
APPENDIX F

DEMOGRAPHIC QUESTIONS

Age: (years) _______

Gender: Male/Female

Highest educational degree:

Number of years teaching:

Subject(s) teach:

Are you certified to teach special education?

If yes:
   Are you currently teaching special education?

   What is the percentage time you are teaching special education?
APPENDIX G

PERSONALITY TRAITS SURVEY

On the scales provided below, check the number on the scale that is closest to the adjective that you feel best identifies what you think are the traits of this person -

<table>
<thead>
<tr>
<th>Trait</th>
<th>Scale 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Healthy</td>
<td>1 2 3 4 5 6 7 Sick</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Employable</td>
<td>1 2 3 4 5 6 7 Unemployable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Unreliable</td>
<td>1 2 3 4 5 6 7 Reliable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Sincere</td>
<td>1 2 3 4 5 6 7 Insincere</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Untrustworthy</td>
<td>1 2 3 4 5 6 7 Trustworthy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Decisive</td>
<td>1 2 3 4 5 6 7 Indecisive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Happy</td>
<td>1 2 3 4 5 6 7 Sad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Not likable</td>
<td>1 2 3 4 5 6 7 Likable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Clean</td>
<td>1 2 3 4 5 6 7 Dirty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Cruel</td>
<td>1 2 3 4 5 6 7 Kind</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Mentally stable</td>
<td>1 2 3 4 5 6 7 Mentally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Unsociable</td>
<td>1 2 3 4 5 6 7 Sociable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Friendly</td>
<td>1 2 3 4 5 6 7 Hostile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Weak character</td>
<td>1 2 3 4 5 6 7 Strong charc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Intelligent</td>
<td>1 2 3 4 5 6 7 Unintelligent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Emotionally</td>
<td>1 2 3 4 5 6 7 Emotionally adjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maladjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Unpleasant</td>
<td>1 2 3 4 5 6 7 Pleasant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Flexible</td>
<td>1 2 3 4 5 6 7 Rigid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

APPENDIX H

QUALITY OF LIFE SURVEY

On the scales provided below, check the number on the scale that is closest to the descriptor that you feel best identifies this person.

1. Is the quality of life of this adolescent lower in comparison with his peers in class?
   Same  1  2  3  4  5  6  7  Different

2. Is the self image of this adolescent lower than that of his peers?
   Same  1  2  3  4  5  6  7  Lower

3. Do you believe this adolescent will be able to work in the future in any profession that they desire, as will as their peers?
   Always  1  2  3  4  5  6  7  Never

4. The achievement of this adolescent is lower in comparison to their peers
   Always  1  2  3  4  5  6  7  Never

5. Do you think this adolescent will be able to live a normal family life in the future, as will their peers?
   Always  1  2  3  4  5  6  7  Never

6. Do you think this adolescent will have more social difficulties, including controversy and quarreling with their peers?
   Always  1  2  3  4  5  6  7  Never
