

THE EXPOSURE, KNOWLEDGE, AND EXPERIENCE OF GRADUATE STUDENTS
IN COMMUNICATION DISORDERS ON TREATING SPEECH/LANGUAGE
ISSUES IN ADULTS WITH NEUROLOGICAL DISORDERS USING SINGING-
BASED THERAPY

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ABSTRACT

Tassie Lee Murphree

THE EXPOSURE, KNOWLEDGE, AND EXPERIENCE OF GRADUATE STUDENTS IN COMMUNICATION DISORDERS ON TREATING SPEECH/LANGUAGE ISSUES IN ADULTS WITH NEUROLOGICAL DISORDERS USING SINGING- BASED THERAPY

There are speech-language pathologists (SLPs) who use singing while in therapy to treat a variety of disorders for adults with neurological disorders. This study was conducted to investigate graduate student exposure to, knowledge of, and experience with utilizing singing in therapy with this population. Specifically, this survey was distributed to first- and second-year graduate students in communication disorders. The survey consisted of both general and specific questions to more effectively analyze the students' familiarity levels with the topic, overall. The results indicated that the majority of students demonstrated limited knowledge of and exposure to singing in therapy. The students' comfort levels with singing in therapy with adults was also low, overall. This study may suggest a need for both additional research about singing in therapy and more education for students on the use of such methods.

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CHAPTER I

INTRODUCTION

According to the American Speech-Language-Hearing Association (ASHA, n.d.), speech-language pathologists are involved in treating a variety of disorders, such as speech and language, communication with others, the cognitive aspects of communication, and swallowing/feeding disorders in both children and adults. There are a variety of techniques used to treat these disorders. These techniques differ based upon the type of disorder and the population that is being treated (Fijii & Wan, 2014). For instance, the treatment methods used for an adult may be far different from the treatment methods used with a child. Similarly, treating a language disorder is much different than treating a speech disorder. Due to these differences, speech-language pathologists must carefully consider their method of treatment based on their client's needs (Akanuma, Meguro, Satoh, Tashiro, & Itoh, 2016).

A speech disorder includes having an impairment in the ability to articulate the sounds of speech, speaking with dysfluencies, and/or having a voice disorder (ASHA, 1993). A language disorder, on the other hand, is impaired understanding and/or use of language in the spoken, written, and/or symbolic form. Individuals are impacted by speech and language disorders in a variety of ways including physically, socially, and emotionally (Rocca, 2015). Consequently, it is exceedingly important that speech-language pathologists utilize the most effective treatment methods for their clients, even if the methods are not considered conventional methods. There are many causes of

speech and/or language disorders including neurological disorders. Two of the most commonly occurring neurological disorders that impact speech and language are cerebrovascular accident (stroke) and traumatic brain injury (Akanuma et al., 2016; Schlaug, Marchina, & Norton, 2008; Shih et al., 2012; Tamplin, 2008).

Several researchers have reported speech and language improvements in adults with neurological disorders as a result of singing therapy (Akanuma et al., 2016; Schlaug et al., 2008; Shih et al., 2012; Tamplin, 2008). Despite singing therapy being shown to be an effective treatment method, there is evidence of a lack of education for students in regards to these methods (Schlaug et al., 2008). There was no available literature about the amount of training that occurs in graduate level communication disorders (CD) programs in terms of using singing-therapy for adults. Consequently, there is a need for research about singing therapy content in the current education of these students and future professionals. The purpose of this study was to assess the educational content of singing in therapy for adults with speech and language disorders due to neurological deficits in the current graduate communication disorders programs. In addition to educational knowledge, this study was designed to evaluate the level of experience with and exposure to singing therapy methods. The research question was as follows: Do graduate students in communication disorders have exposure to, knowledge of, and experience utilizing singing therapy with adults with neurological disorders? It was hypothesized that the majority of students would report little to no inclusion of singing therapy education and/or training in their program curriculum. Additionally, it was hypothesized that due to a lack of education, these students would feel uncomfortable implementing singing-based strategies in their therapy sessions.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this literature review was to evaluate research regarding singing-based therapy techniques used to treat speech/language issues in adults with neurological disorders. A variety of studies were found that analyzed the efficacy of using singing-based therapy for patients with a variety of neurological disorders (Akanuma, Meguro, Satoh, Tashiro, & Itoh, 2016; Conklyn, Novak, Boissy, Bethoux, & Chemali, 2012; Fujii & Wan, 2014; Hurkmans et al., 2012; Jomori & Hoshiyama, 2010; Kim & Jo, 2013; Schlaug, Marchina, & Norton, 2008; Shih et al., 2012; Tamplin, J. 2008; Thompson, Storie, & Purdy, 2016; Yamaguchi, Akanuma, Hatayama, Otera, & Meguro, 2012).

Singing Therapy in Improving Language

Aphasia is a communication/language disorder that is most commonly acquired after experiencing trauma to the brain, a stroke, intense migraines, neurological issues, or brain tumors (Ganzfried, 2014). Aphasia negatively impacts a person's ability to produce speech, to process spoken and/or written language, and to effectively communicate with others (Thompson et al., 2016). Aphasia can significantly impact an individual's quality of life in a variety of areas, including socially, emotionally, and mentally (Thompson et al., 2016). Due to the impact aphasia has on individuals and their families, it is of the utmost importance that these individuals receive excellent care, even if the plan of care includes nonconventional methods, such as singing therapy. The participants in the

following studies were diagnosed with aphasia. Each study focused on the impact that singing therapy had on the speech/language skills of the participants (Akanuma et al., 2016; Schlaug et al., 2008; Yamaguchi et al., 2012).

Aphasia is a disorder that may negatively impact receptive and/or expressive language (American Speech-Language-Hearing Association (ASHA), n.d.). Individuals with aphasia may struggle with word-finding and word-associations (ASHA, n.d.). In an effort to explore an effective treatment method for these issues, Akanuma et al. (2016) evaluated the impact that singing therapy had on the word-finding and association ability of patients with aphasia. The participants included 10 adults (9 males and 1 female) between 52 and 82 years of age with chronic aphasia caused by stroke who were recruited from the Miyagi Association of Aphasia. Each participant had to meet the following criteria in order to be eligible for the study: participants had to be right handed, have aphasia caused by a stroke that occurred at least three years prior to the study, and have stable symptoms in the chronic phase, with the primary symptom being word-finding difficulties. The participants consisted of eight individuals with mild aphasia, one with moderate aphasia, and one with severe aphasia (Akanuma et al., 2016).

Before taking part in a 30-minute singing therapy session each week for 10 weeks, the participants were given a picture naming task of 400 words to determine baseline naming ability, with the exception of the participant with severe aphasia for whom 200 words were used (Akanuma et al., 2016). The target words utilized in the treatment were randomly selected from the words that the participants could not name during the pre-assessment. The following 10 weeks of treatment began by having the participants select melodies of songs that they already knew. For instance, some

participants selected the melody of the nursery rhyme, “Mary Had a Little Lamb.” Once the melody was selected, the researchers wrote new lyrics containing the target therapy words, and the participants sang the new lyrics to the melody that they previously selected during weekly, 30 minute therapy sessions (Akanuma et al., 2016).

After treatment, the picture naming task for the 400 words was given as a post-treatment measure (Akanuma et al., 2016). According to the results, singing therapy served as a valid treatment method for the majority of participating individuals with aphasia. Six of the ten participants improved more than 5% as compared to baseline data in naming skills after singing therapy, one participant did not improve or worsen between -5% and 5%, and the remaining three participants worsened more than 5%. The most successful participant improved from approximately 2% (8/400) pre-intervention to approximately 17% (68/400) post-intervention (Akanuma et al., 2016).

Another study compared two therapy techniques: Speech Repetition Therapy (SRT) and Melodic Intonation Therapy (MIT) (Schlaug et al., 2008). The two participants involved in this study were diagnosed with nonfluent aphasia as a result of ischemic strokes that occurred primarily in the superior area of the middle cerebral artery of the left cerebral hemisphere. Each participant was considered to have severe Broca’s aphasia after completing the Boston Diagnostic Aphasia Examination (BDAE; Goodglass & Kaplan, 1983) with significant impairments in verbal output and speech fluency. Both patients were males, native English speakers, and high school graduates. Each participant also exhibited moderate to severe right-sided hemiparesis. Patient A was a 47 year old who had received two to three years of instrumental practice in childhood while patient B was a 58 year old who had received one to two years of instrumental practice in

childhood. Patient A was 13 months post-stroke, whereas patient B was 12 months post-stroke. One was treated with MIT (patient A), and the other was treated with SRT (patient B) (Schlaug et al., 2008).

Both SRT and MIT took place in 1.5 hour sessions, five days a week for 75 sessions. MIT included three levels, with level one being the elementary level, level two being the intermediate level, and level three being the advanced level (Schlaug et al., 2008). In level one, the clinician showed participant A a picture while saying a phrase with pitch intonations and tapping the participant's hand. Then, the participant said the phrase in unison with the clinician while the clinician continued to tap. Finally, the clinician faded his/her voice and participant A said the phrases alone while tapping to the beat. Level two began with the same steps as level one, but after participant A began saying the phrase and tapping alone, the clinician said the phrase again. Then, participant A waited for a 6 second delay before beginning to say and tap the phrase. In the final level, the clinician said the phrases without singing but with exaggerated stress. The participant then said the same phrase with accentuated rhythm and stress in response to a question asked by the clinician. SRT included these same exact steps, but without the following two elements: (1) singing phrases while using melodic intonation or (2) the participant using a hand (typically the left hand) to tap the rhythm of each spoken syllable while repeating phrases with varying intonation. SRT served as the control intervention. It was chosen because it was a treatment that did not include singing, as in MIT (Schlaug et al., 2008).

After 40 weeks of treatment, participant A (who received MIT) increased his correct information units (CIUs) per minute from baseline by 229.5% (from 4.4 to 10.1)

while conversing about his medical profile (Schlaug et al., 2008). He improved in the number of syllables spoken per phrase by 227.8% (from 1.8 to 4.1). Finally, he improved in picture naming by 133.3% (from 36/60 pictures to 48/60 pictures). Patient B (who received SRT) increased his correct information units (CIUs) per minute score from baseline by 188.9% (from 3.6 to 6.8) while conversing about his medical profile. He improved in the number of syllables spoken per phrase by 166.7% (from 2.4 to 4.0). Finally, he improved in picture naming by 122% (from 35.4/60 pictures to 43.2/60 pictures). These scores reflected a 40.3% higher increase in the scores of the participant that received MIT in CIUs/minute, a 61.1% higher increase in the participant that received MIT in syllables spoken/phrase, and an 11.3% higher increase in scores in the participant that received MIT in picture naming (Schlaug et al., 2008). These findings suggest that MIT was a more effective therapy treatment for one individual with severe nonfluent aphasia in comparison to SRT.

In a case study of a woman with severe aphasia in the chronic phase, researchers sought to determine the effects of a three-part singing intervention approach (Yamaguchi et al., 2012). The participant was a 79 year-old female who developed right hemiplegia and aphasia 16 years prior to the study. Large infarction lesions were discovered in her left anterior communicating artery and middle cerebral artery. She received rehabilitative services for two years after the onset of her symptoms of global aphasia, but very few improvements were made. For this reason, she stopped participating in therapeutic services and lived in a nursing home for 14 years prior to this study. Typically, individuals in the chronic phase of aphasia no longer receive speech/language therapy due to the unlikelihood of improvement. However, the researchers sought to investigate

the use of singing in therapy with this severely impaired participant (Yamaguchi et al., 2012).

Intervention one occurred for nine months. In this phase, the participant and clinician sang 16 popular songs, including nursery rhymes and nostalgic folk songs, together in therapy (Yamaguchi et al., 2012). Before intervention began, the participant sang only the first few words of these songs. After intervention, she sang the entire first verse of 8 of the 16 nursery rhymes after being given a cue by the clinician. This indicated an improvement in the participant's ability to understand cues and ability to acquire memory skills. Intervention two occurred for four months in weekly, half-hour sessions. In this phase, a different song with several bars, a new melody, and new lyrics was sung with the participant in every therapy session. At the end of the four months, the participant memorized and sang the lyrics to the chosen song in response to a cue given by the clinician at the beginning of the song. She also became emotional while singing. The final phase, intervention three, occurred for 12 months. In this phase, the clinician paired the words "goodbye" and "hello" with appropriate gestures and the melody of the song memorized in phase two. Additionally, the names of body parts were incorporated into the lyrics. At the end of this phase, the participant said, "Hello" without prompting when the clinician entered the room. The participant also said, "Goodbye" without prompting when the clinician exited the room. She also identified body parts that she did not identify before therapy began. The researchers inferred that singing therapy was responsible for the participant's newly developed skills. Therefore, the researchers suggested that speech/language therapy that involves singing should still be considered for those with severe aphasia (Yamaguchi et al., 2012).

The previous studies reported information about speech-language pathologists who utilized singing-therapy techniques for individuals with aphasia (Akanuma et al., 2016; Schlaug et al., 2008; Yamaguchi et al., 2012). Each study acknowledged an improvement in at least one of the treatment areas for some of the participants. As a result, music therapy can be considered an effective treatment for some individuals with language deficits due to aphasia.

Singing Therapy in Improving Speech

Traumatic brain injury (TBI) is characterized by a physiological disruption of proper brain function that is caused by extreme trauma (Kay, 1993). TBI is manifested by either affected mental state, impaired memory, or unconsciousness for less than 30 minutes. TBI is caused by severe injury to the brain by force/impact. Individuals who experience a TBI are often left with impaired speech and/or language, which may heavily impact their daily lives (Tamplin, 2008). Similarly, individuals who experience a stroke are left with speech/language issues and need therapy to improve their skills (American Heart Association, 2018). A cerebrovascular accident (stroke) occurs when a blockage of blood flow to the brain results in impaired brain function, paralysis, and/ or slurred speech (Tamplin, 2008). Speech-language pathologists are involved in the treatment of individuals after a TBI or stroke due to feeding and swallowing issues, cognitive impairments, speech impairments, and language deficits (Tamplin, 2008).

Another study examined the impact of singing therapy for seven individuals with aphasia, but focused on improvements in speech rather than language (Thompson et al., 2016). Affective prosody involves the characteristics of speech that are responsible for expressing emotion, including stressing certain words/syllables and varying intonation

(Thompson et al., 2016). Because prosody is used frequently in music, the researchers hypothesized that singing therapy would improve the prosody of individuals with aphasia. Seven participants, including five females and two males who were diagnosed with stroke-induced aphasia, participated in the study. Each participant was a member of the CeleBRation Choir at the University of Auckland's Centre for Brain Research in New Zealand. This choir was created to provide a social atmosphere in which individuals with neurological conditions could connect through singing. The average age of the participants was 62 years with the oldest being 80 and the youngest being 46. The number of years post-stroke ranged from 1-16 years, with the average being 6.43 years. One participant's stroke occurred in the basal ganglia, while one participant's stroke occurred in the right cerebral hemisphere. The remaining five participants' strokes occurred in the left cerebral hemisphere. Three participants exhibited Broca's aphasia, two exhibited anomic aphasia, and two exhibited impairments exclusively in the affective perception of prosody (Thompson et al., 2016).

After completing a 30-minute singing therapy session each week for four weeks, the participants exhibited improvements in the perception of prosody but not the utilization of correct prosody in their speech (Thompson et al., 2016). Pre- and post-assessments were administered to measure improvement in both the perception of prosody and the production of prosody. To measure the perception of prosody, the Prosody Face-Matching subtest, Prosody Pair-Matching subtest, and the Affect Naming subtest of the Applied Clinical Solution's Social Perception Test (Pearson, 2009) were utilized. Five of the seven participants scored higher on the post-test of prosody perception when compared to the pre-test. Prior to treatment, the participants had an

average perception score of 5.71. After treatment, the scores improved to an average of 7.14. Therefore, singing therapy was effective in improving the perception of prosody. To measure improvements in the production of prosody, the Spontaneous Phrase Production Task by Ross, Thompson, and Yenkosky (1997) was administered. However, no improvements were made. The researchers acknowledged that because of the results, music therapy may not be an effective treatment to improve prosodic production. However, this study only lasted four weeks. It is unclear if longer treatment would result in changes with production as well as with perception (Thompson et al., 2016).

Damage to the nervous system that impacts the muscles involved in speech may result in motor speech issues (Tamplin, 2008). This condition is known as dysarthria. Dysarthria is commonly caused by a stroke or TBI. In a study by Tamplin (2008), four participants with varying severities of dysarthria underwent eight weeks of singing therapy. To be eligible for the study, each participant had to be diagnosed with dysarthria caused by neurological damage (stroke or TBI), have no other cognitive or communicative impairments, speak English, exhibit either minimal or no deficits in the initiation of speech, and be 18 months post onset of injury. The participants included three females and one male between 19 and 51 years of age. Two participants were diagnosed with severe dysarthria, one was diagnosed with moderate dysarthria, and one was diagnosed with mild dysarthria. Intervention consisted of individual music therapy sessions that occurred three times per week for eight weeks (24 sessions in all) (Tamplin, 2008).

The treatment was designed to improve both intelligibility and overall speech naturalness (Tamplin, 2008). The treatment consisted of 30 minute sessions of vocal

warm-ups, vocal duets, and instrumental accompaniment to songs. The following three assessment measures were utilized for analysis: The Sentence Intelligibility Test (SIT) was used to measure intelligibility, the Picture Description Task (PDT) was used to assess spontaneous speech, and a group of listeners measured speech naturalness. The group of listeners consisted of 15 speech-language pathologists and 15 non speech-language pathologists in order to prevent skewed results (Tamplin, 2008).

According to the scores on the SIT, the speech intelligibility of the participants improved (Tamplin, 2008). The overall mean intelligibility, as measured by the SIT, improved by 4.01% (from 85.76% to 89.77%). The mean words said per minute increased by approximately 11% (from 73.75% to 84.5%). The mean intelligible words produced per minute increased by approximately 12% (from 65.5% to 76.75%). The improvement in overall intelligibility indicated by the scores on the SIT was also apparent in the scores of the PDT. The overall mean intelligibility, as measured by the PDT, increased by 6.75% (from 91.5% to 98.25%). The mean words said per minute increased by approximately 10.5% (from 64.75% to 75.25%) and the mean intelligible words produced per minute increased by 15% (from 59.75% to 74.75%) (Tamplin, 2008).

To measure speech naturalness, the participants were recorded saying three sentences of 9, 10, and 12 words that were randomly selected from the SIT before and after treatment (Tamplin, 2008). The raters identified the post-treatment speech samples as more natural than the pre-treatment speech samples in 85% of the sentence comparisons. According to these results, singing therapy was also effective in improving speech naturalness (Tamplin, 2008). Overall, the results indicated that singing therapy

was a valid way to improve speech intelligibility and speech naturalness in adults with dysarthria as a result of stroke or TBI.

An additional study involved patients whose strokes caused mixed dysarthria (Kim & Jo, 2013). Dysarthria is often characterized by impaired diadochokinetic skills, issues with fundamental frequency, and short maximum phonation times. Therefore, the researchers sought to examine the effect of using an accent-based music speech protocol (AMSP) during speech therapy with patients with dysarthria as a result of stroke. The participants included six adults with mixed dysarthria due to strokes who were diagnosed within one year of the study. There were four males and two females who ranged in age from 52 to 65 years of age, with an average age of 58.83 years.

Because ataxic dysarthria is strongly related to syllable timing irregularities (Tjaden & Watling, 2004), diadochokinetic skills were tested by having the participants repeatedly verbalize “/pə/, tə/, kə/” (Kim & Jo, 2013). The number and speed of repetitions were recorded. To test maximum phonation time, the participants sustained the /a/ vowel for as long as possible for three consecutive trials. The longest attempt was recorded. Finally, fundamental frequency was measured using the Frequency and Amplitude of Perturbation test. Pre- and post-assessment measurements were taken for diadochokinetic skills, phonation time, and fundamental frequency (Kim & Jo, 2013).

The participants took part in a two week AMSP therapy program that occurred every day in 30 minute sessions (Kim & Jo, 2013). Each patient was in sub-acute care at a rehabilitation facility where the AMSP therapy sessions occurred. The program involved four stages. Stage one involved a four minute warm-up in which the participants were asked to stretch their arms while slowly moving up and down to a musical track of

four beats. Stage two involved four minutes of respiration exercises in which the participants inhaled and exhaled while a keyboard played ascending and descending melodies. Stage three involved 10 minutes of vocalizations of /a/, /e/, /i/, /o/, and /u/ to the beat of a hand drum played by the researcher. The final stage, stage four, involved 12 minutes of chanting melodically to six different Korean chants. While chanting, the participants would beat a hand drum on every first and third beat of the chant (Kim & Jo, 2013).

The results indicated improvements in all three areas (Kim & Jo, 2013). The ability to produce “/pə/, tə/, /kə/” improved from a pre-test mean of 3.93 repetitions of “/pə/, tə/, /kə/” to a post-test mean of 5.48 repetitions amongst the participants. The fundamental frequency improved from a pre-test mean of 135.92 to a post-test mean of 159.49. The length of maximum phonation improved from a pre-test mean of 7.4 seconds to a post-test mean of 14.46 seconds. Because improvements were observed in each of the three areas, the researchers concluded that AMSP was an effective treatment method for improving speech and/or language skills for adults with dysarthria as a result of stroke (Kim & Jo, 2013).

The final study included in this review of the literature was a review of the current research on singing-based therapy methods for adults with neurological disorders (Hurkmans et al., 2012). This review provided valid information about the type of individuals that typically received singing therapy and the efficacy of these therapy programs. The researchers conducted a search of the following databases to retrieve articles that were applicable to the review: PubMed, PsycINFO, CINAHL, and EMBASE. To be included, each article had to contain pre- and post-treatment data,

provide language and/or speech treatment for those with non-congenital neurological disorders that involved musical elements, and only adults could participate. Articles written in English, Dutch, French, and German were included. To define the requirement of therapy including musical elements, the researchers specified that treatment in each article had to include melody, accent, and rhythm practiced in vocal or instrumental form. Articles with participants diagnosed with both expressive and/or receptive language disorders were included; however, articles assessing participants with the following were excluded: stuttering, psychiatric diseases, dementia, amusia, language acquisition disorders, autism, epilepsy, voice disorders, and hearing disorders (Hurkmans et al., 2012).

A total of 15 articles, involving a total of 583 patients, met the inclusion criteria (Hurkmans et al., 2012). Without including one study that had 480 participants, the average number of participants in the reviewed articles was seven individuals. The participants in 14 of the 15 studies were diagnosed with speech-language disorders resulting from strokes. The remaining study included participants whose speech-language disorders resulted from TBI. The nine studies that reported the site of lesion included strokes in the left cerebral hemisphere. Thirteen studies included participants with non-fluent aphasia, with two of these studies including participants with co-occurring apraxia of speech. Consequently, the researchers noted that the majority of the studies involved relatively small sample sizes, which could affect validity. Approximately 86% of the studies included participants that were receiving music therapy to improve speech and language deficits caused by strokes. Approximately 80% of the studies included participants diagnosed with Broca's aphasia. Improvements in at least one of the targeted

areas were observed in 13 of the 15 studies (Hurkmans et al., 2012). These results suggest that music-based therapy served as a valid treatment option to improve speech and language skills for individuals with neurological disorders due to stroke.

Purpose

The reviewed literature suggested that singing-based therapy is a valid and effective method for treating speech and language issues caused by a variety of neurological disorders, such as stroke and traumatic brain injury (Akanuma et al., 2016; Conklyn et al., 2012; Fujii & Wan, 2014; Hurkmans et al., 2012; Jomori & Hoshiyama, 2010; Kim & Jo, 2013; Schlaug et al., 2008; Shih et al., 2012; Tamplin, J. 2008; Thompson et al., 2016; and Yamaguchi et al., 2012.). This literature review also revealed that there are a variety of singing therapy techniques (Fujii & Wan, 2014; Jomori & Hoshiyama, 2010; Schlaug et al., 2008). Due to the positive outcomes of the treatments observed in the reviewed literature, it is important that speech-language pathologists are knowledgeable about using singing therapy with their clients.

If singing-based treatments have been productive in treatment, then what training do graduate students in communication disorders programs get? There was a lack of literature found about the training of speech-language pathology graduate students in employing these therapy methods. In an attempt to answer this question, the following research question was formed: Do graduate students in communication disorders have exposure to, knowledge of, and experience utilizing singing therapy with adults with neurological disorders due to stroke and/or TBI?

CHAPTER III

METHODS

This study was designed to assess the educational content currently offered in graduate communication disorders programs about singing-based therapy for adults with speech and/or language impairments due to neurological disorders. This study utilized a nonexperimental, mixed-methods design. Specifically, an online survey was sent via email to students who were enrolled in a variety of graduate programs in preparation to be speech-language pathologists in Arkansas and Tennessee. A survey link was sent to students at Harding University, the University of Arkansas, the University of Central Arkansas, the University of Memphis, and Arkansas State University. The format of the survey was designed to adequately assess student exposure to, knowledge of, and experience with singing-based therapy techniques. The survey items included 14 multiple choice questions, 17 questions with Likert-scale ratings, and 3 open-ended questions. It was hypothesized that these responses would indicate little to no inclusion of singing-therapy education and/or training in the included program curriculums. It was also hypothesized that, due to a lack of education, these students would feel uncomfortable implementing these strategies into their therapy sessions.

Participants

The survey was sent to students earning a master's degree in either communication disorders, communication sciences and disorders, or speech-language

pathology. Students in their first or second year of coursework were included. Students of every gender, ethnicity, and age were also included. The participants were recruited from programs in Arkansas and Tennessee including Arkansas State University (ASU), Harding University (HU), the University of Arkansas (UA), the University of Central Arkansas (UCA), and the University of Memphis (UM). This was a sample of convenience, as these universities were selected due to being located in close proximity to the primary investigator.

Procedure

Each participant was included based upon the criteria for participation described above. Those who did not meet the qualifications were excluded. The predicted sample size was estimated based on the past two reported class sizes from each university as follows: HU-37, UA-38, and UCA-67 (Harding University, 2018; University of Arkansas, n.d.; University of Arkansas for Medical Sciences, 2017; University of Central Arkansas, n.d.). UM did not provide class sizes, so the primary investigator estimated approximately 36 students. Surveys were sent only to the first-year students at ASU to prevent response bias, as the primary investigator was enrolled in the second-year class. The first-year class at ASU had 30 students. Collectively, these numbers added to 178 students. In anticipation of less than a 100% completion rate, it was estimated that approximately 60 students would participate.

Detailed information about the proposed study was sent to the Institutional Review Board (IRB). Once approval from the IRB was granted, a survey created using Qualtrics Survey Software (Qualtrics, n.d.) was sent via email to the heads of the department at each program. The department heads forwarded the survey to the

first- and second-year students at their respective universities. At the beginning of the survey, an instruction sheet and informed consent form was presented to each participant. The instruction sheet provided explanations of how to complete the survey and was followed by a signature for informed consent. Informed consent included the authorization for the primary investigator to report the survey findings while keeping the participants' identities anonymous. Only students who signed this form were allowed to participate. In an effort to increase the response rate, the primary investigator contacted the head of each program and explained the significance of and need for the current research. Upon receiving the survey responses, the primary investigator compiled, categorized, and recorded the completed survey items.

Research Design and Measures

A nonexperimental, mixed-methods design was utilized in this research. An online survey consisting of 34 items was used to retrieve both quantitative and qualitative data, in addition to both nominal and ordinal data. As previously mentioned, the three main categories of assessment were exposure to, knowledge of, and experience with singing in speech/language therapy. The exposure category consisted of 13 items, including nine Likert-scale questions, three multiple-choice questions, and one open response question. The knowledge category included 10 items, with nine being multiple choice items and one being an open response item, in order to assess more specific academic topics related to singing therapy, such as singing therapy protocols, the benefits of utilizing these protocols, and disorders that can be treated using such therapy methods. The experience category included 11 items, with eight being Likert-scale items, two being multiple choice items, and one being an open response item.

CHAPTER IV

RESULTS

Exposure

Upon receiving the completed surveys, the primary investigator analyzed and scored the retrieved data with Qualtrics Survey Software (Qualtrics, n.d.). A total of 51 surveys were received from students from five universities (Arkansas State University, Harding University, the University of Arkansas, the University of Central Arkansas, and the University of Memphis). This resulted in a 28.65% response rate. There were 11 surveys submitted in which some of the multiple choice items were not completed, so these surveys were discarded. The surveys with incomplete open-response questions were included in the results. Out of the 40 completed surveys, 32 participants reported that their graduation dates were either 2020 or 2021, indicating that they were in their first year of graduate school. The remaining 8 students reported that they would be graduating in 2019, indicating that they were in their second year of graduate school.

The exposure section was composed of 13 questions (Q11-Q23). The first 8 questions were multiple-choice questions regarding the number of clinical observation hours of singing therapy completed, courses taken covering singing therapy content, and personal hobbies involving singing. The majority of these questions (6 out of 8) were used to retrieve a description of the participants and factors that may possibly have affected the validity of their responses. These items did not include information about

exposure to singing therapy for adults with neurological disorders that occurred solely in each respondent's graduate program.

In order to determine the participants' general education about and exposure to adults with neurological disorders, the following survey items were presented. When asked about the number of clinical observation hours of therapy with an adult with a neurological disorder, 27.5% (11/40) reported 0 hours, 30% (12/40) reported 1-3 hours, 17.5% (7/40) reported 4-6 hours, and 25% (10/40) reported having 7 or more hours, as shown in Figure 1. When asked about the number of undergraduate CD courses taken which included information about neurological disorders, 7.5% (3/40) had 0 courses, 55% (22/40) had 1-2 courses, 32.5% (13/40) had 3-4 courses, and 5% (2/40) reported having 5 or more courses, as shown in Figure 2. These results indicated that over 60% of participants had observed at least one therapy session for an adult with a neurological disorder, and over 80% of participants had taken a course that included information about neurological disorders.

In order to compare the amount of undergraduate CD courses about neurological disorders and graduate level CD courses about neurological disorders, the participants were also asked to indicate the number of graduate CD courses taken which included information about neurological disorders. According to the results, 35% (14/40) had taken 0 courses, 37.5% (15/40) had taken 1-2 courses, 20% (8/40) had taken 3-4 courses, and 7.5% (3/40) had taken 5 or more courses. These results, depicted in Figure 2, indicated that the majority of education provided to the participants about neurological disorders occurred in undergraduate programs.

When asked the number of undergraduate CD courses taken which included the topic of treating neurological disorders with singing-based therapy, 77.5% (31/40) reported having 0 courses, while the remaining 22.5% (9/40) reported having 1-2 courses, as shown in Figure 3. When asked the number of non-CD courses that the students attended concerning singing/music/instruments, 60% (24/40) reported attending 0 courses, 35% (14/40) had 1-3 courses, 2.5% (1/40) had 4-6 courses, and 2.5% (1/40) had 7 or more courses, as displayed in Figure 4. Additionally, 45% (18/40) responded that they did not have any personal hobbies related to singing, music, or instruments, 50% (20/40) reported having 1-3 such hobbies, and 2.5% (1/40) had 4-6 of these hobbies. These results, depicted in Figure 5, indicated that the majority of participants were interested/involved with music outside of their educational/professional experiences. As shown in Figure 9, 97.5% (39/40) had not taken additional seminars or educational opportunities related to singing in therapy, indicating that information learned at extracurricular educational events did not impact the results. The participant who reported that he or she had participated in one of these additional seminars and/or educational opportunities did not indicate what seminar or activity was attended in the “open response” question (Q23).

The remaining two multiple choice items involving exposure to treating neurological disorders with singing based therapy that occurred during the respondent’s graduate program included the following: “Number of clinical observation hours completed in which an adult with a neurological disorder was treated with singing-based therapy by an SLP” (Q12) and “Number of graduate CD courses which included the topic of treating neurological disorders with singing-based therapy” (Q16). In question 12,

87.5% (35/40) of respondents answered that they had completed 0 clinical observation hours in which an adult with a neurological disorder was treated with singing-based therapy by an SLP, 5% (2/40) answered that they had completed 1-3 of these clinical observation hours, 5% (2/40) answered that they had completed 4-6 of these hours, and 2.5% (1/40) reported that they had completed 7 or more of these hours, as shown in Figure 1. In question 16, 75% (30/40) of respondents answered that they had taken 0 graduate courses which included the topic of treating neurological disorders with singing-based therapy, 20% (8/40) answered that they had taken 1-2 of these graduate courses, and 5% (2/40) answered that they had taken 3-4 of such courses, as shown in Figure 3. Based upon these results, it was evident that the majority of students (75%) were not provided with any information regarding using singing while in therapy to treat patients with neurological disorders.

The remaining 5 questions in the Exposure section included 1 “rate your knowledge” question, 3 “yes/no” questions, and 1 “open response” question. When asked to rate their knowledge on using singing-based therapy with adults with neurological disorders on a scale from 0-5 (0 being “no knowledge” and 5 being “extremely knowledgeable”), 40% (16/40) of respondents answered “0,” 42.5% (17/40) of respondents answered “1,” 15% (6/40) answered “2,” and 2.5% (1/40) answered “3.” This is displayed in Figure 6. In 2 of the “yes/no” items, 95% (38/40) responded that they would like more educational material about using singing-based therapy with adult clients with neurological disorders (Q20), and 47.5% (19/40) responded that they would be interested in specializing in using singing-based therapy methods (Q21). This data is depicted in Figures 7 and 8.

Knowledge

The “Knowledge” section was composed of 10 questions (Q1-Q10). There were nine multiple choice questions, and one open response question. With the nine multiple choice questions regarding specific, academic knowledge of singing-based therapy, the students demonstrated poor understanding (less than 50% answered correctly) on one item with an average of 32.5% (Q1), accuracy, respectively. This is displayed in Figure 10. On four of the multiple choice items, the students demonstrated moderate knowledge (50-69% answered correctly) with averages of 52.5% (Q5), and 55% (Q7), 60% (Q9), and 65% (Q6) accuracy, as shown in Figures 14, 15, 16, and 18. On the remaining four multiple choice items, the students scored with adequate knowledge (70% or more answered correctly). The percentage of students who answered correctly on these items were 70% (Q3 & Q8), 72.5% (Q4), and 75% (Q2), respectively, as displayed in Figures 11, 12, 13, and 17.

To analyze the results of the open-response question, “Explain what you know about singing in therapy with adults with neurological disorders,” answers were organized into the following themes: Lack of Knowledge, Partial Knowledge, and Knowledgeable. Due to this being an open response question, 30 responses were received. After analyzing the open response items, 46.7% (14/30) responses were categorized as reporting a “Lack of Knowledge,” 23.3% (7/30) responses were categorized as “Partial Knowledge,” and 30% (9/30) responses were categorized as “Knowledgeable.” See Appendix C for a description of the themes.

Experience

The Experience section was composed of 10 questions (Q24-Q34). There were eight multiple choice questions, one open response question, one “yes/no” question, and one “more/less” question. In the first multiple choice question (Q24), the respondents were asked to provide the number of clinical hours that they had provided speech or language therapy with an adult with a neurological disorder. The majority of the students, 57.5% (23/40), reported having 0 hours, 22.5% (9/40) reported 1-10 hours, 5% (2/40) reported 11-20 hours, 10% (4/10) reported 21-30 hours, and 5% (2/40) reported 31 or more hours. Therefore, over half of the participants had never treated an adult with a neurological disorder, as shown in Figure 20.

Interestingly, 82.5% (33/40) had never used singing-based therapy techniques with pediatric clients, 12.5% (5/40) had used singing with children for 1-5 hours, 2.5% (1/40) had done so for 11-15 hours, and 2.5% (1/40) had done so for 16 or more hours (Q25). When asked the same question about clinical hours completed in which singing-based therapy techniques were used with adults (Q26), 90% (36/40) reported 0 hours, 5% (2/40) reported 1-5 hours, and 5% (2/40) had 6-10 hours. These results indicated that over 80% of the students had not used music in therapy with either adults or children, as shown in Figure 21.

In the open response question (Q27), the students who reported having used singing in therapy with adults were asked to elaborate on what they did in therapy. Only two responses were received. One student responded that they used MIT. The other student responded, “I tried using MIT. However, I didn’t feel comfortable hearing my voice modeling how to do MIT.”

To compare the respondents' comfort with using singing in therapy with adults in comparison to children, they were asked to rate their comfort level with each group on a scale of 1-5 (1 being extremely comfortable and 5 being extremely uncomfortable). With adults, 7.5% (3/40) reported feeling extremely comfortable, 35% (14/40) reported being somewhat comfortable, 10% (4/40) reported being neither comfortable nor uncomfortable, 32.5% (13/40) were somewhat uncomfortable, and 15% (6/40) reported being extremely uncomfortable (Q28). With children, 35% (14/40) reported being extremely comfortable, 37.5% (15/40) were somewhat comfortable, 20% (8/40) reported being neither comfortable nor uncomfortable, 2.5% (1/40) were somewhat uncomfortable, and 5% (2/40) felt extremely uncomfortable (Q29). As displayed in Figure 23, 55% reported that they would be either "somewhat uncomfortable" or "extremely uncomfortable" singing in therapy with adults, whereas only 10% reported that they would be either "somewhat uncomfortable" or "extremely uncomfortable" singing in therapy with children.

When prompted with the survey item, "Before creating treatment plans for my clients, I research using singing-based therapy methods for my client," 12.5% (5/40) answered strongly agree, 5% (2/40) answered somewhat agree, 20% (8/40) answered neither agree nor disagree, 25% (10/40) answered somewhat disagree, and the remaining 37.5% (15/40) answered strongly disagree, as shown in Figure 24.

Another rating scale was utilized to investigate if the participants felt comfortable selecting singing-based therapy methods to treat adult clients when possible. The responses were as follows: 2.5% (1/40) felt extremely comfortable, 25% (10/40) felt somewhat comfortable, 7.5% (3/40) felt neither comfortable nor uncomfortable, 42.5%

(17/40) felt somewhat uncomfortable, and 22.5% (9/40) felt extremely uncomfortable.

When asked to rate his or her level of comfort implementing singing-based therapy techniques, 2.5% (1/40) were extremely comfortable, 27.5% (11/40) were somewhat comfortable, 12.5% (5/40) were neither comfortable nor uncomfortable, 35% (14/40) were somewhat uncomfortable, and 22.5% (9/40) were extremely uncomfortable.

Therefore, over 50% of the respondents felt either somewhat or extremely uncomfortable both selecting and implementing a singing-based therapy approach with an adult client, as shown in Figure 25.

The “yes/no” item in this section was presented as follows: “My clinical supervisors have encouraged me to use singing while in therapy with adult clients.” The results, as displayed in Figure 26, were reported as follows: 7.5% (3/40) answered “yes,” 40% (16/40) answered “no,” and the remaining 52.5% (21/40) answered “I have not treated an adult.” Therefore, it was inferred that 15.8% (3/19) of participants who have treated an adult were encouraged to use singing with adults, while 84.2% (16/19) were not. Finally, only 5% (2/40) of respondents said that they felt that less curriculum should be provided in relation to singing-based therapy with adults, whereas the remaining 95% (38/40) of respondents reported that more should be provided. This is shown in Figure 27.

CHAPTER V

DISCUSSION

The principal objective of this study was to examine whether or not students earning a master's degree of communication disorders were exposed to, knowledgeable about, and experienced with utilizing singing in therapy. Specifically, this questionnaire focused on singing-based therapy with adults with neurological disorders. In summary, the "exposure" portion of the survey revealed that while the majority of students reported that they had taken at least one class about adults with neurological disorders, very few reported that this(these) class(es) included information about singing-based treatment with this population. The majority also reported that they had never observed singing being used in therapy for an adult with a neurological disorder. The item that was perhaps the most indicative of a lack of exposure to singing-based therapy was the self-rating item. The overwhelming majority of participants rated themselves as having no knowledge at all or very little knowledge about the topic.

The "knowledge" portion revealed that the students demonstrated more knowledge than what they reported in their self-ratings, with the majority of the students answering approximately 33% of the survey items correctly. However, with the measures utilized, more than half of the survey items in this section indicated inadequate student knowledge about singing-based therapy. When asked to share their knowledge in an open response item, the vast majority of students admitted a lack of knowledge with statements

such as, “I know nothing.” and “I don't know much about using singing techniques in therapy.”

The “experience” section indicated that more students were more comfortable singing in therapy with children than with adults, which was predicted by the researchers prior to the study. It may indicate that students feel intimidated to sing with adults, due to the vulnerability that individuals often feel when singing. More than half of the students reported that they would feel uncomfortable both selecting and implementing singing-based therapy techniques if presented with an adult client on his or her caseload. Of the students who had prior experience treating an adult, the majority indicated that they did not research the possibility of using singing-based therapy with their clients and were not encouraged by their clinical supervisor to consider such techniques.

In consideration of the review of the literature for this research, it should be noted that the majority of the reviewed studies were conducted with relatively small samples. These small samples indicate that singing-based therapy, specifically for adults with neurological disorders, may need further research to establish the validity of such methods. The students’ responses indicating a lack of knowledge, exposure, and experience may have been influenced by graduate school professors omitting information about singing-based therapy due to a need for more research on the subject.

There were many limitations to the study. First, the survey completion rate was low. Less than half (28.65%) of those who were sent the survey responded with a completed survey. In addition, the primary investigator relied on the head of the department at each participating program to email the survey link to the students. Consequently, it cannot be guaranteed that every department head did so, and it is

possible that not all of the students at each program received the survey link. This could have affected the percentage of responses. It is also possible that the personal characteristics of those who participated may have been different from the entire population of communication disorders graduate students. If those who were not inclined to participate had submitted surveys, the data may have more accurately reflected the population of graduate students.

Interestingly, the majority of the participants were involved in personal hobbies related to music. This could have affected the validity, as this factor may have indicated that many of the participants already had musical knowledge from a source outside of the undergraduate and graduate school classrooms. This percentage, however, may also indicate why the vast majority of participants responded that they wanted more information about singing-based therapy techniques with almost half of the students responding that they would be interested in specializing in singing therapy. Even further, it may indicate that the field of speech-language pathology may attract individuals with musical inclinations and may indicate that more clinicians may use music in therapy if they had been more thoroughly informed that it was an option for their professional area.

CHAPTER VI

SUMMARY & CONCLUSION

In conclusion, this survey included data from a small sample of students attending universities located in the southern region of the United States. Overall, those who responded validated the research hypothesis that graduate students would report having little to no knowledge about, exposure to, or experience with singing-based therapy. Due to this study surveying a small number of students, it would be beneficial to conduct an additional survey with a much larger sample of students across many regions of the United States.

The review of the literature revealed that there is a pressing need for more research on the use of singing-based techniques in therapy for adults with neurological disorders. Before implementing curriculum with more singing-based therapy content, it would be important to more thoroughly assess the efficacy of it. With more research, graduate programs may more accurately determine whether or not it is imperative to include more or less information about this type of therapy. It is the hope of the researchers that this study incites other researchers to continue investigating the use of singing in therapy for adults with neurological disorders and to continue educating graduate students in communication disorders about singing-based therapy techniques.

APPENDIX A

CHARTS & FIGURES

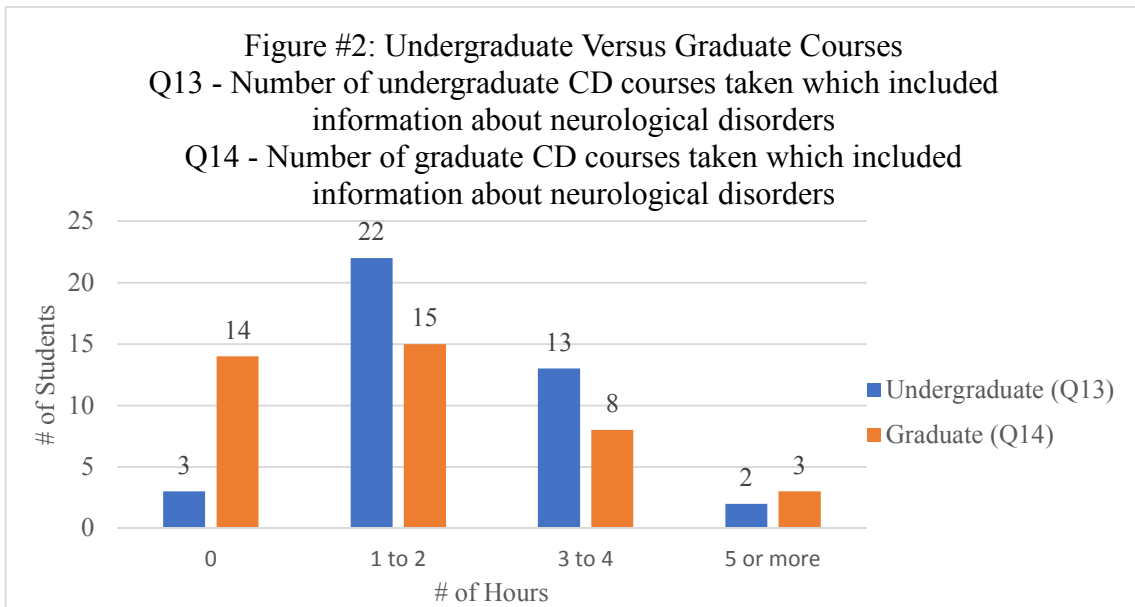
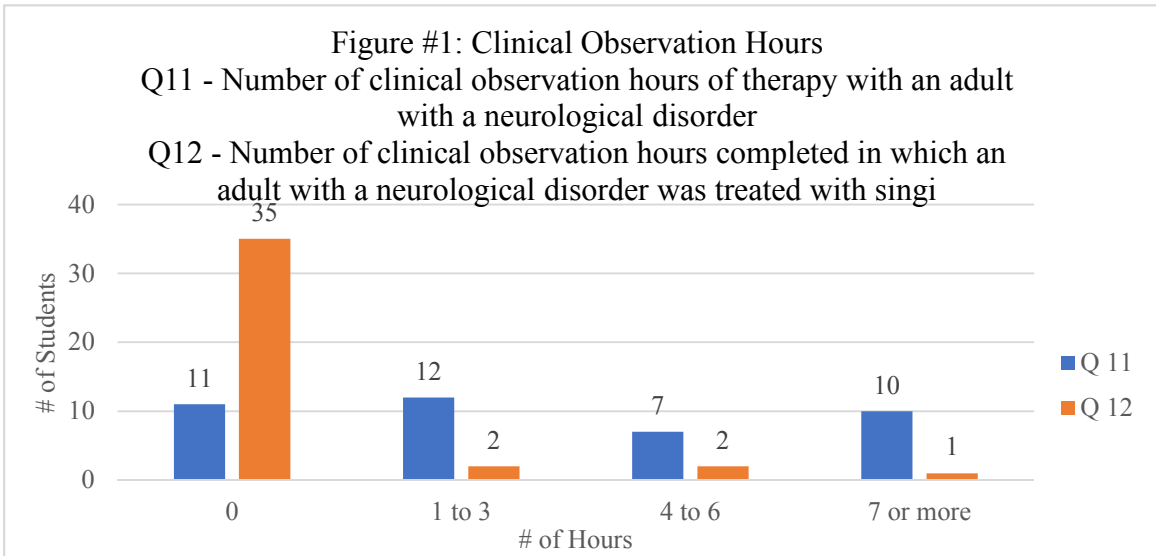


Figure #3: Undergraduate Versus Graduate Courses
 Q15 - Number of undergraduate CD courses which included the topic of treating neurological disorders with singing-based therapy
 Q16 - Number of graduate CD courses which included the topic of treating neurolo

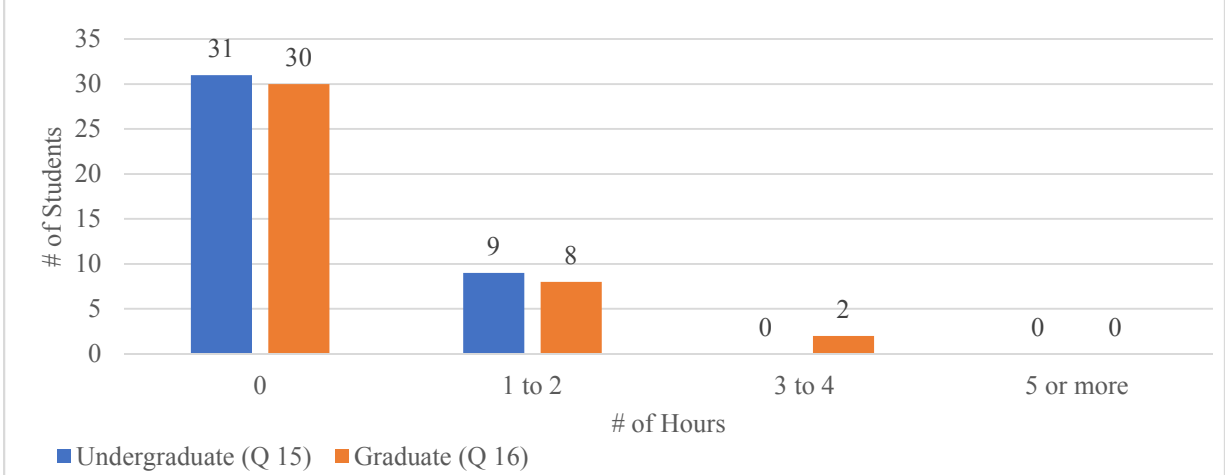


Figure #4: Music Courses
 Q17 - Number of non-CD courses attended about singing/music/instruments

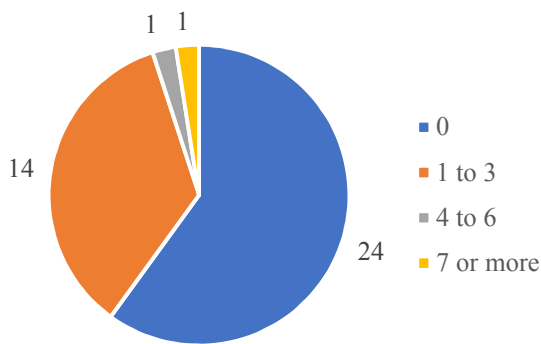
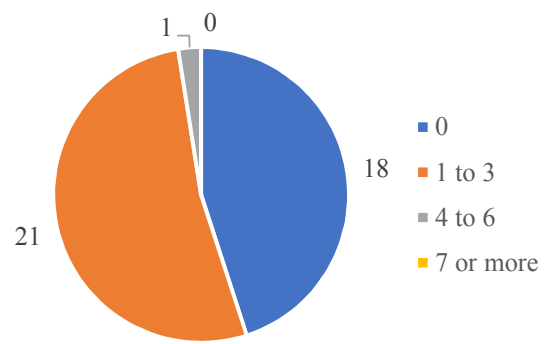


Figure #5: Musical Hobbies
 Q18 - Number of personal hobbies that involve singing/music/instruments



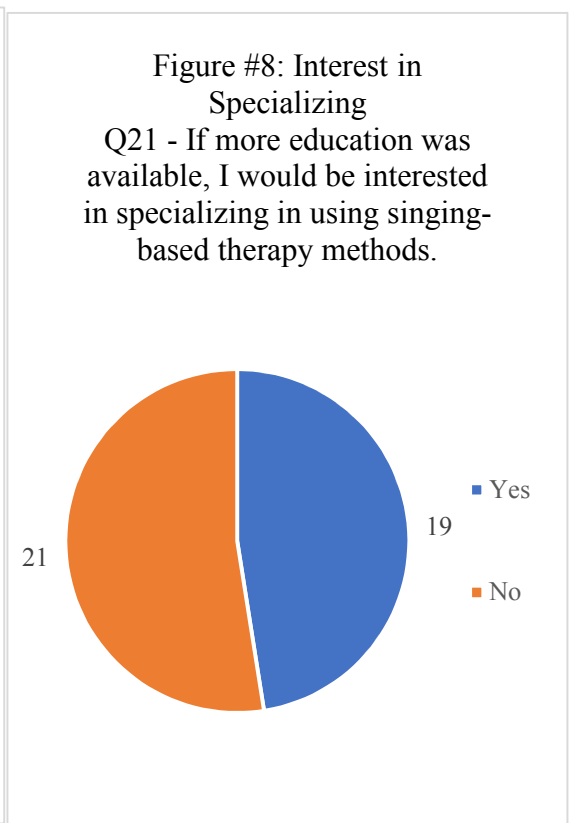
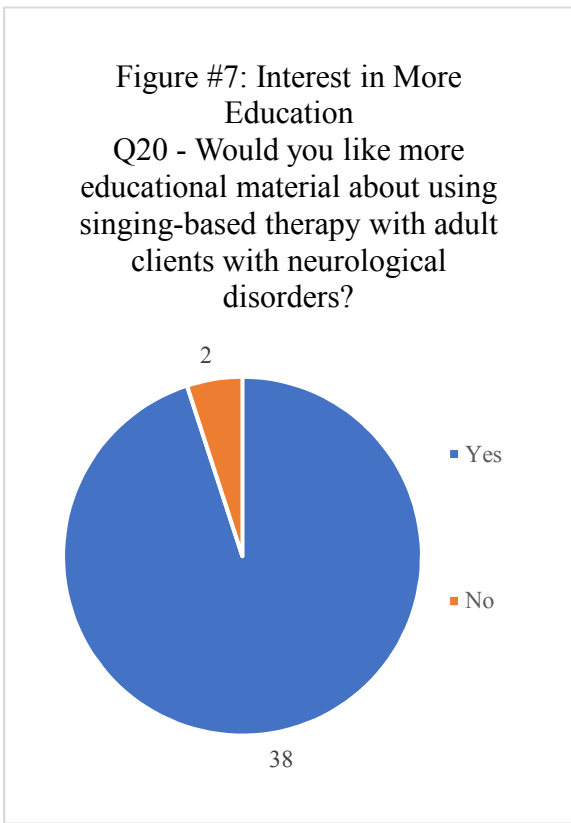
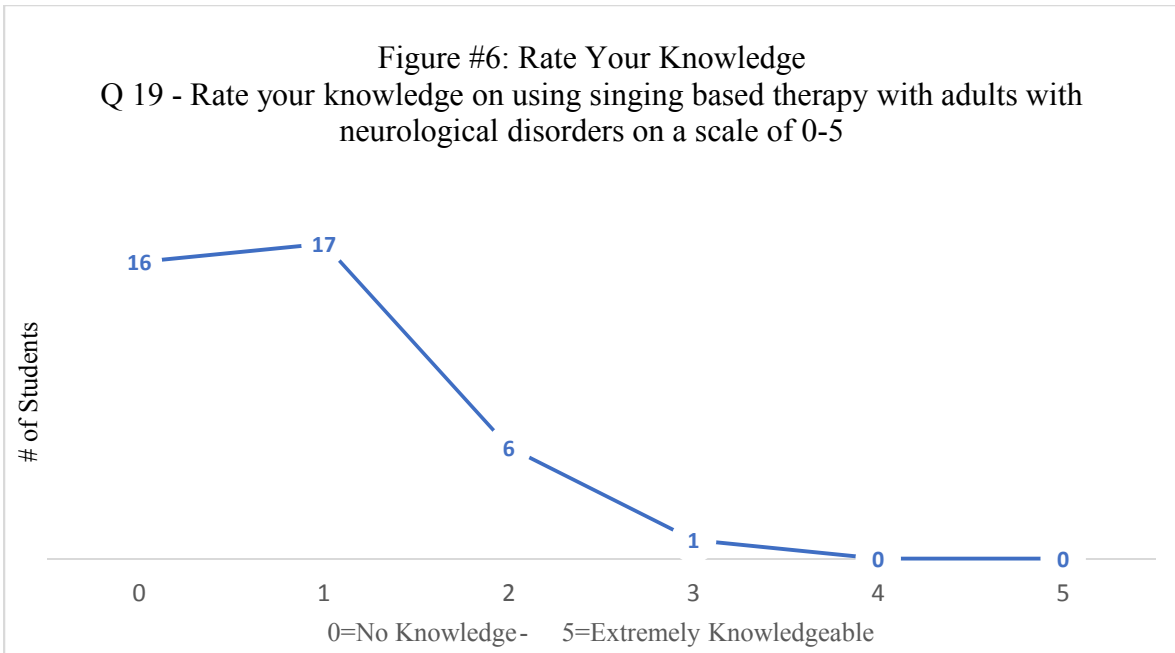


Figure #9: Additional Musical Education
 Q22 - Have you taken additional seminars or educational opportunities related to singing-based therapy?

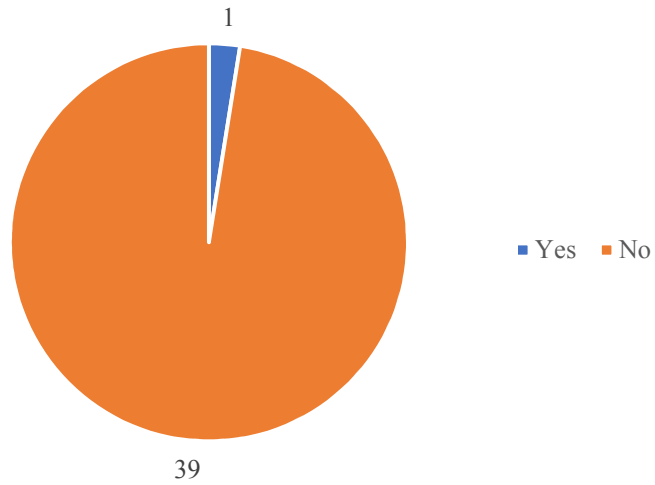


Figure #10: Knowledge of Singing Methods
 Q1 - Which of the following is a type of singing-based therapy method:

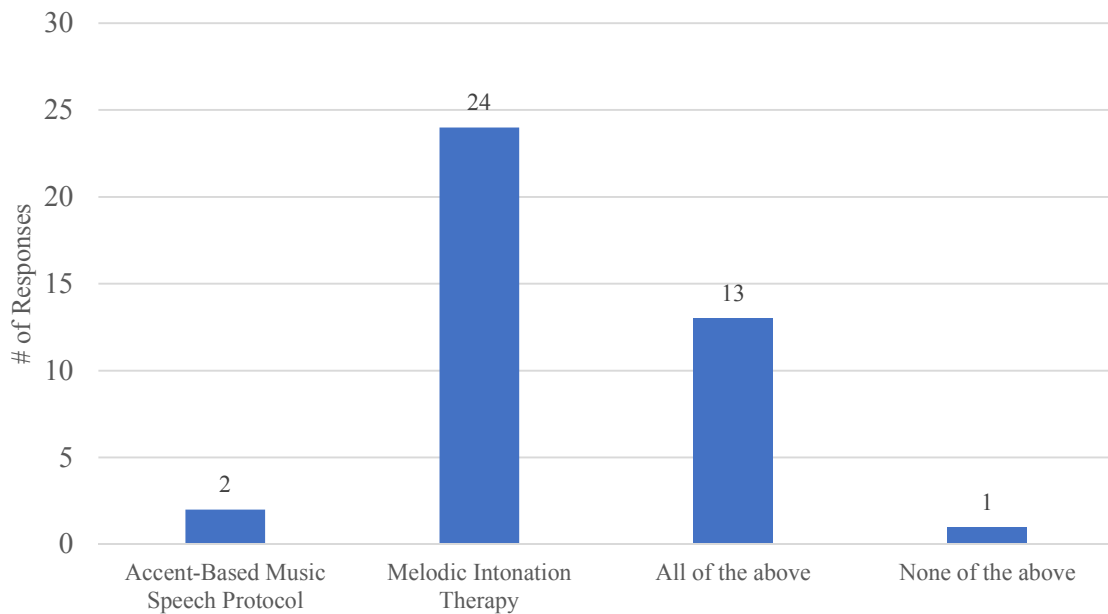


Figure #11: Knowledge of Singing for Neurological Disorders
 Q2 - Singing-based therapy is a possible treatment method for adults with neurological disorders

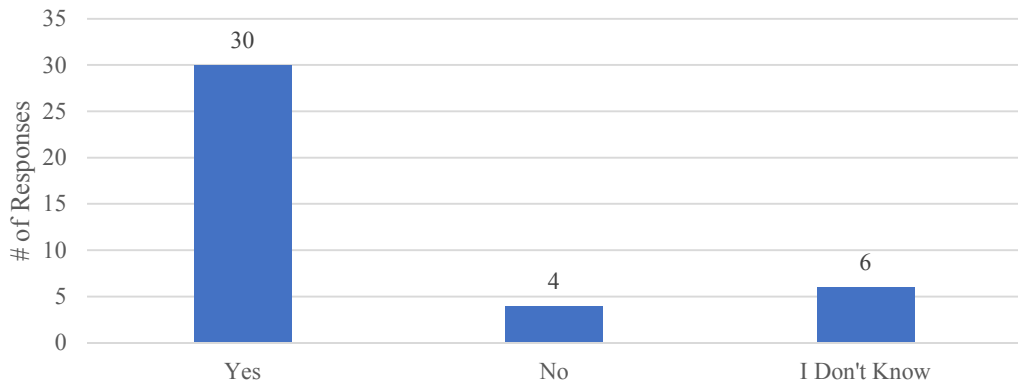


Figure #12: Singing Therapy Certification
 Q3 - Speech-language pathologists who are not certified in singing/music techniques in therapy can use singing/music techniques in therapy

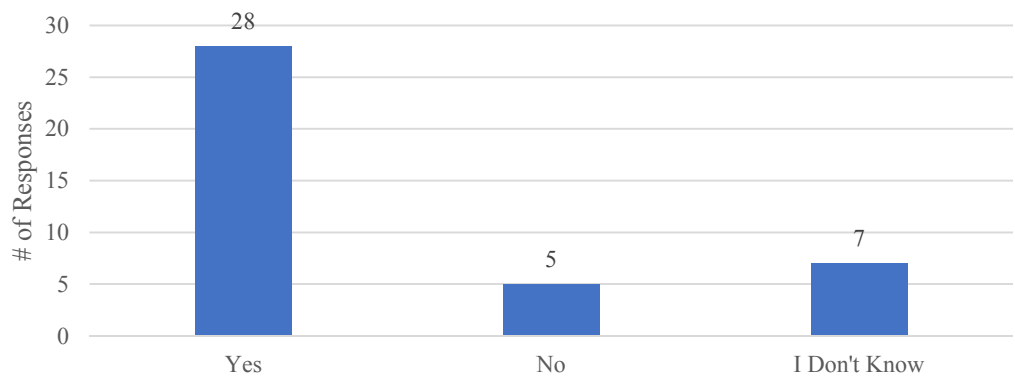


Figure #13: Singing Therapy for Voice Disorders
 Q4 - Singing-based therapy can be used by an SLP to treat voice disorders:

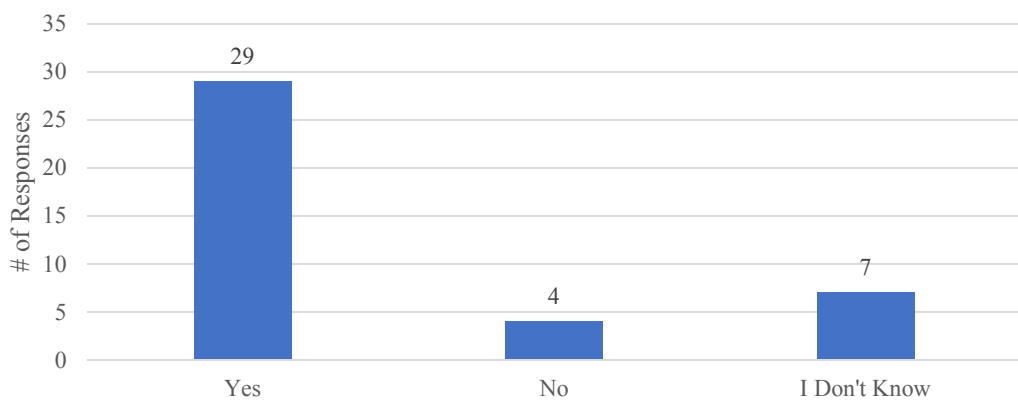


Figure #14: Singing Therapy for Language Disorders
Q5 - Singing-based therapy can be used by an SLP to treat language disorders:

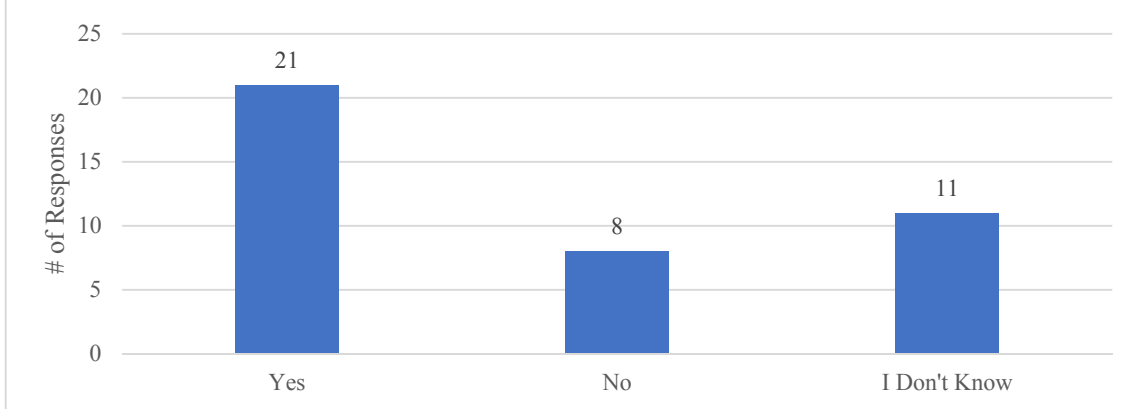


Figure #15: Singing Therapy for Speech Disorders
Q6 - Singing-based therapy can be used by an SLP to treat speech disorders:

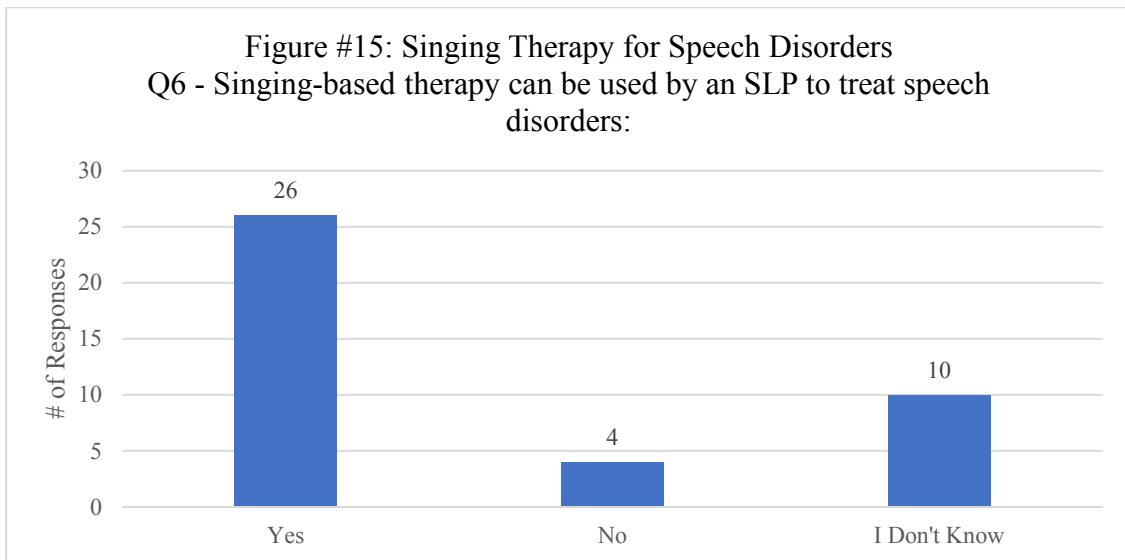
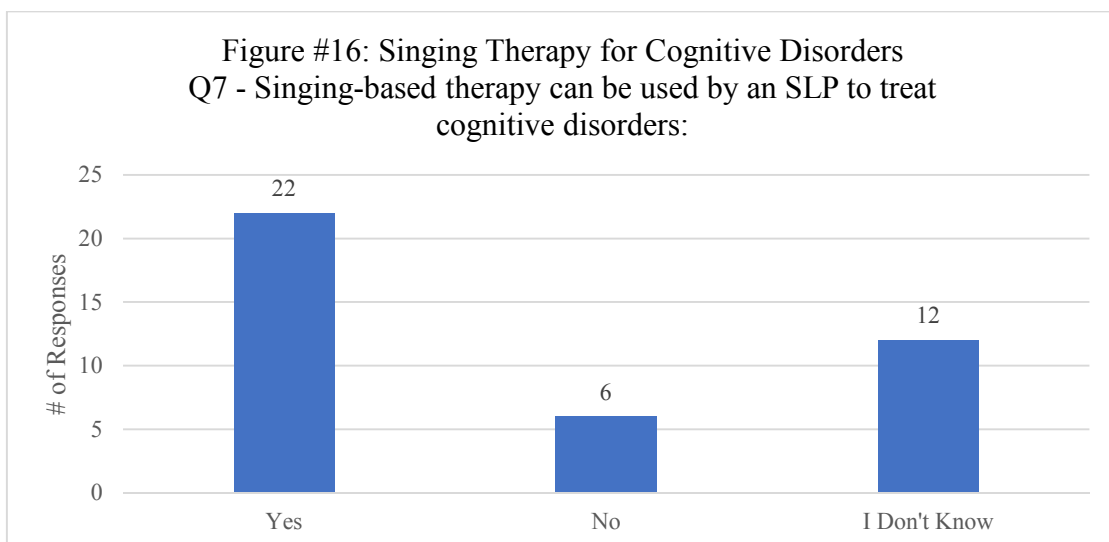


Figure #16: Singing Therapy for Cognitive Disorders
Q7 - Singing-based therapy can be used by an SLP to treat cognitive disorders:



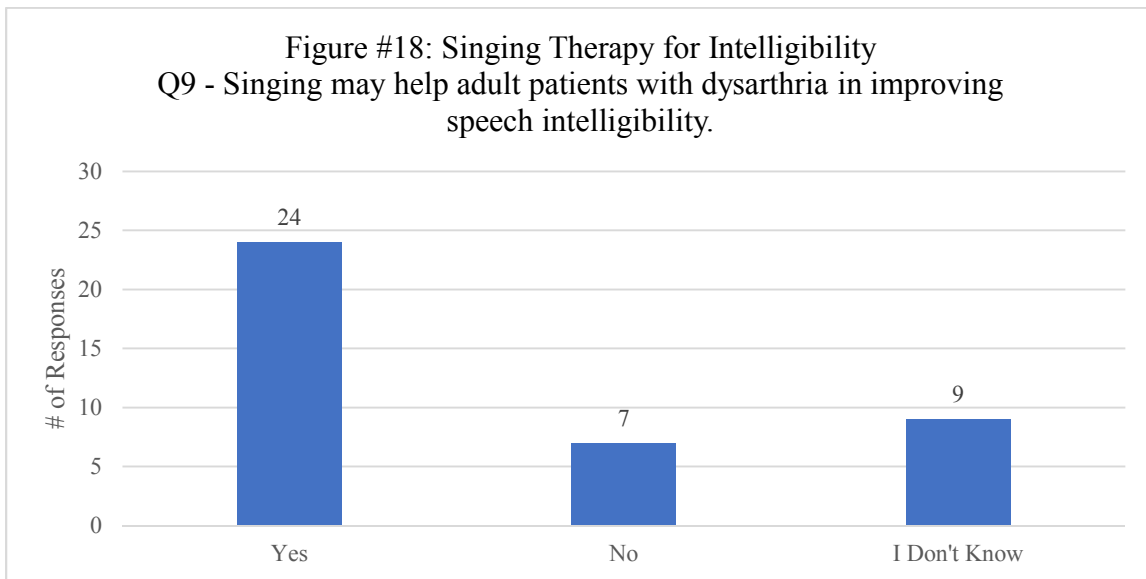
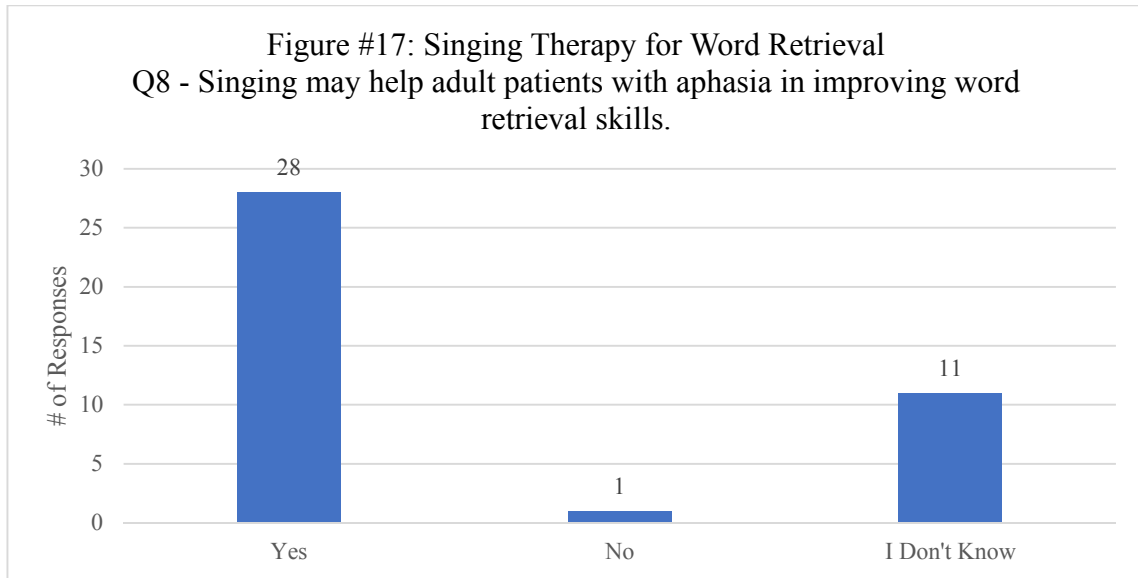


Figure #19: Open Response for Student Knowledge of Singing Therapy
Q10 - Explain what you know about singing in therapy with adults with neurological disorders.

I don't know anything about singing therapy

I do not know much about singing therapy, but that it can improve voice quality.

I know that you can use singing therapy in clients who have a stutter.

I know certain types of singing/activities have the potential to be therapeutic in general (even outside of speech-language therapy) and I'm sure some of that applies to adults with neurological disorders, but I have not encountered evidence/information about it specifically.

I have learned about MIT, but not more than what it is. I don't know how frequently singing therapy is used in the field.

I do not know anything about singing in therapy with adults with neurological disorder. I think it is an area that needs to be further investigated because it sounds very interactive and possibly beneficial.

Nothing

I have not worked with any adults with neurological disorders but I think it is a great concept!

Musical intonation can help some clients recall things or speak easier. For example, a person may stutter but sing perfectly.

I've really only heard of melodic intonation therapy. I would imagine that singing in therapy would benefit a neurological disorder by making targets easier to process and recall.

I know nothing

Singing can help with memory & re-learning activities

Singing can be used to help people with neurological stutters.

I know it can melodic intervention can help with disfluency.

I don't know much about using singing techniques in therapy.

Medoldic intonation Therapy used for Acquired Apraxia of Speech in order to access automatic speech/ residual language

I don't know any evidence based practices that involve singing in therapy.

Can be useful in treating Broca's Aphasia

I don't know anything else.

I dont know much

Not much!!!

I know that music and singing can alleviate the emotional, social, and cognitive effects of neurological disorders in some clients, but I don't know much more than that.

I don't know a lot

I don't know much but think it is a great way to build your client's confidence!! I think you have to be careful how you use singing in therapy to keep it as functional as possible.

Just based on small presentations about MIT in my adult classes

Music and singing is stored in a different part of the brain than the main language centers, so incorporating singing may aid the brain in forming new connections for language after brain damage occurs (stroke, tbi, ect)

I know little about singing in therapy.

I read something about it in a textbook at some point but am not overly familiar

It's good for people with prosodic difficulties

I know singing therapy exists and I associate it with voice. As far as singing therapy and literally anything else, I know absolutely nothing about it. Common sense says, to me, that it would work for the right clients, though.

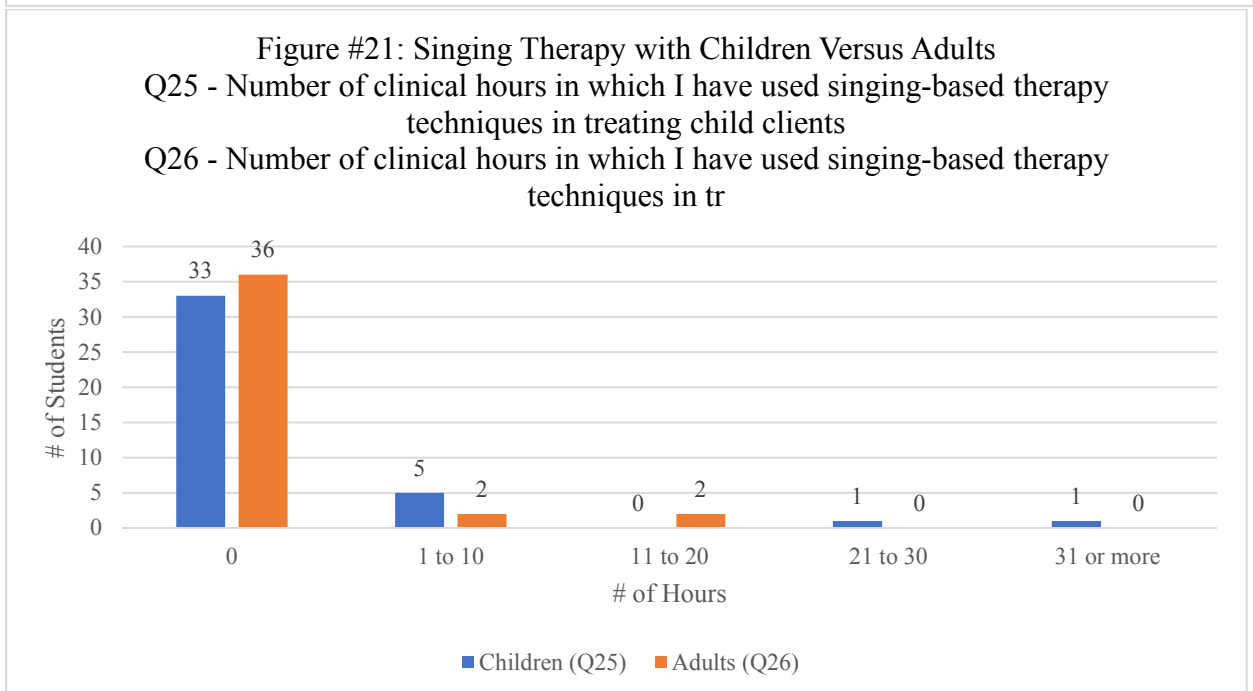
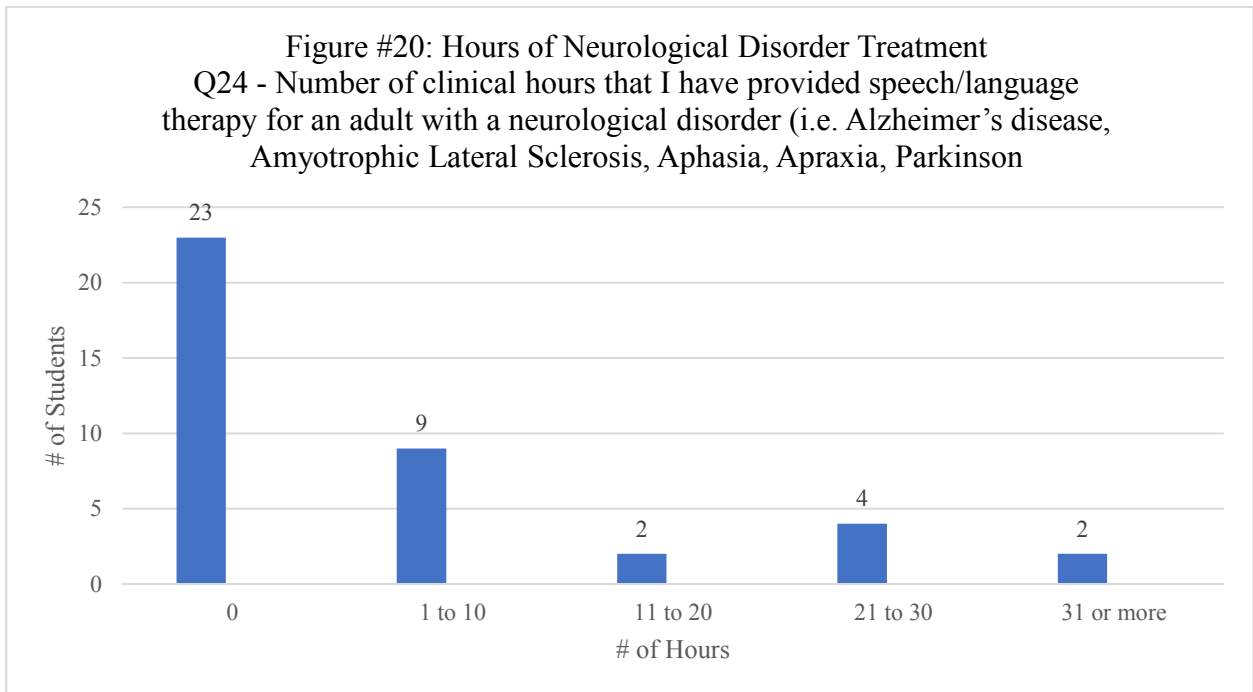


Figure #22: Open Response for Singing Therapy Experience

Q27 - If you have used singing-based therapy techniques in treating adult clients, what did you do?

If you have used singing-based therapy techniques in treating adult clients, what did you do?

N/A

MIT

I tried using MIT. However, I didn't feel comfortable hearing my voice modeling how to do MIT

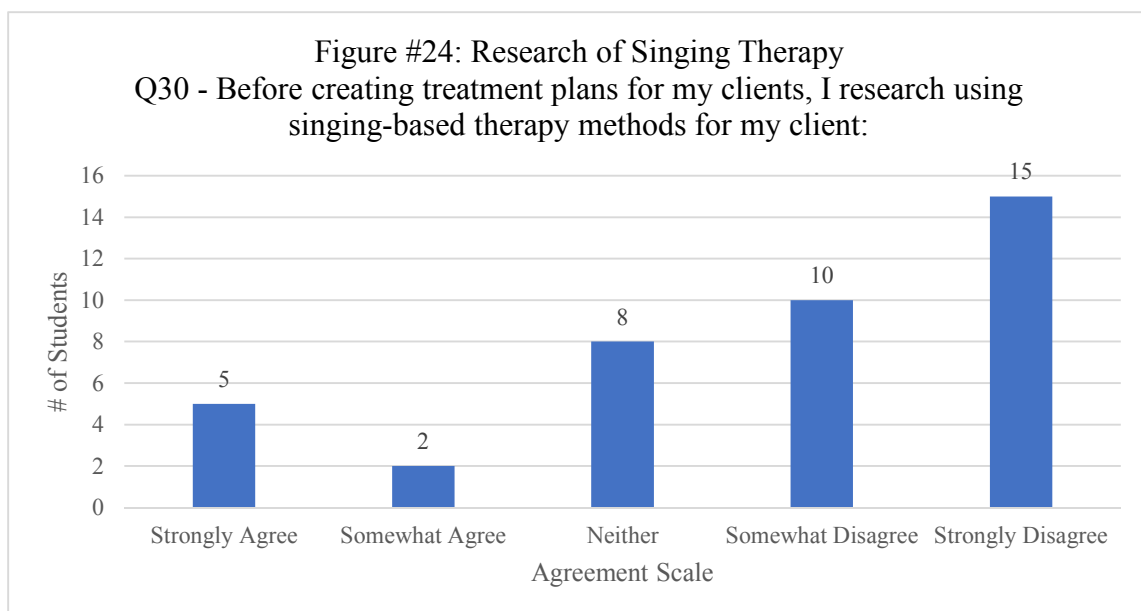
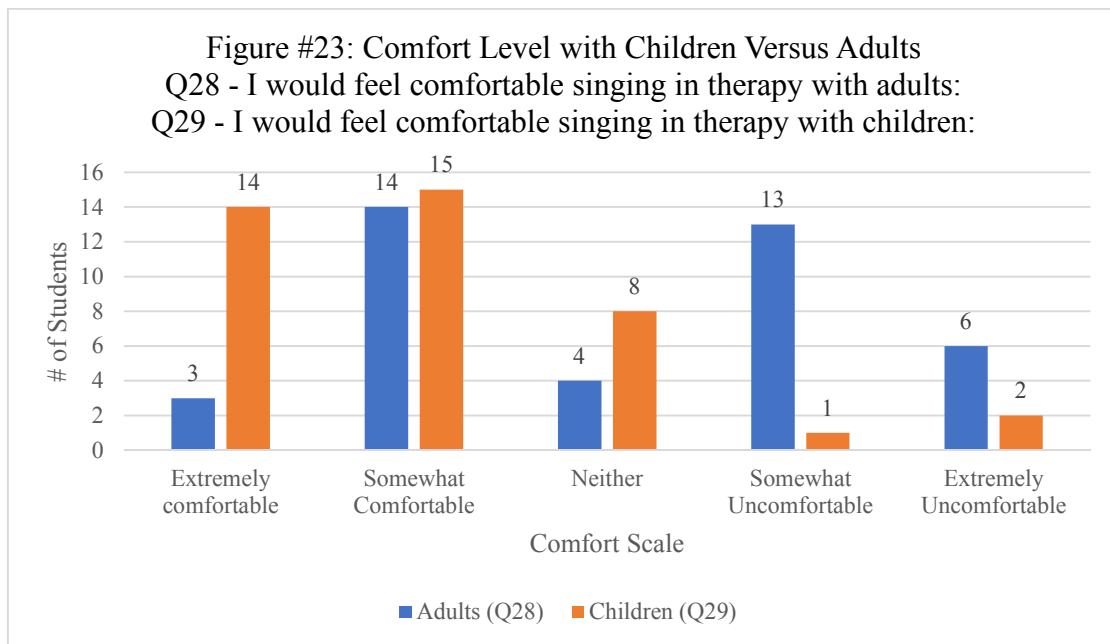


Figure #25: Comfort of Selection and Implementation of Singing Methods
 Q31 - If presented with an adult client on my caseload, I would feel comfortable selecting an appropriate singing-based therapy method.
 Q32 - If presented with an adult client on my case

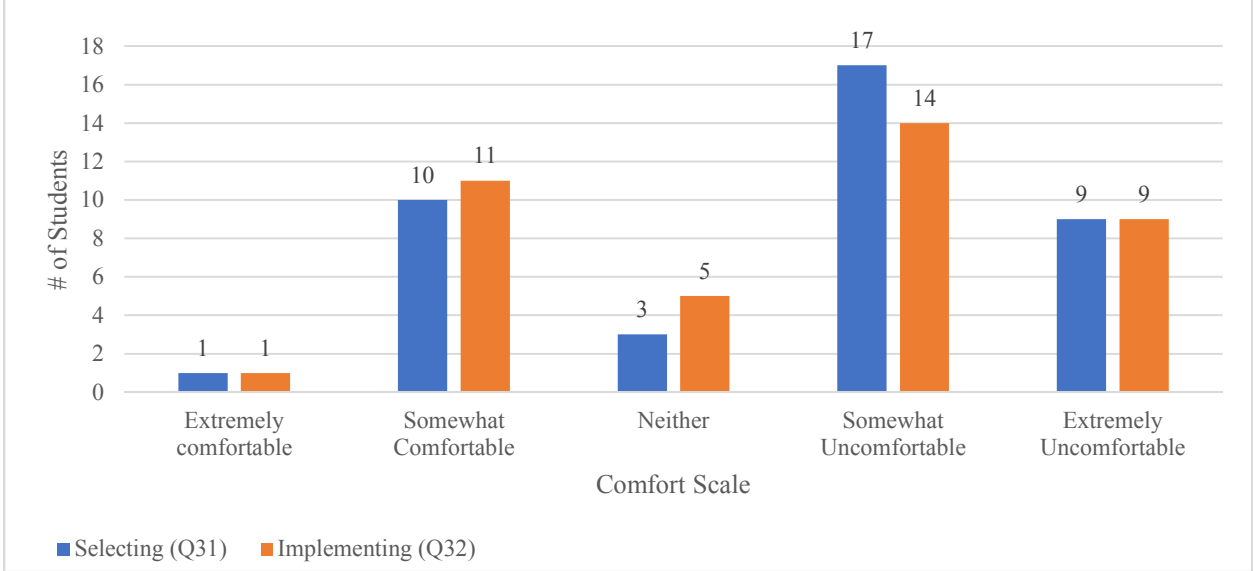


Figure #26: Supervisor Encouragement
 Q33 - My clinical supervisor(s) has/have encouraged me to use singing while in therapy with adult clients

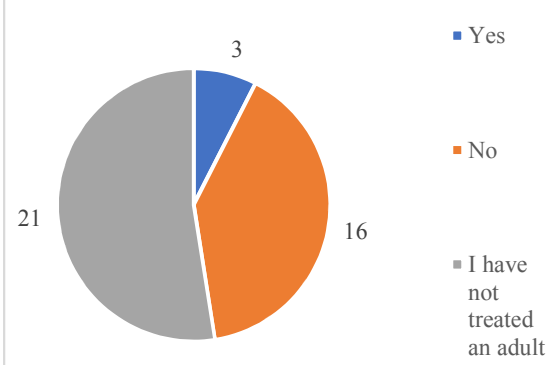
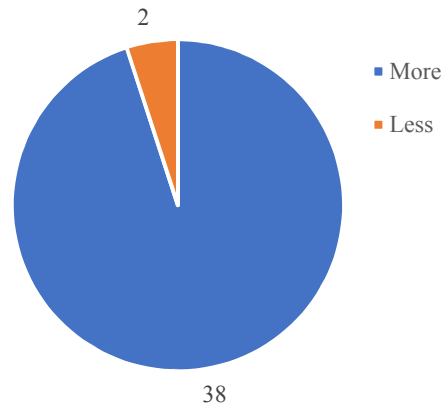


Figure #27: Opinions on Singing Therapy Curriculum
 Q34 - Do you feel that more or less curriculum should be provided related to singing-based therapy used with adults?



APPENDIX B

SURVEY QUESTIONS

1. Which of the following is a type of singing-based therapy method:
A. Accent-based Music Speech Protocol C. All of the above
B. Melodic Intonation Therapy D. None of the above
2. Singing-based therapy is a possible treatment method for adults with neurological disorders
Yes No I don't know
3. Speech-language pathologists who are not certified in singing therapy can use singing/music techniques in therapy?
Yes No I don't know
4. Singing-based therapy can be used by an SLP to treat voice disorders:
Yes No I don't know
5. Singing-based therapy can be used by an SLP to treat language disorders:
Yes No I don't know
6. Singing-based therapy can be used by an SLP to treat speech disorders:
Yes No I don't know
7. Singing-based therapy can be used by an SLP to treat cognitive disorders:
Yes No I don't know
8. Singing may help adult patients with aphasia in improving word retrieval skills.
Yes No I don't know
9. Singing may help adult patients with dysarthria in improving speech intelligibility.
Yes No I don't know
10. Explain what you know about singing in therapy with adults with neurological disorders.
11. Number of clinical observation hours of therapy with an adult with a neurological disorder
0 1-3 4-6 7 or more
12. Number of clinical observation hours completed in which an adult with a neurological disorder was treated with singing-based therapy by an SLP
0 1-3 4-6 7 or more
13. Number of undergraduate CD courses taken which included information about neurological disorders
0 1-2 3-4 5 or more

14. Number of graduate CD courses taken which included information about neurological disorders
0 1-2 3-4 5 or more
15. Number of undergraduate CD courses which included the topic of treating neurological disorders with singing-based therapy
0 1-2 3-4 5 or more
16. Number of graduate CD courses which included the topic of treating neurological disorders with singing-based therapy
0 1-2 3-4 5 or more
17. Number of non-CD courses attended about singing/music/instruments
0 1-3 4-6 7 or more
18. Number of personal hobbies that involve singing/music/instruments
0 1-3 4-6 7 or more
19. Rate your knowledge on using singing-based therapy with adults with neurological disorders on a scale from 0-5 (0 being “no knowledge” and 5 being “extremely knowledgeable”)
0 1 2 3 4 5
20. Would you like more educational material about using singing-based therapy with adult clients with neurological disorders?
Yes No
21. If more education was available, I would be interested in specializing in using singing-based therapy methods.
Yes No
22. Have you taken additional seminars or educational opportunities related to singing-based therapy?
Yes No
23. If so, what?
24. Number of clinical hours that I have provided speech/language therapy for an adult with a neurological disorder (i.e. Alzheimer’s disease, Amyotrophic Lateral Sclerosis, Aphasia, Apraxia, Parkinson’s disease, Multiple Sclerosis, etc.)?
0 1-10 11-20 21-30 31 or more
22. Number of clinical hours in which I have used singing-based therapy techniques in treating child clients
0 1-5 6-10 11-15 16 or more
26. Number of clinical hours in which I have used singing-based therapy techniques in treating adult clients
0 1-5 6-10 11-15 16 or more
27. If you have used singing-based therapy techniques in treating adult clients, what did you do?
28. I would feel comfortable singing in therapy with adults:
Strongly Disagree Disagree Neutral Agree Strongly Agree
29. I would feel comfortable singing in therapy with children:
Strongly Disagree Disagree Neutral Agree Strongly Agree
30. Before creating treatment plans for my clients, I research using singing-based therapy methods for my client:
Strongly Disagree Disagree Neutral Agree Strongly Agree

31. If presented with an adult client on my caseload, I would feel comfortable selecting an appropriate singing-based therapy method to treat them.

Strongly Disagree Disagree Neutral Agree Strongly Agree

32. If presented with an adult client on my caseload, I would feel comfortable implementing a singing-based therapy method.

Strongly Disagree Disagree Neutral Agree Strongly Agree

33. My clinical supervisor(s) has/have encouraged me to use singing while in therapy with adult clients

Yes No I have not treated an adult

34. Do you feel that more or less curriculum should be provided covered related to singing-based therapy used with adults?

More Less

APPENDIX C

CODES FOR ANALYSIS

Codes for Open Response Questions:

1. Lack of knowledge: response includes written admission of poor knowledge about singing therapy used by SLPs without any additional content of accurate knowledge of the topic

Example: “I don’t know about using singing techniques in therapy.”

2. Partial knowledge: response includes written admission of poor knowledge on the topic, but also includes accurate information about the topic.

Example: “I know that music and singing can alleviate the emotional, social, and cognitive effects of neurological disorders in some clients, but I don't know much more than that.”

3. Knowledge: response contains accurate content about the topic without any written admission of a lack of knowledge on the topic.

Example: “Music and singing is stored in a different part of the brain than the main language centers, so incorporating singing may aid the brain in forming new connections for language after brain damage occurs (stroke, TBI, etc.).”

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