

A DETAILED INVESTIGATION, COMPARISON, AND ANALYSIS OF THE
PRACTICE HABITS OF UNDERGRADUATE VOCAL AND
PIANO PERFORMANCE MAJORS

Barrett Radziun

Dissertation Prepared for the Degree of
DOCTOR OF MUSICAL ARTS

UNIVERSITY OF NORTH TEXAS

December 2018

APPROVED:

Stephen F. Austin, Major Professor
Stephen Morscheck, Committee Member
Carol Wilson, Committee Member
Molly Fillmore, Chair of the Division of Vocal
Studies
Felix Olschofka, Interim Director of Graduate
Studies in the College of Music
John Richmond, Dean of the College of Music
Victor Prybutok, Dean of the Toulouse
Graduate School

Radziun, Barrett. *A Detailed Investigation, Comparison, and Analysis of the Practice Habits of Undergraduate Vocal and Piano Performance Majors*. Doctor of Musical Arts (Performance), December 2018, 59 pp., 1 table, 2 appendices, bibliography, 55 titles.

For musicians of all kinds, practice is an essential component in establishing and refining their skills. How a musician learns the art of practicing, and at what point in their musical and cognitive development can vary drastically. The purpose of this research is to understand how two groups of musicians, undergraduate vocal performance majors and undergraduate piano performance majors, developed (or consequently failed to develop) their respective knowledge pertaining to effective practice prior to entering the university setting, and how their practice habits changed (or consequently failed to change) after beginning study with a university instructor. This is accomplished by comparing the practice habits of the two groups prior to entering the university setting, and, after gaining admission into the degree program. Findings are supplemented with recent research pertaining to the study of learning and various types of practice.

Copyright 2018

by

Barrett Radziun

TABLE OF CONTENTS

	Page
CHAPTER 1. INTRODUCTION AND REVIEW OF THE LITERATURE	1
1.1 Literature Review.....	3
1.2 Motor Learning.....	8
1.3 Practice.....	11
1.3.1 The Teacher’s Role in Practice	14
1.3.2 Perception and Action.....	16
1.3.3 Spaced vs Massed Practice	18
1.3.4 Blocked vs Random Practice	21
1.3.5 Parts vs Whole Practice	22
1.3.6 Constant vs Variable Practice	24
CHAPTER 2. METHODOLOGY	26
CHAPTER 3. RESULTS	28
CHAPTER 4. DISCUSSION.....	36
CHAPTER 5. CONCLUSION.....	44
CHAPTER 6. LIMITATIONS OF THE STUDY	47
CHAPTER 7. RECOMMENDATIONS FOR FUTURE RESEARCH	48
APPENDIX A. IRB APPROVAL	50
APPENDIX B. QUESTIONNAIRE.....	52
BIBLIOGRAPHY.....	56

CHAPTER 1

INTRODUCTION AND REVIEW OF THE LITERATURE

For musicians of all kinds, practice is an essential component in establishing and refining their skills. Learning is the ultimate goal of practicing: we practice to make changes that will, over time, improve performance. Vocal pedagogue Clifton Ware describes learning using the equation, “Information + time + effort = learning.”¹ Interestingly, the word practice does not appear in his equation: it is neither one of the variables nor the sum, and yet undeniably flavors each component.

All musicians, regardless of their instrument, seeking to major in performance at the undergraduate level must first perform an audition before a panel of university faculty members. The auditionee must demonstrate skills commensurate with the standards of the degree program—skills that they developed, theoretically, by practicing. Once accepted into the degree program, the student is then expected to improve steadily and exponentially over a period of several years as the result of private lessons with a teacher, core curriculum courses, and individual practice (sometimes a prescribed number of hours per week mandated by the university). Upon successful completion of the degree, should the individual continue to pursue a career in performance, they can expect to spend the duration of their career practicing. Because musicians practice to improve, if one ceases to practice, they will cease to improve their craft.

Where does a musician learn the skill of practicing, and at what point in their musical and cognitive development is it taught? In the case of singers, this can vary drastically. Some may begin taking voice lessons as children, but many may not experience much in the way of formal

¹ Clifton Ware, *Basics of Vocal Pedagogy* (Boston: McGraw Hill 1998), 261.

vocal training until they reach the university, having gained most of their vocal training through their choral experience.² Delayed vocal study can be attributed to a variety of factors, including the complex physical development of the vocal apparatus, a singer's ability to possess natural (unlearned) vocal talent, or a post-pubertal discovery of vocal aptitude. It is interesting to compare the backgrounds of singers and instrumentalists, pianists for example, the latter of whom upon entering a university program have likely been engaged in formal study since early childhood.

It can be assumed, however, in the case of successful university program auditionees on voice *or* piano, that they possess at least some understanding or ability to practice: after all, they were admitted into a collegiate music program. But certain questions beg to be asked: Are there more and less effective methods of practicing? Are players of specific instruments 'better practicers' than players of other instruments? If a musician is not taught how to practice effectively, can they truly reach their full potential?

The purpose of this research is to understand how two groups of musicians, undergraduate vocal performance majors and undergraduate piano performance majors, developed (or consequently failed to develop) their respective knowledge about effective practice prior to entering the university setting, and how their practice habits changed (or consequently failed to change) after beginning study with a university instructor. This is accomplished by comparing the practice habits of the two groups prior to entering the university setting, and, after gaining admission into the degree program. Hypothetically, both groups (having completed successful auditions) should possess some understanding of effective

² Scott McCoy, "The Choir Issue, Part I," *Journal of Singing* 67, no. 3 (January-February 2011): 298.

practice. Should differences in their understanding of effective practice or discrepancies between the two groups emerge, this study will seek to uncover the source. My findings are supplemented with recent research pertaining to the study of learning and various types of practice. Pertinent recommendations are proposed after the results are analyzed.

1.1 Literature Review

Practice plays a key role in the success of performing classical musicians and has therefore been an area of interest to researchers in a variety of fields beyond music, including psychology, vocology, education, and behavioral science. Much has been gained by studying the practice habits of classical musicians, and studies to date have included interviews (retrospective in nature) with musicians regarding their musical development, as well as concurrent observation and data collection of classical musicians in the act of practicing. Each method has inherent advantages and disadvantages, but both have provided pertinent information regarding the effectiveness of practice methods.

One groundbreaking study, conducted in 1985 by Lauren A. Sosniak (who served as the research coordinator for the Development of the Talent Project) began with interviews of twenty-one American concert pianists regarding their musical development and practice habits. Each interviewee had won one of six major international piano competitions. As part of the research, Sosniak requested permission to contact each of the pianist's parents for supplemental information regarding their child's journey toward becoming a professional performing artist. Sosniak divided the pianist's musical training into three periods: the early, the middle, and the late years. She focused her interview on questions regarding amount of practice, exposure to music in the home, rewards for the pianist's efforts, the point at which each pianist began to be

recognized for his or her musical aptitude (either by a parent or a teacher), the quality of instruction, developing a commitment to music, recitals, competitions, performances, family involvement, and instruction with master teachers. What Sosniak discovered was that while the amount of practice time varied somewhat from pianist to pianist during the early years, the number of hours increased steadily to an average of four to seven hours per day during the later years of development and into adulthood as a professional musician—this was the case with all of the pianists who achieved international fame as performing artists.

Another study of this nature is Hannah Smeltz’s interview with eighty-nine adult musicians regarding their practice habits. The research, which was based on a study done by Ericsson et. al, was published by the National Association for Music Education in 2012, and it yielded an interesting conclusion: “more practice does not always lead to more achievement,”³ in fact, it can produce the opposite effect. The data suggested that “for conservatory-level classical musicians, practicing beyond four hours per day led to diminishing returns and a likelihood of physical injury, loss of motivation, and burnout.”⁴ Smeltz concluded that encouragement to practice should contain no mention of time, but rather the recommendation that students use at least five practice methods per session.

Interestingly, most of these studies on practice habits are limited to instrumentalists: very few include data collected on classical singers. One of the few studies on practice which includes singers in its interview subjects was completed by John A. Sloboda et al. The study is titled “The Role of Practice in the Development of Performing Musicians,” and it was published in the

³ Hannah Smeltz, “Reframing Student Practice to Facilitate Lifelong, Joyful Musicianship,” *Music Educators Journal* 99, no 2 (December 2012): 52.

⁴ Ibid.

British Journal of Psychology in 1996. In the study, 257 subjects between the ages of eight and eighteen were interviewed regarding their individual study of a musical instrument. According to Sloboda, “It was discovered that there was a strong relationship between musical achievement and the amount of formal practice undertaken.”⁵ Additionally, “there was no evidence that high achievers were able to gain a given level of examination success on less practice than low achievers.”⁶ Rather, the high achievers demonstrated a more consistent pattern in the schedule of their practicing efforts, “lending strong support to the theory that formal effortful practice is a principal determinant of musical achievement.”⁷ Interestingly, data collected within this study “indicated that piano students did the most practice and voice students the least.”⁸

Two studies that focused on collecting data by observing musicians in the act of practicing were conducted by Robert Duke, et al., and Robert Chaffin and Gabriela Imreh, respectively.

Robert Duke et al. conducted a study published in the *Journal of Research in Music Education* titled “It’s Not How Much; It’s How.” Duke “observed 17 graduate and advanced-undergraduate piano majors practicing a difficult, three-measure keyboard passage from a Shostakovich concerto.”⁹ The results of the study “showed that the strategies employed during

⁵ John A. Sloboda, Jane W. Davidson, Michael J. A. Howe, and Derek G. Moore, “The Role of Practice in the Development of Performing Musicians,” *British Journal of Psychology* 87, no. 2 (May 1996): 287.

⁶ Ibid.

⁷ Ibid.

⁸ Ibid., 301.

⁹ Robert A. Duke, Amy L. Simmons, and Carla Davis Cash, “It’s Not How Much; It’s How: Characteristics of Practice Behavior and Retention of Performance Skills,” *Journal of Research in Music Education* 56, no. 4 (January 2009): 310.

practice were more determinative of performance quality at retention than was how much or how long the pianists practiced.”¹⁰ The study was published in 2009.

Robert Chaffin and Gabriela Imreh conducted research on practicing by observing one concert pianist in her endeavor to learn and record the *Presto* movement from J.S. Bach’s *Italian Concerto* from start to finish, observing the pianist’s practice sessions, and recording the personal comments she made regarding her practice while she was doing it. The study was published in 2001 in *Psychology of Music*, and it proved that practice and self-reports of practice (verbal comments regarding their practice made by the person practicing) do not always agree. Rather, practice sometimes “provides information not available in self-reports.” An example of this from the study was related to the practice of *dynamics*, which the pianist never commented on as a specific goal of practice, but observation showed that dynamics were in fact being practiced. ¹¹Chaffin and Imreh concluded, “In order to relate practice behavior over many sessions to the pianist’s goals in learning the piece, we found it necessary to develop new tools for the description of practice.”¹²

In addition to these accounts of individual musicians and their practice, research has been done on the science and psychology of practice, and its subsequent effects on motor learning in humans.

In the book *Vocology: The Science and Practice of Voice Habilitation*, Ingo Titze and Katherine Verdolini Abbott include a chapter titled “Perceptual-Motor Learning Principles: How to Train,” in which they define motor learning and describe its dependence on practice. Within

¹⁰ Ibid.

¹¹ Roger Chaffin and Gabriel Imreh, “A Comparison of Practice and Self-Report as Sources of Information About the Goals of Expert Practice,” *Psychology of Music* 29 (2001): 39.

¹² Ibid., 67.

this chapter, they also describe different methods of practice (constant versus variable, random versus blocked, and parts versus whole), as well as the advantages and disadvantages associated with each of them. These are the methods of practice on which my questionnaire was based.

The *Journal of Singing* published a column relevant to this research topic titled “Mindful Voice” between 2009 and 2016, which included articles written by Lynn Holding, Ruth Rainero, and Christine Bergan. Particularly relevant is an article by Bergan titled “Motor Learning Principles and Voice Pedagogy: Theory and Practice.” Within this article, she explores the principles of motor learning and different types of practice, in addition to explaining how singers might experience these different practice methods. Bergan then draws on information from a study by P.L. Ackerman, et al. who stated, “although practice is the primary determinant of individual differences in skilled performance of tasks with significant motor requirements, the sheer amount of practice provides only a moderate amount of explanatory power. The kind of practice appears to be an important factor, especially for sports and musical skills.”¹³

Practice is a concept which has and continues to garner interest from researchers. Performers and music educators agree that “practice is an essential, even fundamental component in the pursuit of excellence”¹⁴ and points to the inherent value of research in this area. Each research project I have encountered explores a slightly different aspect of practice and the acquisition of skill, and therefore yields slightly different results, informing our understanding of what makes practicing more or less effective. The significance of this particular research project lies in the fact that very few studies have been done which explore the practice

¹³ Christine Bergan, “Motor Learning Principles and Voice Pedagogy: Theory and Practice,” *Journal of Singing* 66, no. 4 (March/April 2010): 465.

¹⁴ Lynn Holding, “The Mind’s Mirrors,” *Journal of Singing* 66, no. 5 (May/June 2010): 585.

habits of singers by means of data collection and analysis. This is not the case with instrumentalists. By comparing the practice habits of singers to those of pianists, I will be able to determine areas in which the respective groups either excel or lack. Ultimately, the goal of such research is to identify how college voice and piano instructors might better inform and guide the practice of their students during their undergraduate years.

1.2 Motor Learning

According to Schmidt and Lee, *motor learning* is defined as “a process, inferred rather than directly observed, which leads to relatively permanent changes in the general capacity for motor performance, as the result of practice of exposure.”¹⁵ Learning to sing is an example of motor learning. Studies pertaining to motor-learning and skill acquisition are currently of great importance to researchers, as understanding methods for improving motor learning allows humans to increase their motor-skill capabilities.¹⁶

Motor learning occurs in several stages: these stages vary depending on which model is consulted. One such model by psychologist Paul Fitts describes three stages: *cognitive*, *associative*, and *autonomous*. The cognitive stage is “a conscious, verbal stage, in which the learner identifies “what” to do in motor performance – presumably biomechanically.”¹⁷ In learning to sing, this stage involves verbal instruction from the teacher regarding the mechanics of the vocal mechanism, as well as descriptions of specifically prescribed vocalises and the

¹⁵ Ingo Titze and Katherine Verdolini Abbott, *Vocology: The Science and Practice of Voice Habilitation* (Salt Lake City: The National Center for Voice and Speech), 219.

¹⁶ Yong Hyun Kwon, Jung Won Kwon, and Myoung Hee Lee, “Effective of Motor Sequential Learning According to Practice Schedules in Healthy Adults: Distributed Practice Versus Massed Practice,” *Journal of Physical Therapy Science* 27, no. 3 (2015): 769.

¹⁷ Titze and Verdolini Abbott, *Vocology*, 221.

mechanics involved in their proper execution. It becomes the student's responsibility to process this information and understand *how* the skill is to be acquired. This is the associative stage, a stage that relies more on putting the skill into practice and less on verbal instruction. The final stage according to Fitts' model is the autonomous stage, which is "characterized by the emergence of automaticity, that is, skilled performance requiring little if any conscious effort."¹⁸ In singing, this is accomplished after prolonged study and practice, when a singer's technique becomes so ingrained in their body and mind that every aspect of proper vocal technique does not need to be consciously considered on a moment-by-moment basis, and genuine artistic expression takes precedence over conscious effort.

It is important to appreciate that motor learning may never be complete. A 1959 study by Crossman pertaining to the rolling of cigars indicated that even after seven years of rolling nearly 10 million cigars, small increments of improvement in performance were still being detected.¹⁹ Translating this to the task of learning to sing or play an instrument is necessary for young students to understand. Young musicians may become frustrated when they fail to meet a standard of performance they expected of themselves: it is important to communicate to these students that progress is indeed being made, and will continue to be made throughout their lifetime should they continue to consistently put singing or playing their instrument into practice. The evidence suggests that there is no point in which improvement ceases if the skill is continuously practiced.

When considering how one learns a motor-task like singing or playing the piano, it is important to consider that learning is not a fixed state, but it is rather a process. This is important

¹⁸ Ibid.

¹⁹ Titze and Verdolini Abbott, *Vocology*, 220.

for both the teacher and the student, as “the acquisition of new action patterns does not involve ‘units’ of information that reside and accumulate in some discrete location of the brain. Rather, learning refers to changes in the likelihood that various mental processes will occur in the future due to practice or exposure from the past.”²⁰ This means that an effective voice or piano teacher must not only provide the student with verbal instruction and information pertaining to how to solve a particular problem, but he or she must then guide the student toward putting the solution into action, observe the student successfully put the skill into practice, and then encourage the student to repeat the skill until it becomes habitual.

A student of applied music, particularly a beginner, cannot and should not be expected to understand this complicated learning process, and he or she must be purposefully guided in this way. Young voice students in particular may assume their vocal deficiencies are the result of the lack of a particular piece or unit of information: some “golden nugget” of wisdom they expect a voice teacher to provide them with, which will instantly correct their faults. This is not how motor-learning and skill acquisition work (this is especially not the case in singing), and explaining this to beginning voice students may help them better understand the task they are setting out to accomplish. Kagen describes this misunderstanding by writing “the attitude held by many students that vocal technic is a discipline of knowledge which can be reasonably successfully acquired once certain detailed physiological information has been assimilated seems to me totally unwarranted.”²¹ The human voice is complex, and learning to use it is more involved than being receptive to information pertaining to its use.

²⁰ Ibid., 219.

²¹ Sergius Kagen, *On Studying Singing* (New York: Rinehart & Company, Inc., 1950), 77.

Learning how to sing is an arduous process for many students, but this could be simplified considerably if, from the beginning, students were *taught to understand how to learn how to sing*. That is a lot of layers! Kagen explains the process with these words: “The assimilation of accurate knowledge of physiological processes involved in the production of a desirable sound will enable the student to reproduce accurately such processes at will, thus reproducing the sound at will.”²² Young singers do need to receive verbal information regarding the production of beautiful sounds, but they will only learn to make these sounds by actually *making them*, followed by repeated practice making such sounds.

1.3 Practice

Chaffin and Imreh write, “Prolonged, deliberate practice is essential for the development of high levels of skill in any field.”²³ Sloboda, et al. writes, “Sustained practicing is nevertheless essential in order to establish high levels of competence at most, if not all, areas of expertise.”²⁴ Bergan writes, “A primary means of attaining skilled vocal performance is substantial amounts of practice.”²⁵ Lynn Holding writes, “Practice is an essential, even fundamental component in the pursuit of excellence.”²⁶ Manuel Garcia wrote, “The most favorable aptitudes need to be cultivated and directed in their application by a sustained and orderly labor.”²⁷

²² Ibid., 75.

²³ Chaffin and Imreh, “A Comparison of Practice and Self-Report,” 39.

²⁴ Sloboda, et al., “The Role of Practice in the Development of Performing Musicians,” 287.

²⁵ Bergan, “Motor Learning Principles and Voice Pedagogy,” 458.

²⁶ Holding, “The Mind’s Mirrors,” 585.

²⁷ Manuel Garcia, *A Complete Treatise on the Art of Singing: Part One* (New York: Da Capo Press, 1984), 2.

For a professional performing musician, understanding *and* executing prolonged, deliberate practice is a nonnegotiable part of a long and fruitful career. While young musicians (especially those who are ardent or exceptionally talented) are typically taught this truth at a young age, many may be expected to innately understand the complicated task of practicing with little guidance from their teacher or mentor. Young musicians are often told over and over that practice is essential for success, but they may never be taught how to successfully practice. This seems especially true in the world of classical singers—a world in which learning to practice seldom includes the use of specific method books or practice tools, and most often is self-guided by the singer and overlooked by the teacher. This approach to self-guided singing practice is a relatively modern method. In order to understand how practicing singing has changed over the centuries, we must look back to the earliest sources of information concerning practice.

Cornelius Reid explains that the *bel canto* style of singing and the principles of tone production associated with that style originated long before the invention of opera, even as far back as the fourth century.²⁸ Singers were schooled at the *Schola Cantorum*, a conservatory of music established by Pope Sylvester, where they were instructed “in the basic principles of tone production and musical theory.”²⁹ In 600 A.D., Pope Gregory made the executive decision to significantly increase the financial endowment of the *Schola*, and as a result, the students were “set to the arduous task of becoming a musician and a vocal artist.”³⁰ The general enthusiasm of the singers and the priest-voice teachers was so significant that Pope Gregory “found it necessary

²⁸ Cornelius Reid, *Bel Canto: Principles and Practices* (New York: The Joseph Patelson Music House, 1978), 13.

²⁹ Reid, *Bel Canto*, 14.

³⁰ *Ibid.*

to warn the priests against devoting too much time to the problems of voice training to the neglect of their clerical duties.”³¹

The goal of training at the *Schola Cantorum*, which lasted a rigorous nine years, was a complete and thorough mastery of phrasing, tone production, and vocal technique. This tradition continued through the centuries, and the early teachers of singing left in their wake a thorough account of perspectives in the form of treatises—many of which contain fastidious methodology regarding practice. Caccini’s *Nuove Musiche* of 1601, Tosi’s *Observations on the Florid Song* of 1723, and Mancini’s *Practical Reflections on the Figurative Art of Singing* of 1776 are prime examples of early method books containing pertinent information on practicing singing. These treatises, though widely available (for purchase, in libraries, and online) and full of relevant information from the masters of *bel canto* technique, are seldom used in twenty-first century voice studios. I did not encounter them until the second year of my doctoral studies in a class entitled *Comparative Vocal Pedagogy*.

To emphasize the intensity of the rigorous practice regimen expected of singers training with master teachers in the seventeenth century, Reid provides a quote from *Historia Musica* by Giovanni Bontempi, who was a pupil of Virgilio Mazzochi. The quote recounts Bontempi’s daily curriculum:

One hour in the morning was set aside for difficult passages, another for the practice of shading, another for singing before a mirror, in the presence of the master, in order to acquire a good position of the mouth and a pleasing attitude in singing... On days when the pupils were allowed to go out, they used to pass through the tower gate, called *Angelus*, near the Monte Mario, where there is an echo; there they used to sing, whilst the echo returned their errors to their own hearing.³²

³¹ Ibid.

³² Reid, *Bel Canto*, 35.

The intensity of this training insured that all of the pupils were masters of singing before they appeared before the public in performance. Notably, while the students spent time practicing by themselves, they also practiced under the auspices of their teachers. This method not only guaranteed that the student spent an adequate amount of time practicing, it also insured that he or she was practicing material in a way that was deemed acceptable and appropriate by the teacher. This concept of observed practice also seems to have disappeared in the twenty-first century. Further discussion regarding the evident disappearance of such rigorous training in the setting of today's undergraduate university programs appears in Chapter 4: Discussion.

1.3.1 The Teacher's Role in Practice

Rainero defines *deliberate practice* as “the application of intentional strategies during a practice session with the goal of improving musical elements, whether note and rhythm accuracy, increased tempo phrasing, tone quality, or other.”³³ This differs from what many young singers may consider practice, which is not consistently implemented with intentional strategies, nor does it begin with the identification of specific elements to be practiced. Specificity of method, in addition to clear goals increases the productivity of practice. While this may seem intuitive, it cannot be assumed that voice students understand this concept. It is important that voice teachers clearly explain the importance of these two key components of practice to their students, work with them individually to implement the components, and take the time to observe their students putting these concepts into action.

³³ Ruth Rainero, “Practicing Vocal Music Efficiently and Effectively: Applying ‘Deliberate Practice’ to a New Piece of Music,” *Journal of Singing* 69, no. 2 (November/December 2012): 203.

F.W. Root, an American composer, voice teacher, and choir director (among other things) advocated this type of specific practice regimen among students. He also believed in the importance of teacher-observed practice. In *School of Singing*, which was published in 1873, Root wrote, “It will be well to have someone watch you while you practice...the best thing possible is to have a music-teacher, one who can not only see that you conform to the directions here given, but give you all necessary musical instruction, and see that your taste is correctly educated as you progress in vocal culture.”³⁴ Internationally famous Italian coloratura soprano Luisa Tetrazzini stated, “but it is rather a matter for the individual teacher to prescribe what is required in this way, since all voices will not need the same...to which, I would add, that it is of utmost importance not only what one practices but *how*.”³⁵

Practice must go beyond the basics of learning notes and rhythms, and voice teachers must not assume that students know what or how to practice beyond such basics. Practice should be individually prescribed by the voice teacher on a weekly basis, especially for young singers. American pianist, composer, and voice teacher Sergius Kagen summarized the average young voice student in the following passage: “Anyone who has had the opportunity to observe and work with a number of young people studying singing no doubt knows the singular confusion and the extraordinarily haphazard manner in which most of them seem to approach their task.”³⁶ While this unfortunately is the case, it does not need to be. Voice teachers can help students “find a way to study singing intelligently”³⁷ by guiding and observing their practice habits.

³⁴ F.W. Root, *School of Singing: A Method At Once Simple, Comprehensible, and Complete, For Voice Development, Execution, and the Art of Singing* (Cincinnati: John Church & Co., 1873), 12.

³⁵ Luisa Tetrazzini, *How To Sing* (New York: Da Capo Press, 1975), 108.

³⁶ Kagen, *On Studying Singing*, v.

³⁷ *Ibid*.

Philip A. Duey writes, “Perhaps no other one thing could contribute so much to the raising of the caliber of vocalism today as the acceptance of formulae and the methods of putting them into practice.”³⁸

1.3.2 Perception and Action

Practicing singing is one thing, but understanding how to practice singing is quite another. While the body of scholarly information available regarding skill acquisition and motor learning is vast, what good can it possibly do young singers if it is not reaching them? Or perhaps the more pressing question is how are voice teachers ensuring that this information is reaching young singers?

In his book *Vocology: The Science and Practice of Voice Habilitation*, Ingo Titze writes about the differences between *declarative* and *procedural* learning. This is relevant information to understand if one is serious about making the most of their practice time and in guaranteeing that perceptual-motor learning and skill acquisition will be maximized. Learning to sing relies on both declarative and procedural learning; however, it is procedural learning and associated memory that is responsible for productive practice sessions.

Titze writes, “procedural memories are those that reflect skill associated with activities...procedural memories are not revealed by asking people to report what they know, but rather by asking them to engage in a previously practiced task. Procedural memories are revealed without conscious knowledge of what has been learned.”³⁹ This is important for voice teachers to

³⁸ Philip A. Duey, *Bel Canto in Its Golden Age: A Study of Its Teaching Concepts* (New York: Da Capo Press, 1980), 156.

³⁹ Titze and Verdolini Abbott, *Vocology*, 227.

understand, as it reveals that a young singer need not be consciously aware of information relayed to him or her during a training session in order to create a particular sound, but what is most important is that the student recreates the sound successfully many times.

Additionally, a 1997 study on people learning to ski (a motor-learning task) by Wulf and Weigelt revealed that “subjects who received instructions about the mechanics of platform skiing, thus turning their attention away from experience, showed poorer training performance than subjects who were given no instructions at all.”⁴⁰ One explanation for these findings is that “verbal instructions about the biomechanics of a task are at best gross, inadequate descriptors of action, often exceeding people’s processing capabilities.”⁴¹ What these findings may suggest in terms of learning to sing is that “conscious attention to the mechanics of a motor task negatively affects both performance and learning for a task, whereas attention to task *effects* benefits performance and learning.”⁴²

Kagen believes similarly that too much attention to the mechanics of the voice “tends to impair a student’s natural coordination, destroys whatever musicality he may possess...and usually results in an abnormally self-conscious and, because of this, inefficient manner of singing.”⁴³ This does not bode well for voice instructors who repeatedly hurl bits of technical information at young students while they are singing. What could be thus considered a more effective method would be to notify a student when he or she demonstrates a skill well, request that he or she repeat it several times during the lesson, and instruct the student to recreate the same experience throughout the week outside of lessons.

⁴⁰ Ibid., 229-230.

⁴¹ Ibid., 230.

⁴² Ibid., 231.

⁴³ Kagen, *On Studying Singing*, 76.

1.3.3 Spaced vs Massed Practice

Spaced practice refers to training that alternates practice with rest, whereas massed practice refers to training that involves extensive practice with little rest between repetitions.⁴⁴ According to Wiseheart et al., “longer lags between learning episodes results in greater retention accuracy.”⁴⁵ This is vital information to have when considering how humans learn a motor skill because time between learning sessions can result in less forgotten material. Research specifically pertaining to the spacing effect and its influence on learning a motor skill like music performance is limited, and should be investigated more thoroughly. However, numerous studies including those conducted by Ammons, Bourne & Archer, and Lee & Genovese point to the evidence that spaced practice “tend to produce greater learning per repetition of a task than massed practice.”⁴⁶

Two predominant hypotheses used to explain the effect of spaced versus massed practice are the *forgetting hypothesis* and the *consolidation hypothesis*. The first hypothesis states that rest, or time away from a particular motor-learning task, ensures that incorrect solutions to problems are forgotten during periods of non-practice, enhancing motor learning. As a result of rest, the learner returns to the task “having released the hold on prior, potentially incorrect biases.”⁴⁷ The second hypothesis suggests that during rest periods, information is stored,

⁴⁴ Titze and Verdolini Abbott, *Vocology*, 220.

⁴⁵ Melody Wiseheart, Annalise A. D’Souza, and Jacey Chae, “Lack of Spacing Effects During Piano Learning,” *PLoS ONE* 12, no. 8 (2017): 1, <https://doi.org/10.1371/journal.pone.0182986>.

⁴⁶ Titze and Verdolini Abbott, *Vocology*, 220.

⁴⁷ Titze and Verdolini Abbott, *Vocology*, 220.

solidified, and stabilized. This can occur during non-active periods of being awake, or while sleeping.

Mind wandering can be an especially difficult obstacle to overcome when learning to do anything. For musicians, it is important to avoid mind wandering during practice, as constant awareness is necessary for improving performance through practice. Kagen writes, “Most singers allow their minds to wander while they sing...After a while, however...one could learn to concentrate in this fashion for longer periods of time. Eventually, one can reach a stage of self-discipline where such concentration becomes nearly automatic and almost subconscious.”⁴⁸ Studies have shown that massed practice is more likely to result in mind wandering than spaced practice. One study in particular, by Janet Metcalfe and Judy Xu showed that subjects are “on task less-fully when the stimuli are massed rather than spaced.”⁴⁹

Another study by Logan et al. explains that “memory performance benefits from the repeated presentation of items, and long-term retention benefits when these items are spaced apart in time, rather than massed.”⁵⁰ One may consider that while massed learning or practicing, much like cramming for an exam, can result in better short-term memory, it generally does not lend itself to long-term learning, as information and concepts are quickly forgotten following the exam. This can translate to singing in the sense that a student may find that massed practice allows him or her to learn and memorize music faster for a jury or recital. However, when it

⁴⁸ Kagen, *On Studying Singing*, 57.

⁴⁹ Janet Metcalfe and Judy Xu, “People Mind Wander More During Massed Than Spaced Inductive Learning,” *Journal of Experimental Psychology* 42, no. 6 (2016): 978.

⁵⁰ Jessica M Logan, Alan D. Castel, Sara Haber, and Emily J. Viehman, “Metacognition and the Spacing Effect: The Role of Repetition, Feedback, and Instruction on Judgments of Learning for Massed and Spaced Rehearsal,” *Metacognition Learning* 7 (2012): 176.

comes to developing a singing technique over the course of a four or five year undergraduate education, spaced practice will result in more effective long-term learning.

Spacing of practice also lends itself particularly well to physical activities like singing, as muscular activity is involved in the process. Allowing time for the voice to recover from high levels of physical exertion during singing has been mentioned many times throughout history as a component of healthy singing technique. William Shakespeare writes, “To practice is to exercise certain muscles. Pause therefore after, say, a quarter or half an hour’s practice...If fatigue is felt in the breathing muscles, but not in the throat, the practice has been good, and may be repeated two or three or (later on) four times during the day.”⁵¹ Bairstow states this most elegantly, encouraging spaced practice by writing, “All who use their muscular systems in the prosecution of their daily work, as, for instance, musicians...should be aware of a few of nature’s laws...The most important one is that no movement is continuous, but alternations of work and relaxation.”⁵² Kagen reiterates this saying, “Put the song away for a few hours...After this you will be able to practice it without doing damage to it as well as to your voice.”⁵³

Manuel Garcia also writes about the advantages of spaced practice, more so from a viewpoint of promoting longevity in the singer’s instrument than for the sake of memory and performance benefits. He writes, “It is necessary, therefore, to practice moderately and to precede the physical work with mental work, in order to avoid the gropings [sic] which, instead

⁵¹ William Shakespeare, *The Art of Singing* (Pennsylvania: Oliver Ditson Company, 1921), 176.

⁵² Edward C. Bairstow and Harry Plunket Greene, *Singing Learned From Speech* (London: MacMillan and Co., 1945), 11.

⁵³ Kagen, *On Studying Singing*, 51.

of being sources of progress, serve only to fatigue the organ, even the most robust.”⁵⁴ He goes on to prescribe the following practice regimen for beginning singers:

In the first days, the students should not devote themselves to practicing more than five consecutive minutes at a time; however, the short periods can be repeated four or five times each day, separated by long intervals. Then the time devoted to the work can be increased by five minutes at a time, to be extended to a half hour, a limit which should never be surpassed. At the end of five or six months, one will be able to do four of the half-hour practices per day, but one will take care never to go beyond that; it is still well understood that these half hours will be separated by long rests.⁵⁵

1.3.4 Blocked vs Random Practice

The utilization of blocked and random practice methods are also influential in the process of learning a motor skill. These terms refer to the order in which skills are practiced. In blocked practice, one skill is repeated many times before moving onto the next. In random practice, several individual skills are practiced in succession without repetition. Titze explains, “In voice training, an example of blocked practice might be many repetitions of a specific vocal exercise before progressing to another exercise...Random practice would involve mixing up the exercises randomly.”⁵⁶

Studies have concluded that while blocked practice enhances performance immediately following practice, random practice enhances long-term learning. Laura A. Stambaugh conducted such a study on clarinet players, and her results revealed, “24 hours after completing practice, random group participants were able to play significantly faster than blocked group participants without sacrificing accuracy.”⁵⁷ The results also revealed that the performance speed

⁵⁴ Garcia, *A Complete Treatise on the Art of Singing*, 8.

⁵⁵ Garcia, *A Complete Treatise on the Art of Singing*, 9.

⁵⁶ Titze and Verdolini Abbott, *Vocology*, 234.

⁵⁷ Laura A. Stambaugh, “When Repetition Isn’t The Best Practice Strategy: Effects of Blocked and Random Practice Schedules,” *Journal of Research in Music Education* 58, no 4 (January 2011): 377.

of the blocked practice group actually deteriorated to a level similar to that of the early practice sessions.⁵⁸

Similar results were found in a study conducted by Fazeli et al., who measured skill retention following blocked and random practice regimens of golf-putters. Fazeli et al. writes, “While those engaged in the random practice method putted more poorly during acquisition (i.e. practice) than those in blocked practice, the random practice group experienced more accurate retention during the final putting trials.”⁵⁹

Studies like these reveal that repetitive drilling of a particular skill may not be the most effective method of practice for long-term retention of skill acquisition. It is important for music instructors to understand this and communicate it to students, in order to prevent relapse of skill acquisition. In his treatise *The Art of Singing* (published in 1900), Lamperti encouraged the concept of random practice by writing, “The general rule is to study moderately, and with a variety of exercises.”⁶⁰

1.3.5 Parts vs Whole Practice

In a task like learning to sing a song or aria, one must consider the most effective method for retention. Titze writes, “there is evidence that practice of component parts of a global behavior may be useful when the ultimate goal will involve performing the parts serially, one after the other.”⁶¹ Voice students may sometimes fall into the trap of always practicing a song

⁵⁸ Ibid.

⁵⁹ Davoud Fazeli, Reza Taheri Hamid, and Alireza Saberi Kakhki, “Random Versus Blocked Practice to Enhance Mental Representation in Golf Putting,” *Perceptual Motor Skills* 124, no. 3 (2017): 674.

⁶⁰ Francesco Lamperti, *The Art of Singing* (New York: Belwin Mills Publishing Corp., 1900), 18.

⁶¹ Titze and Verdolini Abbott, *Vocology*, 234.

beginning at the first measure. An alternative is to begin practicing the song at various points, ensuring that the beginning will not be learned more thoroughly than the middle or the end.

Chan et al. describes parts and whole practice in the following way: “Motor skills can be learned by practicing the whole or part of a movement. In whole practice, a skill is acquired by practicing the movement in its entirety, whereas in part practice, a task is learned by practicing its components before combining them.”⁶² In singing, this not only applies to the learning of music, but also to learning various components of vocal technique. In performance, many aspects of vocal technique ideally come together in order that a singer may demonstrate a well-functioning vocal mechanism (including respiration, phonation, resonance, articulation, and expression). It can be overwhelming and counterproductive for a young singer to practice applying all of these concepts at once. Parts practice can be demonstrated by isolating each individual component of singing, and mastering one before moving on to the next.

Chan writes, “Conceivably, by breaking down a skill into smaller parts, the physical and cognitive demands placed on a learner can be reduced for more effective learning.”⁶³ In her singing method book, Mathilde Marchesi wrote, “That in order to arrive speedily to a happy result, the teacher should present but one difficulty at a time to the pupil, overcome it as well as others, each in their natural order.”⁶⁴ This method book, *Art of Singing*, was published in 1884 and is a testament to the fact that parts practice is not a novel concept, but rather one which has been tried and true for well over a century. Music instructors must inform students of the benefits associated with parts learning, and encourage its use in the practice room.

⁶² John S. Y. Chan, Yuejia Luo, Jin H. Yan, Liuyang Cai, and Kaiping Peng, “Children’s Age Modulates the Effect of Part and Whole Practice in Motor Learning,” *Human Movement Science* 42 (2015): 261.

⁶³ Chan et al., “Children’s Age Modulates the Effect of Part and Whole Practice in Motor Learning,” 262.

⁶⁴ Mathilde Marchesi, *Bel Canto: A Theoretical and Practical Vocal Method* (New York: Dover, 1970), 2.

1.3.6 Constant vs Variable Practice

Wiseheart et al. explains that “deliberate introduction of contextual interference decreases performance during motor skill acquisition and improves later retention: however, too much contextual interference reduces retention performance, indicating that some degree of contextual interference is desirable, while too much is undesirable.”⁶⁵

In the university or conservatory setting, instrumentalists and singers often confine the extent of their practicing habitat to a practice room. While practicing one’s instrument can be successfully executed in a variety of settings, the traditional practice room is perhaps the most common. Ironically, depending on the university or conservatory setting, the practice room can be the least inspiring environment in which to uncover the secrets of an instrument. These small, mostly windowless, acoustically dead cell-like spaces are commonly located deep within the bowels of a music building away from natural light.

It is important to consider also that practice rooms are designed to be an environment in which many different instruments can be practiced in relative isolation. The problem lies in that what may be an acoustically ideal setting in which to practice trumpet is likely not going to be as ideal of a setting for an instrument like the human voice. This can result in both overexerting oneself to create a particular sound, and also in acoustic confusion due to lack of reverberation in the practice room. In an article pertaining to ideal practice room conditions, Denny Meyer explains, “properly trained musicians will adjust how they play to sound the best in each

⁶⁵ Wiseheart, D’Souza, and Chae, “Lack of Spacing Effects During Piano Learning,” 2.

space.”⁶⁶ However, undergraduate music students are not properly trained: they are still in the process of their training. It is important that they understand that how a legato passage is sung or played in a dry acoustic will be achieved in a very different way than in a reverberant environment. Students must vary the setting and circumstances of their practice in order to ease the shock of the “acoustical disconnect between a practice room and performance environment.”⁶⁷

According to Titze, “variable practice involves practicing under an array of different conditions.”⁶⁸ These conditions are not exclusively limited to physical environments in which one practices, but can also include practicing under different levels of emotional stress, practicing indoors or outdoors, and practicing in environments with varying levels and types of distractions. Titze points out that “although variable practice degrades performance during training sessions, it enhances learning.”⁶⁹ This is relevant information for music instructors to understand, and it must be communicated to students during their formative years of practice.

Several studies have been done on the effects of constant versus variable practice, most notably two studies on their effects pertaining to free-throw shooting in basketball. These study’s results are in line with Titze’s statement regarding variable practice enhancing learning, confirmed by the conclusion that “the most variable practice groups performed as well as the other groups on the retention test, despite lower practice performance.”⁷⁰

⁶⁶ Denny Meyer, “Making Practice Perfect: Effective Music Practice Rooms,” *Journal of Performing Arts Leadership in Higher Education* 2 (Fall 2011): 47.

⁶⁷ *Ibid.*, 48.

⁶⁸ Titze and Verdolini Abbott, *Vocology*, 233.

⁶⁹ Titze and Verdolini Abbott, *Vocology*, 233-234.

⁷⁰ Elizabeth L. Schoenfelt, Leslie A. Snyder, Allison E. Maue, C. Patrick McDowell, and Christopher D. Woolard, “Comparison of Constant and Variable Practice Conditions on Free-Throw Shooting,” *Perceptual and Motor Skills* 94, no. 3 (2002): 1113.

CHAPTER 2

METHODOLOGY

The research question proposed in this project was explored by means of four study objectives: (1.) the study and comparison of the practice habits of undergraduate vocal performance and piano performance majors through data collection, (2.) discussion of the science of effective practice and its effect on motor learning as it is currently understood based on scholarly research, (3.) the identification of areas pertaining to practice in which singers excel or lack comparatively to the pianists, based on the collected data, (4.) and the determination of ways in which college voice instructors can use this information to help maximize the outcome of practice in undergraduate vocal performance majors.

Participants in the data collection portion of this research were undergraduate vocal performance majors and piano performance majors, and they were recruited from approximately 70 universities, liberal arts colleges, and conservatories of music throughout the United States. Participants were all currently enrolled in a performance degree program. In order to compare the practice habits and development of knowledge pertaining to effective practice between undergraduate vocal performance majors and piano performance majors, I collected both quantitative and qualitative data by means of a questionnaire, distributed to subjects meeting the qualifications of my study (current undergraduate students majoring in vocal performance or piano performance). University institutional review board approval was obtained, and all participants gave informed consent. I designed the questionnaire to target specific areas pertaining to student's practice history and habits.

Students were recruited by direct email contact, or via direct email contact with their major professor. While it is impossible to know exactly how many students the online

questionnaire reached, approximately 400 voice and piano faculty members were contacted in the recruitment of student subjects. The qualitative data I aimed to gather included the subject's descriptions and narratives of practice methods and goals, as well as experiences with applied study on the subject's respective instrument. These questions were designed to reveal the subject's understanding and execution of practice concepts, namely the differences between *spaced* and *massed* practice, *blocked* and *random* practice, *parts* and *whole* practice, and *constant* and *variable* practice. Additionally, these questions sought to identify how, from whom, and at what point in their studies each subject first learned to practice.

The quantitative data I aimed to gather was measured in units, and included the number of years each subject has spent studying their primary instrument, the number of weekly hours spent practicing their primary instrument, and the number of method/technique books each student has used during the course of their study. Subjects were also asked to rate themselves on scales pertaining to how well they feel they understand formal, deliberate practice on their primary instrument, and whether their motivation to practice stems more from a desire to receive a particular grade or to improve their skill.

The questionnaire was created on 4 April 2018, and was open for participation through 6 July 2018.

CHAPTER 3

RESULTS

The online questionnaire was completed by 111 participants. The data being presented, however, represents 107 participants, as two participants reported that they were not currently enrolled in undergraduate degree programs, one participant did not report whether he or she was currently enrolled in an undergraduate degree program, and one participant did not specify whether piano or voice was his or her primary instrument. These four participant's responses were discarded on account of failure to comply with the instructions detailed at the beginning of the questionnaire.

Of the 107 total participants, 76 (71.03%) reported voice to be their primary instrument, and 31 (28.97%) reported piano to be their primary instrument. In describing the type of academic institution each participant currently attends, 66 participants (55.26%) reported that they attend a university, 19 (22.37%) reported that they attend a liberal arts college, and 22 (20.56%) reported that they attend a conservatory of music.

Of the 76 singers, the breakdown of class standing was as follows: 10 (13.16%) reported freshman status, 25 (32.89%) reported sophomore status, 18 (23.68%) reported junior status, 21 (27.63%) reported senior status, and 2 (2.63%) reported fifth-year senior status. Of the 31 pianists, the breakdown of class standing was as follows: 3 (9.68%) reported freshman status, 5 (16.13%) reported sophomore status, 12 (38.71%) reported junior status, 10 (32.26%) reported senior status, and 1 (3.23%) reported fifth-year senior status.

Of the 76 singers, 75 reported their age. The range of ages reported by singers was 18-24 years old, and the mean age was 20.32 years old, with a sample standard deviation of 1.33. 31

pianists reported their age. The range of ages reported by pianists was 18-30 years old, and the mean age was 20.84 years old, with a sample standard deviation of 2.25.

Survey participants were asked if they currently receive private lessons on an instrument other than their primary instrument. Of the 76 singers, 13 (17.57%) reported that they do receive private lessons on an instrument besides their primary instrument, and 61 (82.43%) reported that they do not. Of the singers who do receive private lessons on a secondary instrument, nine study piano, one studies organ, one studies both ukulele and piano, and one studies violin. The singers who reported receiving private lessons on a secondary instrument were asked how many hours per week they spend practicing their secondary instrument. The range of practice hours on the secondary instrument reported by singers was 1-14 hours with a mean of 4.7 hours per week, and a population standard deviation of 3.74.

Of the 31 pianists, 6 (19.35%) reported that they do receive private lessons on an instrument besides their primary instrument, and 25 (80.65%) reported that they do not. Of the pianists who do receive private lessons on a secondary instrument, four study voice, one studies voice and organ, and one studies trombone. The pianists who reported receiving private lessons on a secondary instrument were asked how many hours per week they spend practicing their secondary instrument. The range of practice hours on the secondary instrument reported by pianists was 0.5-5 hours with a mean of 2.93 hours per week, and a population standard deviation of 1.42.

Questionnaire participants were asked at what age they began receiving private, individual instruction on their primary instruments. The age range of singers was 6-19 years, with a mean age of 14.12 years old, and a sample standard deviation of 3.09. The age range of

pianists was 4-18 years, with a mean age of 6.23 years old, and a sample standard deviation of 2.74.

Questionnaire participants were asked how many years in total they have received private instruction on their primary instruments. Singers reported a range of 1-14 years with a mean of 6.26 years of private study, and a sample standard deviation of 2.92. Pianists reported a range of 4-23 years, with a mean of 14.52 years of private study, and a sample standard deviation of 3.41.

Questionnaire participants were asked if during the course of private study on their primary instrument they used any specific method or technique books to aid in the development of specific skills. Of the 31 pianists, 24 (77.42%) answered yes, while 7 (22.58%) answered no. Of the 76 singers, 28 (37.33%) answered yes, while 47 (62.67%) answered no.

The specific method books used by pianists, and the number of students reporting using each were as follows: Hanon (19), Czerny (9), Alfred (3), Dohnányi (2), Faber (2), Burnam (2), Liszt (2), Bastien (1), RCM (1), Schaum (1), Beringer (1), Tan (1), Phillip (1), Arrau (1), Thompson (1), Suzuki (1), and Snell (1). The most popular, Hanon, was used by 61.29 % of pianists. The second most popular, Czerny, was used by 29.03% of pianists.

The specific method books used by singers, and the number of students reporting using each were as follows: Vaccai (6), Marchesi (3), Clippenger (1), Coffin (1), Lamperti (1), RCM (1), Sieber (1), Miller (1), Ware (1), Davids and LaTour (1). The most popular, Vaccai, was used by 7.89% of singers. The second most popular, Marchesi, was used by 3.95% of singers.

Questionnaire participants were asked if their primary instrument was the first instrument on which they began receiving individual, private instruction. Of the 76 singers, 23 (30.26%) answered yes (voice was the first instrument on which they began receiving private, individual instruction), and 53 (69.74%) answered no. Of the 31 pianists, 30 (96.77%) answered yes (piano

was the first instrument on which they began receiving private, individual instruction), and 1 (3.23%) answered no. The participants who answered no to this question were subsequently asked if it is then true that the instrument on which they first learned to practice was an instrument other than their primary instrument. The one pianist answered yes, and 50 of the 53 singers answered yes.

Questionnaire participants were asked to self-assess how well they understand formal, deliberate practice on their primary instrument using a scale of 0-100, with 0 being “no understanding” and 100 being “complete understanding.” The collective averages of piano and voice were quite similar, pianists reporting a mean of 77.45 with a sample standard deviation of 13.85, and singers reporting a mean of 77.09, with a sample standard deviation of 15.46. These scores can also be broken down according to class standing, and by instrument. The results are presented in the following table.

Table 3.1: Singers and Pianists Self-Assessment of Understanding of Practice, (0-100 scale)

		n	Mean	Population Standard Deviation, σ	Range
Freshman	Voice	10	74.7	21.8	20-93
	Piano	3	72.6	7.13	63-80
Sophomore	Voice	25	74.76	14.9	15-95
	Piano	5	84.8	9	76-100
Junior	Voice	18	77.5	8.9	58-95
	Piano	12	75.92	15.33	40-90
Senior	Voice	21	81.52	15.11	32-100
	Piano	10	76.1	13.79	60-90
Fifth-Year Senior	Voice	2	67.5	17.5	50-85
	Piano	1	87	0	87

Questionnaire participants were asked who, in their estimation, first taught them how to practice their primary instrument. Pianists reported the following, and each response is followed

by the number of pianists reporting that answer: private piano teacher before college (11), private piano teacher, but unspecified when (10), mother (5), undergraduate piano teacher (2), “teacher” (1), private piano teacher and mother (1), and private piano teacher who is also my mother (1). Singers reported first learning to practice voice from a total of 21 different sources, but the top four most common responses were undergraduate voice teacher (23), high school voice teacher (18), high school choir director (6), and middle school choir director (4).

Questionnaire participants were asked at what age they were first taught to practice their primary instrument. 74 singers responded, one answered “unsure,” and one skipped the question. The age range of singers was 4-20 years old with a mean age of 14.62 years old, and a population standard deviation of 3.85. The age range of pianists was 4-18 years old with a mean age of 9.05 years, and a population standard deviation of 4.37.

Questionnaire participants were asked if their college/university program of study/department handbook specifies or mandates the number of hours students are required to practice while enrolled in lessons. Of the singers, 22 (29.33%) reported yes, 38 (50.67%) reported no, and 15 (20%) reported that they did not know. Of the pianists, 16 (51.61%) reported yes, 14 (45.16%) reported no, and 1 (3.23%) reported that they did not know. Of the students who answered yes, they were also asked to report what that requirement is. The results varied drastically. Among singers, the following requirements were all reported: 2 hours per day, 14 hours per week, 12 hours per week, 7-10 hours per week, 10 hours per week, 9 hours per week, 6-8 hours per week, 7.5 hours per week, 6 hours per week, and 2.5 hours per week, and one reported that it “varies.” Among pianists, the following requirements were all reported: 24 hours per week, 20 hours per week, 15 hours per week, 5 hours per week, 4-6 hours per day, 3-5 hours per day, 2-3 hours per day, and 3 hours per day.

Those students who indicated that their college/university program of study/department handbook specifies or mandates the number of hours students are required to practice while enrolled in lessons were also asked if they meet or exceed this requirement each week. Of the 22 singers who indicated that a specific amount of practice is mandated, 10 (45.45%) indicated that they do meet or exceed the requirement, while 12 (54.55%) indicated that they do not meet or exceed the requirement. Of the pianists who indicated that a specific amount of practice is mandated, 8 (50%) indicated that they do meet or exceed the requirement, while 8 (50%) indicated that they do not meet or exceed the requirement.

Questionnaire participants were asked if the desire to receive a particular letter grade in applied lessons influences the amount of time they spend practicing. Of all 107 participants, 105 offered responses. 42 (40%) responded yes, while 63 (60%) responded no. Of the 76 singers, 74 offered responses. 27 (36.49%) responded yes, while 47 (63.51%) responded no. Of the 31 pianists, 15 (48.39%) responded yes, while 16 (51.61%) responded no.

Questionnaire participants were asked to place themselves on a scale ranking their motivation or reason for practicing. The scale was 0 to 100, with 0 being grade-based practicing and 100 being progress-based practicing. The range of scores reported by pianists was 34-100 with a mean of 82.32, and a population standard deviation of 15.55. The range of scores reported by singers was 25-100 with a mean of 85.77, and a population standard deviation of 16.8.

Questionnaire participants were asked whether or not their practice habits changed after entering the college/university setting. Among the singers, 94.67% reported that their practice habits did change, and 5.33% reported that their practice habits did not change. Among the pianists, 100% reported that their practice habits did change.

The participants who reported that their practice habits did change after entering the college/university setting were asked if they practiced more or less after entering the college/university setting. Of the singers who answered yes, 98.57% reported that they practiced more, and 1.43% reported that they practiced less. Of the pianists who answered yes, 87.1% reported that they practiced more, while 12.9% reported that they practiced less.

Questionnaire participants were asked how many hours per week they currently practice their primary instrument. The singer's answers ranged from 0.5-20 hours per week, with a mean of 7.63 hours and a population standard deviation of 3.45. The pianist's answers ranged from 4 to 40 hours per week, with a mean of 20.39 and a population standard deviation of 8.93.

Questionnaire participants were asked to report whether they take breaks to rest while practicing, or if they practice in continuous periods. Of the singers, 72% reported that they tend to take breaks, and 28% reported that they practice in continuous periods. Of the pianists, 67.74% reported that they tend to take breaks, and 32.26% reported that they practice in continuous periods.

Questionnaire participants were asked if during a practice session in which they are focused on several tasks, do they train each task completely before moving onto the next, or do they intersperse their practice between tasks and if so, whether or not there is a predetermined order of the tasks. Of the singers, 22.67% reported that they train each task completely before moving on the next, 28% reported that they intersperse their practice between tasks with a predetermined order, and 49.33% reported that they intersperse their practice between tasks with no predetermined order. Of the pianists, 35.48% reported that they train each task completely before moving onto the next, 45.16% reported that they intersperse their practice between tasks

with a predetermined order, and 19.35% reported that they intersperse their practice between tasks with no predetermined order.

Questionnaire participants were asked if during practice of repertoire (with the ultimate goal being a complete performance), whether they break the whole into smaller components as they practice, or if they practice the repertoire only as a whole unit. Of the singers, 89.33% reported that they break the whole into smaller components, and 10.67% reported that they practice the repertoire only as a whole unit. Of the pianists, 100% reported that they break the whole into smaller components.

Questionnaire participants were asked whether or not they vary the setting and circumstance (practice space, listeners present, distractions present) of their practice from session to session. Of the singers, 60% reported that they keep the setting and circumstance constant, and 40% reported they that vary the setting and circumstance. Of the pianists, 45.16% reported that they keep the setting and circumstance constant, and 54.84% reported that they vary the setting and circumstance.

CHAPTER 4

DISCUSSION

While success in both piano performance and vocal performance relies on effective and efficient practice, the nature of each instrument and the physical implications of playing each respectively do have an effect on the sheer amount of time one can spend practicing each instrument. In this study, it became evident that undergraduate pianists spend more time practicing than singers. However, a large part of this is due to the physical limitations of the voice: pianists can practice their instrument longer than singers can without the inherent risk of physical fatigue or potential damage to their bodies. How much time a singer should spend singing each day is debatable: pedagogues have proposed various and wide-ranging opinions for several centuries. Understanding this, the discussion now presented is based on the results of the data collected in this project. The goal is to understand the differences in the practice habits of singers and pianists. Based on what is known about effective practice, this information is presented to be shared with undergraduate music performance majors in the hope that they will make the most of their practice time during their undergraduate education.

The last four questions presented in the questionnaire were designed to reveal how effectively singers and pianists put into practice what we know about *spaced* versus *massed* practice, *blocked* versus *random* practice, *parts* versus *whole* practice, and *constant* versus *variable* practice, all of which were explained in detail in chapters 1.3.3-1.3.6.

Research indicates that *spaced* practice is better for long-term retention of a skill than *massed* practice. The data collected in this questionnaire indicates that while the majority of undergraduate singers (72%) and pianists (67.74%) do favor *spaced* practice, many singers (28%) and pianists (32.36%) are still exercising *massed* practice. This percentage could be

different if students were presented with information regarding the long-term benefits of *spaced* practice, in addition to being encouraged by their major professors to use *spaced* practice. The cause of the relatively high percentage of students using *massed* practice techniques could be the pressure students feel to cram or prepare for a jury or recital, as *massed* practice is more effective for short-term learning, but at the cost of less skill retention in the long-term.

We also know from the data collected that for many pianists and singers, the academic grade they receive at the end of the semester does have an effect on their motivation to practice, rather than progress alone as motivation. This issue could be resolved if faculty members would work to eliminate the pressure felt by students to receive a particular grade, and rather put the focus on long-term skill retention. The pressure of learning and memorizing music for required juries and degree recitals, in addition to the desire (or need) to be awarded a particular letter grade can cause students to focus more on meeting requirements than on mastering the use of their respective instrument. Unfortunately, maintaining financial assistance and scholarships are often of greater importance to students than a high level of musical achievement.

Studies show that *random* practice is more beneficial for long-term skill acquisition and retention than *blocked* practice. The data collected in this project indicates that only 22.67% of singers and 35.48% of pianists are using a *blocked* method in their practicing. While these figures do not represent the majority of either group, they do indicate that a significant portion of these students are not practicing using the most effective method.

Regarding *random* practice, one might consider whether this method of practice is most effective with or without a predetermined order. Truly *random* practice does not include an order or a plan. A recent study by Dvir and Lechler indicated that project success may be more effective *without* a plan, due to the fact that the negative effects of goal changes override the

positive effects of the quality of planning. The title of the article states, “plans are nothing, changing plans is everything,”⁷¹ implying that the ability to adapt is more important for success than the ability to plan. The data collected in this project indicates that singers utilize truly *random* practice more than pianists: 49.33% of singers reported that they intersperse their practice between tasks with no predetermined order (true *random* practice), while the percentage of pianists practicing this way was 19.35%. Additionally, 28% of singers and 45.16% of pianists reported that they intersperse their practice between tasks with a predetermined order (a modified version of *random* practice that includes some planning). Naturally, more research must be done in order to determine the effectiveness of planning and order on the success of training a skill.

Researchers and musicians alike have been advocating the benefits of *parts* practice for over a century. When a skill is broken down into parts, it can reduce the mental and physical demands on the learner, resulting in more effective and efficient learning. The results of the questionnaire indicated that 100% of pianists favor *parts* practice over *whole* practice. While 89.33% of singers reported that they favor *parts* practice, 10.67% reported that they only practice repertoire as a whole unit. This leaves room for improvement.

When considering the difference between *constant* and *variable* practice, it is important to realize that while distractions do sometimes detract from immediate performance, they ultimately leave performers better prepared for future performance. The data collected in the questionnaire revealed that pianists utilize *variable* practice more than singers: 54.84% of pianists reported that they vary the setting and circumstance of their practice, while only 40% of singers reported the same. This means that 45.16% of pianists and 60% of singers utilize

⁷¹ Doy Dvir and Thomas Lechler, “Plans are Nothing, Changing Plans is Everything: The Impact of Changes on Project Success,” *Research Policy* 33 (2004): 1.

constant practice, a rate that is far too high knowing that *variable* practice is more effective long-term. Part of this is likely due to the university/college/conservatory settings, in which practice spaces are limited. Students should be encouraged to practice in a variety of spaces if they are available, not limiting their practice exclusively to a practice room. The less-than-ideal environment of practice rooms likely plays a role some students' lack of motivation to practice. In my personal experience, the practice rooms at my respective institutions of higher learning left something to be desired in terms of being inspirational and learning-conducive environments: during graduate school, the practice rooms briefly underwent a mold infestation. Who would be inspired to practice in such an environment? As a result, I made a conscious effort to practice in a variety of spaces at each schools I attended: spaces both large and small, resonant and acoustically dead, elaborate and modest. These spaces are available, either within the school or in the community, and music students should take advantage of practicing in a variety of spaces.

If such spaces do not exist at a given institution (which is unlikely), then students should be encouraged to find off-campus spaces such as auditoriums, concert halls, performance spaces, or churches in which to practice. Students should also be encouraged to occasionally invite peers and colleagues to observe them practice for even greater variation and a higher level of distraction.

One rather telling statistic was revealed by asking students whether or not their institution mandates the number of hours they practice their instrument each week. Firstly, this question revealed that there is a bit of confusion surrounding the topic: 3.23% of pianists and 20% singers reported that they are unsure if their school mandates the number of hours they practice each week. Additionally, 45.16% of pianists and 50.67% of singers reported that their schools do *not*

mandate the number of hours. This left 51.61% of pianists and 29.33% of singers reporting that their institution *does* mandate the number of hours they practice each week.

The students who reported that their institutions *do* mandate the number of hours they practice each week were subsequently asked if they meet or exceed that requirement each week. The results revealed that only 36.49% of singers and 48.39% of pianists do meet or exceed the required number of practice hours, leaving 63.51% of singers and 51.61% of pianists falling short on practice hours.

If practice is the means by which one learns a skill, why would training programs not mandate a specific number of hours of practice? Perhaps the answer is revealed in the conclusion that mandating a specific number of practice hours does not help singers or pianists meet or exceed that expectation, and the data proves that; in fact, it may even be detrimental to their number of practice hours. In my estimation, students who practice do so because they want to improve their skills, not because their institution of higher education insists that they must.

The use of method books in teaching a student to learn an instrument is also a topic well worth discussing. The data collected in this survey shows a remarkable difference in the musical training of pianists and singers regarding the use of method books: 77.42% of pianists used a method book (or more than one), while 37.33% of singers used a method book. A method is defined as “a particular form of procedure for accomplishing or approaching something, especially a systematic or established one.”⁷² There are many different method books available to aid in the cultivation of singing or playing the piano, and student’s practice habits may benefit from consistency regarding a systematic method of learning to play their instrument. In my

⁷² The New Oxford American Dictionary, 3rd ed., s.v. “Method.”

experience, I was not introduced to singing method books until the second year of my doctoral program. Furthermore, I studied piano privately beginning in grade two, and I diligently practiced Hanon exercises from a young age. The data indicates that piano method books are more commonly used (and with much more consistency: 61.3% of pianists used Hanon and 29% used Czerny) than vocal method books (7.89% of singers used Vaccai).

The difference in use of method books between pianists and singers is not due to a lack of method books for either instrument: as previously mentioned, there are many method books widely available for both piano and voice. Perhaps the difference lies in the tradition of teachers passing method books that they themselves used during their education on to their students. The question is, why have the dexterity exercises of Hanon remained so popular, while the vocalises and agility exercises of Marchesi or Lamperti (or countless others) have gone nearly extinct?

Perhaps it lies in the idea that piano technique is more objective, while singing technique is more subjective, leaving room for each voice teacher to form their own biases and opinions on voice building. Is this a reason, however, not to encourage our voice students to practice exercises taught by the teachers who trained the singers for whom Rossini, Bellini, Donizetti, and Verdi were writing their operas? Naturally, certain aspects of vocal technique can be viewed as somewhat subjective (resonance imagery, for instance), but exercises designed to build strong voices should not be viewed as subjective. It would be interesting to experience a renaissance of the distribution of vocal method books of the past few centuries, and to see how it affects the practice habits of singers. I think a more logical explanation for the disappearance of vocal method books is simply due to the fact that at some point in history, voice teachers stopped passing them on to their students; this is different than piano teachers, who continue to pass on the exercises/methods of Hanon and Czerny due their many longstanding benefits.

In terms of method, practicing piano is drastically different than practicing singing. The same could be said for any number of instruments: violin, guitar, clarinet, horn, etc. Applied music professors must consider this when we instruct our students in effective practice. A piano teacher would not assign his or her student bowing exercises, in the same way that a voice teacher would not encourage a singer to practice for six hours per day (as a piano teacher might). Teaching a student *how* to practice is also very different than encouraging a student *to* practice. The second is useless if a student does not already understand the complex task of practicing a specific instrument.

Of the students who participated in this questionnaire, 96.77% of pianists reported that piano was the first instrument on which they began receiving private, individual instruction. This means that piano was the first instrument on which they began to understand the complex task of practicing. Of the singers who participated in the questionnaire, only 30.26% reported that voice was the first instrument on which they began receiving private, individual instruction. What one can deduce from this statistic is that 69.74% of the singers who participated in this questionnaire began their applied lessons on an instrument other than voice, bringing preconceptions and understandings of practice on another instrument to their study of voice. Whether or not these practice methods from another instrument apply to effective practice of the voice is unclear (and frankly unlikely, as instruments vary so greatly). It can be understood from the data that pianists more consistently study their one, primary instrument from the beginning, whereas the majority of singers came to study voice after studying other instruments. It is so important for voice teachers, then, to help singers understand effective practice methods of voice, considering that most have preconceived notions regarding practice influenced by the study of another instrument.

Garcia's specific regimen for the practice of voice was detailed in Chapter One. In my experience of voice study, I have never encountered such a detailed practice regimen regarding the amount of time spent singing. Additionally, as a voice teacher, I have never prescribed such a detailed practice schedule to a student. Perhaps voice teachers should consider revisiting the methods of a voice pedagogue as well known as Garcia, and test out their effectiveness on current voice students. Additionally, in my own experience as an undergraduate voice performance major, I practiced singing consistently, but rarely did I do so with intentional strategies and clear goals for each practice session. In my estimation, college level music instructors must assign specific and attainable practice regimens to undergraduate performance majors in order to insure success.

CHAPTER 5

CONCLUSION

In a 2014 article from *The New Yorker*, Leon Botstein, long-time president of Bard College (my alma mater), gave insight into his pedagogical hypotheses regarding higher education. Botstein's intentions were made clear early in the article, when he was quoted stating, "Life is not about odd, tricky problems that try to cheat you out of the little you know."⁷³ This comment was in reference to Botstein's idea that the college admission process could be expanded and improved to include more real-life application of skills that would be used once a student was admitted. Botstein's quote tidily sums up my thinking on practicing: practicing does not have to be confusing or elusive. If a musician understands how to practice effectively, there is no other trick to the process.

In the article, Botstein went on to propose that students could either submit the regular application materials (test scores, teacher recommendations, G.P.A), or they could be given the opportunity to submit essays on topics predetermined by Bard College faculty members. The essays would reflect the type of work they would be expected to do once admitted to the college, and their essays would be graded by Bard College faculty members. If the students received a B-plus average (or higher) on four essays of varying topics totaling 10,000 words, they would be admitted to the college.

What academics (including applied music professors) should take from this idea (which instead of being viewed as idealistic or radical, could be viewed simply as practical) is that we must consider *why* we are asking students to do what we are asking them to do. What is the value

⁷³ Alice Gregory, "Pictures at an Institution," *New Yorker*, September 29, 2014, <https://www.newyorker.com/magazine/2014/09/29/pictures-institution>.

of a high G.P.A, a great teacher recommendation, or high standardized test scores if a student is unable to convincingly write a series of scholarly essays? Similarly, what is the point of having a student practice a certain number of hours if they do not clearly understand *what* or *how* to practice in the first place? In order to remedy this situation in the undergraduate voice studio, I propose the following three ideas.

First, voice teachers must reduce the pressure some students experience to practice in order to receive a particular grade. Though perhaps *radical*, an equally as *practical* solution would be to limit student's access to their grades in private voice studio during the course of their undergraduate education. Should a situation arise in which a student must be informed of potentially failing, the teacher should inform the student. However, as long as the student is practicing effectively and efficiently and, as a result, making appropriate progress, there should be no need to ever see a letter grade. I would be curious to know if the voice students of the *Schola Cantorum* received marks for their progress.

Secondly, voice teachers should consider increasing the use of systematic methodology in the private voice studio. The data collected in this study suggests that pianists already do this with much more consistency, and the voice studio could benefit from more structure in practicing vocalises methodologically. Many exist and are readily available for training all articulations of the voice, including *legato*, *sostenuto*, *staccato*, *messa di voce*, and the trill.

Finally, voice teachers must teach students how to effectively and efficiently practice singing. It cannot be assumed that students understand how to practice when they arrive at undergraduate institutions, no matter how talented they may be. The data collected in this project proves that there is room for improvement related to how singers understand (or do *not* understand) practicing. One solution to this problem could be the development of a mandatory

course on the skill of effective practicing for first semester vocal performance majors. This would allow all students the opportunity to learn about effective practice based on what we know from research, the importance practice will play on the cultivation of their instrument over their four to five years of undergraduate school, and an opportunity to explore the vast collection of methodology available. Additionally, students could explore applying practice techniques in front of each other, creating a workshop in which practice techniques can be explored and discussed.

CHAPTER 6

LIMITATIONS OF THE STUDY

The primary limitation of this study is the size of the body of research participants. The number of students who completed the online questionnaire represents a very small percentage of undergraduate vocal performance and piano performance majors in the United States. Additionally, the method used to recruit students leads me to the conclusion that the students who did complete the online questionnaire are likely a sample of the most ambitious, responsible, and aptitudinal music performance majors in the country, and may therefore practice more hours than students who did not complete the questionnaire. A future questionnaire might also include a means to measure student ambition.

Additionally, by having the students submit their data anonymously online, it left some room for error. Several students misread questions which, as a result, may have affected their responses. Had the data been collected via in-person interviews, questions and responses could have been immediately clarified.

A third limitation lies in the fact that students were asked to provide data related to the number of hours they practice, and this is often approximated or generalized. A truly accurate representation of number of hours practiced would require students to time their practice and report it, rather than retrospectively approximate the number of hours they practice.

CHAPTER 7

RECOMMENDATIONS FOR FUTURE RESEARCH

This project leaves much room for future research. More research should be done observing the practice of undergraduate vocal performance majors and piano performance majors, as well as the general student population of undergraduate music majors. Asking students to report data regarding their practice was the focus of this project, but observing what actually happens in the practice room through various stages of musical development could be well worth exploring.

Another area for future research would be the exploration of how the use of method books during a student's musical education affects their performance abilities and level of musicianship. My study asked students to report whether or not they used a method book during their course of study, and if so, which method book, but to find a way to measure the effectiveness of these method books would be valuable.

One might also find value in researching the development of training singers from the time of the *Schola Cantorum* to the present day university system. Certain questions beg to be asked: why are these tried and true methods of practicing—methods developed in the golden age of singing by true masters of the art form—disappearing in the twenty first century voice studio? Why has the training of singers changed so drastically with the system of higher education? How did the curriculum for training professional singers evolve from several hours per day of individual instruction aimed at the acquisition of specific skills to one hour per week of one-on-one student/teacher interaction?

Surely, the goal of training singers has not changed—voice instructors today, as well as in the seventeenth century, want[ed] students to finish their training adequately

prepared for a long and successful career as a singer, ably demonstrating beauty of tone as the result of a well functioning vocal mechanism. While this is the goal, university study in voice performance in the twenty-first century may not be ideally designed to produce this product. While students at the *Schola Cantorum* studied singing for *nine* years, most undergraduates today majoring in voice performance finish in *four to five* years. The sheer number of hours spent training does not add up to mastery. Should a singer with a bachelor's degree in vocal performance possess the talent, drive, and financial security to pursue a master's degree, he or she will graduate with a total of six to seven years of higher education training. How can voice teachers and singers expect the same results (i.e. mastery of singing) with much less time dedicated to the teaching and practicing of the art form?

The proposal I made regarding the development of a required course related to practicing for first semester undergraduate performance majors could also be explored, developed, and observed. More information pertaining to its effectiveness and the long-term benefits of its installment as a core part of the curriculum of undergraduate music performance programs could be helpful in understanding how institutions might better equip students, especially in regard to their skill development and performance ability.

APPENDIX A
IRB APPROVAL



THE OFFICE OF RESEARCH AND INNOVATION
Research and Economic Development

March 6, 2018

Dr. Stephen Austin
Student Investigator: Barrett Radziun
Department of Music Education
University of North Texas

RE: Human Subjects Application No. 18-068

Dear Dr. Austin:

In accordance with 45 CFR Part 46 Section 46.101, your study titled "A Comparative Study of the Practice Habits of Undergraduate Music Performance Majors" has been determined to qualify for an exemption from further review by the UNT Institutional Review Board (IRB).

Enclosed are the consent documents with stamped IRB approval. Since you are conducting an online study, **please copy the approved language and paste onto the first page of your online survey. You may also use the enclosed stamped document as the first page of your online survey.**

No changes may be made to your study's procedures or forms without prior written approval from the UNT IRB. Please contact The Office of Research Integrity and Compliance at 940-565-4643 if you wish to make any such changes. Any changes to your procedures or forms after 3 years will require completion of a new IRB application.

We wish you success with your study.

Sincerely,

A handwritten signature in blue ink, appearing to read "CT", enclosed in a rectangular box.

Chad Trulson, Ph.D.
Professor
Chair, Institutional Review Board

CT:jm

APPENDIX B
QUESTIONNAIRE

Purpose: This questionnaire will aid in research pertaining to the practice habits of undergraduate vocal performance and piano performance majors.

I. Program Identification

Are you currently enrolled in an undergraduate degree program, majoring in music performance?

Yes No (*If no, disregard this survey.*)

Which of the following best describes your academic institution?

University

Liberal Arts College

Conservatory of Music

What is your **primary** instrument? Voice Piano

Circle whichever best describes your class standing:

Freshman

Sophomore

Junior

Senior

Other: _____

What is your current age? _____

Do you currently receive private lessons on another instrument? Yes No

If, yes what instrument(s)? _____

If yes, how many hours per week do you currently spend practicing your secondary instrument(s)? _____

II. Musical Background

- a. At what age did you begin private, individual instruction on your **primary** instrument?
- b. How many years total have you received private, individual instruction on your **primary** instrument?
- c. Please list any other instruments on which you have received private, individual instruction, and the total number of years you pursued such instruction:
- d. During the course of private, individual instruction on your **primary** instrument, did you use any specific method/technique books to aid in the development of specific skills (i.e. articulation, scales, arpeggios, dexterity, flexibility exercises, or understanding of practice)? Yes No

If yes, which method/technique books? (*Please list all that you used*)

III. Practice

- a. Was your **primary** instrument the first instrument on which you began receiving individual, private instruction? Yes No
- b. If no, is it true that the instrument on which you first learned to practice is an instrument other than your **primary** instrument? Yes No
- c. Based solely on self-assessment, how well do you feel you understand formal, deliberate practice on your **primary** instrument? (Numerical scale 0-100)
- d. No Understanding Complete Understanding
0 100
- e. In your estimation, who *first* taught you how to practice your **primary** instrument?
- f. At what age were you *first* taught how to practice your **primary** instrument?
- g. Does your college/university program of study/department handbook specify or mandate the number of hours you are required to practice while enrolled in lessons? Yes No
- h. If yes, what is the requirement? _____
- i. If yes, do you meet this requirement every week? Yes No
- j. Does the desire to receive a particular letter-grade in your applied lessons influence the amount of time you spend practicing?
- k. Yes No
- l. Where would you place yourself on the scale of motivation/reason for practicing?
(Numerical Scale 0-100)
Grade-Based Progress-Based
0 100
- m. Did your practice habits change after entering college/university? Yes No
If yes, do you practice more or less after entering college/university?
More Less
- n. How many hours per week do you currently practice your **primary** instrument?

IV. Qualitative Data

When you practice, do you tend to take breaks to rest, or practice in continuous periods?

During a practice session in which you are focused on several tasks, do you train each task completely before moving onto the next, or do you intersperse your practice between tasks, with no predetermined order? _____

When you practice repertoire (with the ultimate goal being a complete or whole performance), do you break the whole into smaller components as you practice, or practice the repertoire only as a whole unit? _____

When you practice, do you vary the setting and circumstance (practice space, listeners present, distractions presents), or do you keep them constant? _____

BIBLIOGRAPHY

- Ackerman, P. L. "New Developments in Understanding Skilled Performance." *Association for Psychological Science* 16, no. 5 (2007): 235-239.
- Anderson, John R., Ed. *Cognitive Skills and Their Acquisition*. Hillsdale: Lawrence Erlbaum Associates, Inc., 1981.
- Austin, Stephen. "Frederic W. Root's 'Systemizing Voice Culture.'" *Journal of Singing* 66, no. 2 (November/December 2009): 201-206.
- Bairstow, Edward C., and Harry Plunket Greene. *Singing Learned From Speech*. London: MacMillan and Co., 1945.
- Bergan, Christine. "Motor Learning Principles and Voice Pedagogy: Theory and Practice." *Journal of Singing* 66, no. 4 (March/April 2010): 457-468.
- Bloom, Benjamin, Ed. *Developing Talent In Young People*. New York: Ballantine Books, 1985.
- Breslin, Gavin, Nicola J. Hodges, Andrew Steenson, and A. Mark Williams. "Constant or Variable Practice: Recreating the Especial Skill Effect." *Acta Psychologica* 140 (2012): 154-157.
- Chaffin, Roger, and Gariela Imreh. "A Comparison of Practice and Self-Report as Sources of Information About the Goals of Expert Practice." *Psychology of Music* 29 (2001): 29-69.
- Chan, John S.Y., Yuejia Luo, Jin H. Yan, Liuyang Cai, and Kaiping Peng. "Children's Age Modulates the Effect of Part and Whole Practice in Motor Learning." *Human Movement Science* 42 (2015): 261-272.
- Duey, Philip A. *Bel Canto in Its Golden Age: A Study of Its Teaching Concepts*. New York: Da Capo Press, 1980.
- Duke, Robert A., Amy L. Simmons, and Carla Davis Cash. "It's Not How Much; It's How: Characteristics of Practice Behavior and Retention of Performance Skills." *Journal of Research in Music Education* 56, no. 4 (January 2009): 310-321.
- Dvir, Dov, and Thomas Lechler. "Plans are Nothing, Changing Plans is Everything: The Impact of Changes on Project Success." *Research Policy* 33 (2004): 1-15.
- Ebin, Zarchy. "Shinichi Suzuki and Bird Song: Assessing Suzuki's Claim that Musical Talent is Not Inborn." *Canadian Music Educator* 57, no. 3 (April 2016): 18-22.
- Ericsson, K. Anders, Ralf Th. Krampe, and Clemens Tesch-Romer. "The Role of Deliberate Practice in the Acquisition of Expert Performance." *Psychological Review* 100, no. 3 (July 1993): 363-406.

- Evans, Robert J., Robert Bickel, and Edwina D. Pendarvis. "Musical Talent: Innate or Acquired? Perceptions of Students, Parents, and Teachers." *Gifted Child Quarterly* 44 no. 2 (April 2004): 80-90.
- Fazeli, Davoud, Hamid Reza Taheri, and Alireza Saberi Kakhki. "Random Versus Blocked Practice to Enhance Mental Representation in Golf Putting." *Perceptual Motor Skills* 124, no. 3 (2017): 674-688.
- Garcia, Manuel. *A Complete Treatise on the Art of Singing: Part One*. New York: Da Capo Press, 1984.
- Garcia, Manuel. *Hints on Singing*. London: Forgotten Books, 2015.
- Gladwell, Malcolm. *Outliers: The Story of Success*. New York: Back Bay Books, 2008.
- Gregory, Alice. "Pictures from an Institution," *New Yorker*, September 29, 2014.
- Hahn, Reynaldo. *On Singers and Singing*. Portland: Amadeus Press, 1990.
- Haroutounian, Joanne. "Perspectives of Musical Talent: A Study of Identification Criteria and Procedures." *High Ability Studies* 11, no. 2 (2000): 137-160.
- Helding, Lynn. "The Mind's Mirrors." *Journal of Singing* 66, no. 5 (May/June 2010): 585-589.
- Helding, Lynn. "Science and Art and True Grit." *Journal of Singing* 69, no. 1 (September/October 2012): 67-73.
- Howe, Michael J. A., Jane W. Davidson, and John A. Sloboda. "Innate Talents: Reality of Myth?" *Behavioral and Brain Sciences* 21, no. 399-407.
- Kagen, Sergius. *On Studying Singing*. New York: Rinehart & Company, Inc., 1950.
- Krampe, Ralf Th., and K. Anders Ericsson. "Maintaining Excellence: Deliberate Practice and Elite Performance in Young and Older Pianists." *Journal of Experimental Psychology* 125, no. 4 (1996): 331-359.
- Kwak, Paul E., C. Richard Stasney, Jeremy Hathaway, Charles G. Minard, and Juliana Ongkasuwan. "Knowledge, Experience, and Anxieties of Young Classical Singers in Training." *Journal of Voice* 28, no. 2 (2014): 191-195.
- Kwon, Yong Hyun, Jung Won Kwon, and Myoung Hee Lee. "Effectiveness of Motor Sequential Learning According to Practice Schedules in Health Adults: Distributed Practice Versus Massed Practice." *Journal of Physical Therapy Science* 27, no. 3 (2015): 769-772.
- Lamperti, Francesco. *The Art of Singing*. New York: Belwin Mills Publishing Corp., 1900.
- Logan, Jessica M., Alan D. Castel, Sara Haber, and Emily J. Viehman. "Metacognition and the Spacing Effect: The Role of Repetition, Feedback, and Instruction on Judgments of Learning for Massed and Spaced Rehearsal." *Metacognition Learning* 7 (2012): 175-195.

- Marchesi, Mathilde. *Art of Singing*. Boston: Oliver Ditson Company, 1884.
- Marchesi, Mathilde. *Bel Canto: A Theoretical and Practical Vocal Method*. New York: Dover, 1970.
- McCoy, Scott. "The Choir Issue: Part I." *Journal of Singing* 67, no. 3 (January-February 2011): 297-301.
- McKinney, James C. *The Diagnosis and Correct of Vocal Faults*. Long Grove: Waveland Press, 2005.
- Metcalfe, Janet, and Judy Xu. "People Mind Wander More During Massed Than Spaced Inductive Learning." *Journal of Experimental Psychology* 42, no. 6 (2016): 978-984.
- Meyer, Denny. "Making Practice Perfect: Effective Music Practice Rooms." *Journal of Performing Arts Leadership in Higher Education* 2 (Fall 2011): 44-50.
- Miller, Richard. *Training Tenor Voices*. Belmont: Schirmer Books, 1993.
- Mosing, Miriam, and Guy Madison. "Practice Does Not Make Perfect: No Causal Effect of Music Practice on Music Ability." *Psychological Science* 25, no. 9 (September 2014): 1795-1803.
- Mugitani, Ryoko, and Sadao Hiroya. "Development of Vocal Tract and Acoustic Features in Children." *Acoustical Science and Technology* 33, no. 4 (2012): 215-220.
- Nokes, Timothy J., and Stellan Ohlsson. "Comparing Multiple Paths to Mastery: What is Learned?" *Cognitive Science* 29, no. 5 (September 2005): 769-796.
- Phillips, Kenneth H. "Another Perspective: Every Child A Singer." *Music Educators Journal* 100, no. 3 (March 2014): 49-51.
- Rainero, Ruth. "Practicing Vocal Music Efficiently and Effectively: Applying 'Deliberate Practice' to a New Piece of Music." *Journal of Singing* 69, no. 2 (November/December 2012): 203-214.
- Reid, Cornelius L. *Bel Canto: Principles and Practices*. New York: The Joseph Patelson Music House, 1978.
- Root, F. W. *School of Singing: A Method At Once Simple, Comprehensible, and Complete, For Voice Development, Execution, and the Art of Singing*. Cincinnati: John Church & Co., 1873.
- Schoen, Max. "Musical Talent and Its Measurement." *The Musical Quarterly* 14, no. 2 (April 1928): 255-292.

- Schoenfelt, Elizabeth L., Leslie A. Snyder, Allison E. Maue, C. Patrick McDowell, and Christopher D. Woolard. "Comparison of Constant and Variable Practice Conditions on Free-Throw Shooting." *Perceptual and Motor Skills* 94, no. 3 (2002): 1113-1123.
- Shakespeare, William. *The Art of Singing*. Pennsylvania: Oliver Ditson Company, 1921.
- Sloboda, John A., Jane W. Davidson, Michael J. A. Howe, and Derek G. Moore. "The Role of Practice in the Development of Performing Musicians." *British Journal of Psychology* 87, no. 2 (May 1996): 287-309.
- Smeltz, Hannah. "Reframing Student Practice to Facilitate Lifelong, Joyful Musicianship." *Music Educators Journal* 99, no. 2 (December 2012): 51-55.
- Stambaugh, Laura A. "When Repetition Isn't The Best Practice Strategy: Effects of Blocked and Random Practice Schedules." *Journal of Research in Music Education* 58, no. 4 (January 2011): 368-383.
- Tetrazzini, Luisa. *How To Sing*. New York: Da Capo Press, 1975.
- Titze, Ingo R., and Katherine Verdolini Abbott. *Vocology: The Science and Practice of Voice Habilitation*. Salt Lake City: The National Center For Voice and Speech, 2012.
- Ware, Clifton. *Basics of Vocal Pedagogy: The Foundations and Process of Singing*. Boston: McGraw Hill, 1998.
- Wiseheart, Melody, Annalise A. D'Souza, and Jacey Chae. "Lack of Spacing Effects During Piano Learning." *PLoS ONE* 12, no. 8 (2017): 1-13.
<https://doi.org/10.1371/journal.pone.0182986>.