PHYSICAL PROBLEMS IN VIBRATO AMONGST FIRST-YEAR COLLEGE VIOLINISTS: A DESCRIPTIVE STUDY

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The purpose of this descriptive study was to first identify to what extent first-year college violinists physically struggle with the vibrato motion, and further, to identify physical problems within the motion that are contributing to their challenges during the learning process. The 16 participants in this study were chosen randomly from the College Music Society Directory of Music Faculties in Colleges and Universities (2013-2014 edition). Participants completed a questionnaire of 32 quantitative and qualitative questions addressing the vibrato of their 2013-2014 first-year violinists. 62% of participants’ first-year students had a physical problem with vibrato, 70% of participants’ students were working on correcting physical problems in vibrato during lessons. Participants also reported that 15% of their students were not able to create a vibrato motion at all.

Almost all professors (n=15) indicated that students with a problematic vibrato were too tense in parts of the arm or hand and this negatively affected the motion and thus, the sound. Specific problems also included vibrato being too narrow, but rarely too wide, vibrato being too fast or too slow caused by tension, problems with when and how vibrato was being applied, problems with maintaining intonation before or during use of vibrato, and problems with not understanding the motion needed or imagining an intended sound.

Most professors used movement terminology to describe physical problems with vibrato as well as aural problems with vibrato. Only a few professors discussed aural
problems in vibrato using terminology depicting the sound. Participants revealed that the most commonly used types of vibrato amongst their first-year students were arm vibrato and a combination vibrato (use of wrist, arm and finger vibratos). Most participants also listed these combined parts of finger, wrist and arm in their own definitions of a good-sounding vibrato.

Results from this study can be directed to the attention of classroom teachers, studio teacher and private instructors to these specific physical and aural problems before a student begins to study vibrato early in learning. Conclusions suggest possible ways in which the college or pre-college teacher can address these issues in students that have a problematic vibrato motion.
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CHAPTER 1
INTRODUCTION

Vibrato is one of the most prominent aural attributes of a violinist’s playing and is a crucial artistic element in their sound. As twentieth century vibrato researcher Louis Cheslock states, “‘to vibrate or not to vibrate’ can no longer be a question in violin playing….It is used by every violin virtuoso worthy of his art, and by every aspirant to virtuosity.”¹ Though the violin has many technical facets to its sound production, vibrato is wholly personal, often described as the window to the soul of the artist. Many past-and present-day recorded violinists can be identified through their vibrato as the precise motion used to vibrate differs for each person. Though vibrato method books and pedagogues all share commonalities in how to create a successful vibrato, the manner in which these steps are conveyed to the student can differ. Additionally, violinists must achieve a sound that requires physiological effort, effortlessly. As violinist and pedagogue Paul Rolland writes of vibrato, “The ultimate goal [for violinists is] a beautiful sound…with least possible effort.”² For some, the perfect combination of pedagogy, natural talent and musicality leads one to this sound effortlessly. For others, the physiological effort of creating the motion becomes a hurdle that stands in the way of musical achievement and satisfaction.

Despite it being a necessary component of a violinist’s sound today, the physical motion required to vibrate a pitch is complex and often misunderstood amongst students and teachers. The physical attributes of the motion, combined with the different

pedagogical approaches to the motion, as well as its changing and inconsistent applications throughout playing history, have made vibrato a technique worthy of study. Questions surrounding the technique have led to academic and pedagogical interest in the motion that seeks to remove these complexities from a student’s learning process.

Though there has been consistent academic interest in the technique in recent years, research targets the younger beginner to intermediate level student. This is for a good reason: vibrato is a technique that is introduced early on in a violinist’s learning process. However, a student may continue to struggle with the vibrato motion for years after their initial introduction to the technique. Physical and mental factors contribute to the success of the motion, as well as a student’s initial understanding of how the motion is created. When a mental or physical “block” occurs during the learning process, it may stay with a student even upon entering college. In conducting this study, it is my intent as a violinist, pedagogue and researcher to address the physical challenges these older students face while learning vibrato. Further, I wish to acknowledge these physical problems that may still be present within this first-year college population of violinists.

Reason for Study

There are few existing statistics within research that measure the percentage of college violin students struggling to learn and perform vibrato. The presence or success of vibrato is a challenging technique to quantify, as the many varying physiological approaches to teaching, learning and applying the technique are unique and subjective to each individual. Successful vibrato is valued by the sound that the motion creates, more than the motion itself. In order to produce this sound, however, the body must
understand a particular combination of learned motions unique to the violin. Even if the violinist approaches the technique with a desired sound, physical misunderstandings can derail this sound quickly.

My knowledge and interest in this topic comes from my own physical challenges within the motion as a young violin student; I experienced a physical block that led to a delayed learning of a successful vibrato motion. I did not achieve a good sounding vibrato until I was in my last year of undergraduate studies as a Bachelor of Music violin performance major. Though my challenges with the motion began ten years earlier as a physiological misunderstanding, years of not physically being able to vibrate cultivated a psychological aversion to the technique as I entered my undergraduate studies as an intended performance major. I had been exposed to a range of vibrato methods, including teacher-improvised methods and those existing within the vibrato methodology, all based upon the physical attributes needed in a good-sounding vibrato.

My misunderstanding of the technique existed in my knowledge of how each of the physiological components within the motion was combined to produce the desired sound. This is a gap many teachers and artists rely upon students to bridge themselves. Once the correct exercises have been introduced and practiced by the student in a series of logical steps from successful vibrato methodologies, it is expected that the student will slowly grasp the proper fluidity, speed, and width that will result in the intended musical sound. Music education researcher Rebecca MacLeod sums this up in her review of current vibrato research that has been conducted within the last century: “Much of the research reinforces activities that pedagogues have been promoting for
years. That is, most pedagogues share commonalities in their various approaches to teaching vibrato because most method books work for students. As with all violin techniques, vibrato motion is introduced by a teacher, but must be refined and practiced consistently by the student outside of the lesson. Vibrato is a trained motion and the muscles must learn the correct oscillating movements. Unfortunately, my left hand could not fluidly make these oscillating movements. The range of vibrato method exercises introduced to me by various teachers did not work, despite having been successful for their other students. I could not bridge the gap from initial learned movements to an automatic pulse.

It took me nearly ten years after vibrato was first introduced by my teacher to achieve what I now understand to be a good-sounding vibrato with all joints and muscles working in tandem to produce a motion free of physical tension. The successful motion was discovered during my final year of my undergraduate studies, though I continued to be unaware of the joints or muscles being used to initiate these oscillations. My years of frustration had led to a semester of voracious tenacity in which I forced my muscles continually to operate in a manner I thought would be successful. Though I was advised my vibrato would develop after “letting go,” “relaxing,” or “freeing the muscles in the arm,” I found that learning the motion would require a significant amount of effort that I did not comprehend earlier in my studies. My delayed use of the technique affected my undergraduate years, musically, as I did not have the physical maturity to support the musical expression.

3 Rebecca MacLeod, “Achieving an Artistic Violin Vibrato: Applications of Research to the Classroom,” American String Teacher 64, no. 2. (May 2014): 23.
My experience with learning vibrato was personal and may not be generalized onto a larger population of students my age. It is not my intent to find weaknesses in existing vibrato methodologies that may or may not work for certain individuals. Upon entering college, most violinists understand the musical impact the sound of vibrato has on their playing, but many, like me, may still find discomfort in an aspect of the motion. This discomfort may stunt the growth of a college violinist wishing to pursue music as a career. It is my wish to address this population of college violinists that continue to struggle with a good-sounding vibrato motion through the following course of study.

Need for Study

Violin vibrato requires physiological movements unique to the instrument that may not come easily to every student. The complexity in teaching and learning a natural-sounding vibrato through these movements can lead to problems within the technique. Though vibrato is often introduced to violin students at the beginner to intermediate level of instruction, many violinists continue to struggle with vibrato as they enter college as music majors. No systematic investigation has identified why these problems persist. Despite the prolific amount of literature on vibrato history, methodology and physiology, little research exists regarding problems specific to the physical motion of violin vibrato and less research on vibrato exists pertaining to students beyond high school.

Thus, there remains a need to examine vibrato more extensively at the collegiate level. Students in their first year of collegiate study are a specific and informative population in this study. Collecting data related to these entering, first-year students
have revealed to what extent problems in vibrato exist beyond high school and into college. This study identifies those problems and examines the physiological reasons that may be preventing the students from achieving a good vibrato.

Purpose

The purpose of this descriptive study was to first identify to what extent first-year college violinists physically struggle with vibrato motion, and further, to identify physical problems within the motion that are contributing to their challenges during the learning process. The results of this study direct the attention of classroom teachers, studio teachers, and private instructors to the specific physical problems early in learning that may otherwise prevent students from achieving a good vibrato. The study is a resource for both the pre-college and college teacher and serves as a building block in discovering the technical challenges in vibrato that may be preventing many students from advancing in the technique, despite their exposure to existing methodologies, prior to college. Additionally, the data from this study can supplement current vibrato teaching methods, instructing teachers about common faults in the vibrato motion that may affect students into their first year of college.

Brief Method Overview

Research data for the current study was received through a questionnaire administered to a sample of 160 violin professors at four-year colleges and universities across the United States randomly chosen from the College Music Society Directory of Faculties. The responses from the questionnaire were submitted anonymously through
the University of North Texas online survey tool, Qualtrics. The author categorized and synthesized both quantitative and qualitative survey data to find common and shared physical problems in the vibrato motion amongst first-year violin students.

Limitations

The following limitations may be applied to this study when drawing conclusions about the results. The participants in this study were sampled from all four-year colleges and universities from across the United States. This included music conservatories, but not two year colleges and thus, the results of the study must not be generalized for violin student populations at all institutions post-high school. Though many participants questioned in this study taught violin and viola, the questions only pertained to the first-year violin students and thus, the results of this study should not be considered applicable for first-year violists.

The participants in this study were asked to complete the questionnaire with their fall 2013- spring 2014 first-year violin students in mind even though the study was conducted during the fall 2014 semester. This request was made so the participants had a full year of experience with the students before making assessments about their vibrato motion(s). There was no attempt made by the researcher to enforce this request and therefore, it is possible that participants may have mistakenly or purposely used their current student body (2014-2015) to complete the questionnaire. It is also possible that participants had trouble remembering the details of their students from the previous year.
The participants were asked to categorize their students’ vibrato into the four categories of wrist, arm, finger, or combination vibrato type. Though the types of vibrato have been documented in a review of literature, the researcher had no way to ensure the participants shared the same physiological definitions of each type. It was assumed as such when assessing the answers to these questions, but this is a consideration when interpreting the results of this study.

Participants were asked to answer the questionnaire using all of their first year college violinists. I made no attempt to distinguish the intended music majors from the non-majors. That is, each professor throughout the questionnaire considered all violinists enrolled in lessons for their first year equally. Therefore, the results of this study should not be solely applied to music-major violinists and instead, should be considered for all violinists leaving high school and entering their first year of study within a four-year college or university.

Finally, the sample of participants was randomly chosen from a pool of four-year college professors from music programs of varying sizes, levels and reputations. The responding sample was smaller than expected and may or may not have included all expert, highly experienced teachers. For this reason, participants’ responses within this study may not be entirely representative of all violin professors teaching within four-year college music programs. It is important to consider this when interpreting the results of this study.
CHAPTER 2

REVIEW OF LITERATURE

Vibrato first became the subject of empirical research during the early part of the twentieth century by psychiatrist Carl E. Seashore. Seashore’s early studies in his laboratory at the University of Iowa yielded a definition applicable to all artists: “A good vibrato in music is a periodic pulsation, generally involving pitch, intensity, and timbre, which produces a pleasing flexibility, mellowness and richness of tone.”\(^4\) In his studies, Seashore acknowledged the challenges behind vibrato and why it had not been universally understood or explained before his research. He summarized that performing vibrato is very different from how vibrato is heard.\(^5\) Vibrato research grew throughout the twentieth-century in an attempt to give a physiological explanation of the sound of vibrato.

The importance of vibrato as a technical skill for all violinists has been well documented by pedagogues and researchers throughout the twentieth-century. It is a skill that is included in most major group and private string teaching curricula. The most well-known violin pedagogues have included vibrato in their playing and teaching treatises. Vibrato has become the topic of academic studies and dissertations in recent years, as the trend to synthesize the many varying pedagogical approaches to the technique has increased.

Vibrato research has broadened the repertoire of knowledge and brought awareness to the technique, but the motion continues to challenge teachers and students. Research that addresses problems with this “most confused and least


\(^5\) Ibid., 55-56.
understood technique on the violin” can be divided into three main categories. The first category is a historical overview of the application and use of vibrato within violin playing in order to further understand the physiological intricacies of the technique today. No longer just used as ornamentation as in the Baroque period, today vibrato is a staple of the modern violin sound. Though continuous use of vibrato is standardized across violin playing today, its growth as a technique has been inconsistent and subjective. Furthermore, changes in the violin’s build, structure, set-up and position have led to changes in the physiological relationship between player and instrument that may have an affect on the vibrato motion.

The second category, methodology, includes the varying array of teaching methods and pedagogical approaches to the motion, which have created inconsistencies within the literature. The universal agreement is that vibrato is important, but there is no standardized method to use; “while many pedagogues share similar definitions of the different types of vibrato, they often differ in which type to teach first and whether the different kinds can even be taught independently of the others.”

This conflict has influenced much of today’s existing research on violin vibrato.

The third category is the physiological understanding of how vibrato is performed. Though most pedagogues have recognized the different types of vibrato that occur between the arm, wrist, and finger, there is not always an explanation as to how these joints move or how the body reacts while vibrating. As Hauck wrote in his study on the

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physicalities of violin vibrato: “Above all, it seemed essential to attack and remove the imponderables of vibrato technique and to make available physiological data supporting the assertion that it can be taught.”9 Physiological blocks or problems in the early stages of learning may prevent the student from mastering the technique, regardless of a prescribed teaching method.

Historical Overview of Application and Use

Vibrato has been present within Western music throughout the history of violin playing; yet its technique, application and use has changed dramatically.10 The most marked change that has taken place is its transition from an ornamental technique, most prominent during the Baroque era, to its emergence during the twentieth-century as a continuous technique, emphasizing the lyrical quality of the violin.11 Though there has been a recent return to its ornamental use as historically informed performance practice has grown, the twentieth-century’s modern violin vibrato is still used continuously within both solo and orchestral playing.12 The development of vibrato has been inconsistent, which has led to many subjective applications of the technique. Its sound and use has changed throughout the history of violin playing, which has made the pedagogical aspects of this technique challenging.

During the Baroque era, early violinist and pedagogue, Francesco Geminiani described vibrato as “a close shake” that was used “as often as possible.”\textsuperscript{13} The narrow, fast, shaky quality of vibrato was popular during this time as the hand and arm may not have been as free to make a wider motion. However, treatises on the topic varied in their approach to its use and how it should sound. Both Georg Muffat and Leopold Mozart agreed that the music does not benefit from an overuse of the technique and Muffat felt the wavering or shake of the pitch affected the intonation of the player.\textsuperscript{14}

The Classical era saw little change in the use of vibrato, though the speed and oscillation width (intensity) of the motion became more varied. Vibrato continued to be used as an ornament and was applied to held notes at the ends of phrases, or to notes preceding cadenzas.\textsuperscript{15} Selective use of vibrato was linked with musical elements to assist the player in expressing the overall character or musical directions of a piece. Vibratos also varied in intensity, though the pulsation was overall far narrower and tighter than the modern pitch oscillation. The amplitude and speed was less intense than the vibratos of today since players did not vibrate with any part of the lower arm; only with the hand/wrist.\textsuperscript{16} This historical difference may suggest a relationship between the intensity of the vibrato motion and the use of the arm in the motion; however, existing research and pedagogical literature does not reveal this association in modern violinists. In his investigations during the early twentieth century, researcher Louis Cheslock discovered that the intensity of the motion did not depend on the use of wrist versus arm. Through his light-method observations, he found “a slight arm participation

\textsuperscript{13} Brown and Sadie, \textit{Performance Practice}, 58.
\textsuperscript{14} Ibid.
\textsuperscript{15} Brown and Sadie, \textit{Performance Practice}, 246.
\textsuperscript{16} Ibid.
even in the purest so-called ‘wrist vibrato; an observation strengthened by many pedagogues throughout the twentieth century.’" 17 Though there is no evidence to assume that use of the arm increased vibrato intensity during the early Classical period, it is clear that the physiological approach to the motion began to change.

The definition and use of vibrato expanded even further into the nineteenth-century. Selective and ornamental use based upon the musical landscape continued. As melodies began to expand, violinists began using vibrato to emphasize cantabile playing as well.18 Prolific composer and violinist Louis Spohr recognized the increasing and varying use of vibrato within the repertoire and categorized them into four different types: a fast vibrato for accented notes, a slow vibrato for sustained pitches within a melody, an accelerating vibrato within a crescendo and a decelerating vibrato within a decrescendo. Spohr also recommended that the vibrato be used sparingly throughout.19

Violinists began increasing their use of vibrato and changing their sound towards the end of the nineteenth century, inspired by one of the century’s leading virtuosos. Composer, performer and pedagogue Eugene Ysaye established the modern violin sound that quickly became a mimicked standard amongst violinists. His expressive and melodic use of vibrato within lyrical passages brought a bolder sound into popularity. This more continuous use of the technique became favored over the earlier strict ornamental use, though vibrato was still limited to slow passages.20

The first part of the twentieth-century saw significant change in the use of vibrato; however, the topic was highly subjective amongst major pedagogues and performers of

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19 Ibid.
the time. Ornamental use of vibrato did not disappear and many violinists were still advocating its use over continuous vibrato. Leopold Auer, the highly influential Hungarian pedagogue who helped to establish modern violin playing in the United States, was in favor of the former ornamental style of vibrato and insisted his students not over-use the technique throughout their playing.\(^\text{21}\) Thus, the controversial topic did not follow a clear line of development towards continuous use during the early part of the twentieth-century. Despite these two different trends within the technique, teaching manuals, beginning in 1920, started advocating the use of continuous vibrato.\(^\text{22}\)

Ornamental use of the technique faded with the help of violin virtuoso, Fritz Kreisler during the 1930s. Kreisler expanded the use of vibrato into fast technical passages and ushered in the most modern use of continuous vibrato heard today.\(^\text{23}\) Vibrato became a component of a violinist’s tone and defined the personality and expressiveness of a player. In addition to left and right hand technical agility and precision, vibrato use became the stamp of a violin virtuoso. Today, the modern sound of vibrato is varied and personalized from player to player and is used consistently and thoroughly. Violinists are expected to have varying speeds and sounds to their vibrato that match the musical affect. As a technique, vibrato reveals the technical ability of the player and allows the musical expressiveness of a player to be heard.

Today, modern use of vibrato is a combination of continuous and ornamental, depending on the musical intentions of the performer, though unintended selective use of the technique is avoided. It is also expected that every violinist today is able to create

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\(^{22}\) Ibid.  
\(^{23}\) Ibid.
a singing, lyrical tone through the application of the technique. Today’s violinist is not complete without a continuous, good-sounding vibrato.

The evolution of sound and use in vibrato from the Baroque era to present day is a reflection of the musical practices of the time, but is also linked to its emerging role as a solo virtuosic instrument. As the violin grew in popularity amongst composers and performers, modifications in how the instrument was held and played were necessary in order to keep up with the increasing technical demands upon the player. As the use of vibrato increased throughout the nineteenth and twentieth centuries, so did the physiological demands upon the player. These physiological demands drew attention to a proper alignment and set-up that was needed for a continuous vibrato movement, as well as more virtuosic left and right hand technique. A prominent difference between the Baroque position and the modern position today is the absence of a chin rest and shoulder rest, though the level of shoulder support differs for every modern player. If a player is not technically impeded by the absence of a shoulder rest, it may not be a requirement.

With the invention of the chin rest in 1820, Louis Spohr helped to shift the position of the violin to the left, closer to the shoulder. The placement of the chin rest partially shifted the support of the instrument out of the left hand and helped alleviate the weight of the instrument in the hand. This allowed for freer movements by the left wrist and fingers and allowed for more virtuosic and expressive playing.24

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technical demands upon violinists increased, so did the need for increased mobility and range of the left hand and arm up a longer fingerboard.

In 1834 violin virtuoso and pedagogue Pierre Baillot introduced the idea of using shoulder support to further assist the violinist in shifting the weight of the instrument out of the left hand and in keeping it in a higher position upon the shoulder. The use of any type of pad or cushion support between the instrument and the top of the shoulder helped the player correctly hold the instrument after the addition of the chin rest. The present day shoulder rest became a widely used accessory amongst violinists during the mid-twentieth century and has more recently been targeted as being a source of tension, not release, within the neck and shoulders. Some of today’s pedagogues have been in support of removing the shoulder rest from the violin in an attempt to lessen the need of shoulder support in a student’s playing as “ironically, the shoulder rest has come to increase tension for many violinists.” However, playing without a shoulder rest requires more left hand support to avoid lifting and tightening the shoulder. Because of this tendency, many violinists still find the assistance of a shoulder rest to be beneficial in removing any adverse tension from the left side while playing.

Despite the varying views on the topic of support and set-up, most violinists and pedagogues agree that excessive tension accumulated throughout the left hand, arm, and shoulder affects the technical capabilities of a player. More specific to this current study, left side tension can significantly affect the sound and success of vibrato. In a review of violin treatises and pedagogical sources, discussions of good-sounding vibrato nearly always include the importance of freeing up the left hand, arm, and

25 Boyden et al., “Violin.”
26 Ibid.
shoulder. In his initial scientific investigations of violin vibrato in 1931, Louis Cheslock even concluded that the violinist “must hold the violin without [any] left hand support.” In their pedagogical treatise for violinists and violists, Rolland and Mutschler emphasize the importance of not holding tension in the finger joints and wrist, as this will make vibrato “impossible.” Galamian also writes that the hand must never squeeze the neck of the violin and stresses the importance of teachers to loosen the hand of the student before continuing with vibrato study. Though pedagogues and treatises differ in their approach to violin set-up, most infer that position must not be the source of tension. Though violinists may achieve a good-sounding vibrato with various levels of support on the left side, most researchers and pedagogues are in agreement that excess tension on the left side can lead to problems in the vibrato movement.

Methodology

Teaching literature on vibrato may be separated into two categories: method books that have been written for use in private or group class settings, and pedagogical principles of the master teacher. Both provide a resource for the teacher and student. The level of detail and physiological explanation in each, however, varies significantly. Overall, methodology resources lack thorough investigations into the physiological and muscular intricacies. Szende and Nemessuri observed this weakness within methodologies of the time in 1971: “[Methodological literature of the violin] neglects the

27 Cheslock. Research Studies in Music, 44.
study of muscular functions involved.” Additionally, the opinion on what kind of vibrato should be achieved can also vary. The consistent goal between pedagogues remains the same: vibrato should achieve a beautiful, natural, singing tone.

Today’s popular method books used in classrooms include Samuel Applebaum’s *String Builder*, Gerald Fischbach and Robert Frost’s *Viva Vibrato!*, the Suzuki Method, Elizabeth Green’s *Teaching Stringed Instruments in Classes*, Simon Fischer’s *Basics* and Paul Rolland and Martha Mutschler’s *The Teaching of Action in String Playing*. All books combine text with musical exercises, which explain how the motion should be initiated and the goal of each step. Also, all are especially intended for the beginner to intermediate class teacher, but are useful in any teaching situation.

Of these method books, *Viva Vibrato!*, *The Teaching of Action in String Playing*, and *Basics* provide the most thorough approach to teaching and learning vibrato. Fischbach and Frost provide vibrato exercises to all string instruments (violin, viola, cello, bass) in their *Viva Vibrato!* method books with the simple goal of creating “a well-balanced vibrato [that] can actually make playing feel easier, by helping the left hand and arm stay well aligned and balanced.” The violin method begins with a “vibrato readiness checklist” that allows the pedagogue or instructor to decide if the student is ready to begin the advanced technique. The checklist addresses identifying tension within the shoulder, arm, and hand (thumb and fingers) with exercises before the student begins to learn the vibrato motion. The exercises include “swinging exercises” to and from the instrument to loosen the entire arm as well as “tapping” exercises with

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the thumb and fingers to cultivate a loose approach to the string. The successive vibrato exercises within the section, “The Birth of a Vibrato” involve rhythmic exercises initiated by the palm of the hand in playing position as well as in a modified “banjo” position.32

Though Fischbach and Frost do not introduce a specific type of vibrato (finger, wrist, or arm) their exercises infer that the motion involves the flexibility of all the major muscles and joints of the left arm and hand with the operating motion coming from the “waving” motion of the wrist.33 Short compositions follow the written and photographed exercises to allow the student to “help [the] newborn vibrato become mature in several important ways.”34 The end goal of the method book is to provide teachers with a resource to help students develop a mature, artistic vibrato that reaches beyond a physical motion to an expressive, musical technique.

Rolland and Mutschler recognize that problems in vibrato arise out of tension or a fault within the motion and thus, their teaching recommendations also begin with a series of relaxation studies involving the wrist, arm, and shoulder. The following steps build upon each other, beginning with a simple tapping motion then moving to finger, hand (wrist) and arm fluctuations. These building blocks are preparing for the complete vibrato motion, which Rolland and Mutschler believe to be a combination of finger, wrist, and arm vibratos.

Simon Fischer also approaches the teaching of vibrato through both arm and hand vibrato “since each contains elements of the other.”35 His exercises begin with work on the “flexibility,” or bending, of both the first joint and the base knuckle joint of

32 Fischbach and Frost, Viva Vibrato!, 5.
33 Ibid., 7.
34 Ibid., 12.
the left hand. These building blocks for the motion then lead to exercises in hand and arm movements that begin with “sliding movements” up and down the string. Fischer describes the beginning motion of hand vibrato as moving “up and down the string from the wrist, without actively moving the arm and…lead[ing] the movement with the finger.”36 The beginning motion of arm vibrato is described by “mov[ing] the arm and hand together” and “although the main movement is from the elbow, keep the wrist very relaxed” and again, “lead the movement with the finger.”37 Though Fischer acknowledges the difference between a wrist and an arm vibrato, he supports the use of both in achieving a good vibrato and discusses each vibrato as a combination of movements from the finger, wrist, and arm.

This “combination vibrato” is in congruence with most master teachers and is supported by the earlier physiological examinations of vibrato motion by Cheslock and Szende and Nemessuri.38 Rolland and Mutschler conclude with instruction on vibrato frequency, speed, amplitude and timing control. The texts of Fishbach and Frost and Rolland and Mutschler are very similar in approach and theory, however the design and organization of Viva Vibrato! is intended for orchestra classes and group settings, as well as private studios. Additionally, Viva Vibrato! for violin is written as part of a series including vibrato instruction for all four stringed instruments. This uniformity across instrumentation makes it a method book appropriate for orchestra class teachers in charge of all string instruction.

36 Fischer, Basics, 216.
37 Ibid.
38 Cheslock, Research Studies in Music, 34; Szende and Nemessuri, The Physiology of Violin Playing, 68.
Suzuki and Green are less descriptive in their approach to learning vibrato. In her book, *Teaching Stringed Instruments in Classes*, Green provides a teaching resource that may also be used in a class with upper and lower strings.\(^{39}\) Her violin vibrato instruction, in contrast with Rolland and Mutschler and Fischbach and Frost, approaches the motion only from the wrist and advises the student use the edge of the violin (in third position) to stabilize the arm so the wrist can act as a hinge for the hand to move.\(^{40}\) Though she advises that the teacher be wary of the student “clutching the instrument,” her exercises make no mention of tension or relaxation. Once the student has “perfected [the vibrato] on each finger in third position, [the student] should be able to just transfer this motion to first position.”\(^{41}\) Green’s less thorough approach may present problems for the teacher or student within a class setting, unless one has previous knowledge of the motion to supplement group learning.

Like Green, Suzuki introduces vibrato in volume 3 of his method books as a motion that initiates from the wrist.\(^{42}\) His exercises instruct the student to roll the finger back by half-step, using written pitches for the student to follow. This motion is not mentioned as being assisted by the arm in any way. Suzuki’s written exercises are similar to Rolland’s “pivoting shifts” in which the student oscillates the finger joint above and below a central pitch by half step.\(^{43}\) Vibrato speed is increased rhythmically


\(^{40}\) Ibid., 75.

\(^{41}\) Green, *Teaching Stringed Instruments in Classes*, 75.


beginning with oscillations by quarter note and ending with sixteenth notes, a common written approach amongst pedagogues to increase the speed of the motion.

The most notable pedagogical guidebooks written by master teachers include Carl Flesch’s *The Art of Violin Playing*, Ivan Galamian’s *The Art of Violin Playing*, Yehudi Menuhin and William Primrose’s *Violin and Viola*, Leopold Auer’s *Violin Playing As I Teach It* as well as Samuel Applebaum’s *With the Artists*. The latter consists of discussions with world-famous string players about their playing and teaching. This text is less traditional, but can still serve as a pedagogical resource for the student or teacher. Galamian’s *The Art of Violin Playing*, though not considered a popular classroom method book, is a well-known reference for private studio teachers, providing readers with a section on vibrato in the chapter titled, “Left Hand.” The chapter provides narrated description of the motion with pictures to illustrate the position of the hand and wrist upon the violin during the motion. It also provides examples of rhythms that can be used in the learning stages of the motion. Galamian advocates the use of all types of vibrato writing, “The schools are, at present, divided on the question of what is the right form of vibrato….Each of [the] three types has its characteristics, and I feel that because of their different color possibilities all three should be developed and used.” Thus, he provides written explanation of learning each type of vibrato: finger, wrist, and arm.44

The guidebooks may be less approachable by the classroom teacher needing an organized lesson plan for the technique. Instead, the books provide a general discussion for teachers and students on how to begin and build upon the motion of vibrato with less step-by-step instruction for the student or teacher.

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Most methods begin the initial vibrato studies in third position to provide support for the hand and wrist. All emphasize the flexible wrist as the core of the oscillating sound, while Galamian, Flesch and Applebaum, all advocate use of a combination of the three types (finger, wrist, arm) for a good vibrato. Though these methods physically guide the student through the motion, only Flesch discusses the problems of motion technique that arise with violin vibrato and it is within the context of vibrato type. In the Art of Violin Playing, Flesch poses problems “to do away with,” including “the over-close finger vibrato,” “the over-broad wrist vibrato,” “the over-stiff lower arm vibrato.” In order to avoid these problems, Flesch suggests that no single type should be used independently as each type balances the motion and negative tendencies of another.

Since 2000, recent studies have sought to address contradictions in the pedagogical literature surrounding the physicalities of vibrato motion. Geringer, Allen, and MacLeod studied high school and university violin and cello students to see in what direction their vibrato first initiated and to see if the center of the pitch was altered based on this initial movement. Their results conflicted with the recommendations of pedagogues Galamian, Green, and Fischer whose teachings advise their students to begin the motion backwards from the pitch center and to never oscillate above the pitch center to maintain correct intonation. Fischer made this point especially clear, claiming that individuals who teach a student to vibrate both above and below the note are falling victim to a persistent “myth” that exists to the present day.

47 Ibid., 36
Based upon the findings of Geringer, Allen and MacLeod, all players vibrated above and below the pitch without it being altered significantly, proving that the present-day “myth” - vibrating both above and below a desired pitch will result in poor intonation - is not true.50 The results of the study were in agreement with Seashore’s earlier finding that during oscillations, the center of the pitch is heard.”51 These results were also in agreement with the findings of Ho, Lin, Chen, and Tsai who used a computer-based vibrato analysis system to determine that expert violinists vibrated both above and below the pitch, fairly equally.52 Geringer, Allen, and MacLeod repeated their findings in subsequent studies with violin and cello students at the high school and university levels.53

Most recently, MacLeod synthesized and applied her earlier studies with Geringer and Allen in an article as a resource for classroom and studio pedagogues. Drawing upon “research conducted during the last century relative to vibrato performance practice,” MacLeod reviewed discrepancies and multiple views of the following researched elements: pitch center, vibrato rate, vibrato width, initial direction of vibrato motion and continuity of the motion.54 The conclusion of this article cites the idea that the reviewed existing research on these areas of vibrato motion supports pedagogical strategies in teaching and learning vibrato that have already been

50 Ibid., 249.
54 Rebecca B. MacLeod, “Achieving an Artistic Violin Vibrato: Applications of Research to the Classroom,” American String Teacher, 64, no. 2 (May 2014): 18.
documented. Proper instrument and left hand set up early on in learning will allow a more successful utilization of vibrato.\textsuperscript{55} MacLeod’s article highlights the relevance of vibrato within the private studio and classroom and acknowledges existing pedagogical literature that can be used to achieve a good-sounding vibrato. However, despite the existing resources, students may still misunderstand the complex motion required to achieve a good-sounding vibrato.

Past dissertations on violin vibrato have mainly resulted in pedagogical guides for the beginner and intermediate upper-string teacher. Citing a need for “known pedagogical sources available to assist the teacher or performer in developing the technique,” Lee sought to provide teachers with a resource that incorporated physiological principles and pedagogical methods of vibrato.\textsuperscript{56} His interviews with teachers found that a unified method of teaching vibrato could not be attained. The researcher also found that it was “impossible to incorporate all the opinions of the different pedagogues” due to contradicting ideas regarding teaching methods and physiological beliefs about the technique.\textsuperscript{57} His study did not achieve a standardized guide for teachers and performers.

Many additional authors have been influenced in their writing by a need for further understanding of the pedagogical approaches to teaching and learning vibrato in the classroom. Redlinger and Shepherd both examined string orchestra students in high school and middle school, respectively, suggesting elements to study that may be more

\textsuperscript{55} Ibid., 26.
\textsuperscript{56} Ka-Won Lee, “An Investigation of Left-Hand Vibrato Technique on the Violin” (PhD diss., Columbia University Teachers College, 1999), i.
\textsuperscript{57} Ibid., 209.
Redlinger found that vibrato was taught more successfully with enough time spent on the instruction - at least four weeks. Shepherd found the use of video recording technology to be of particular help in order to extend instruction outside the classroom or studio environment. Both studies effectively proposed ways to bridge the gap between the existing knowledge available to teachers on vibrato and the success of their students with it. However, there remains a need to address physical problems that may prevent a student from achieving a natural sounding vibrato, regardless of the time and the resources available.

Physiology

The study of the relationship between body movement and violin playing began gaining importance towards the second half of the twentieth-century in efforts to provide unbiased points of reference for players and teachers. Though methodologies may differ widely in their approach to playing, none can avoid the topic of the necessary physicalities involved. Szende and Nemessuri explain their interest in violin physiology from this perspective: “An artistic performance is a senso-motor activity….It is no mere accident that all instrumental methodologies devote some space to the question of motor physiology.” Researchers studying the physiology of vibrato recognize the pedagogical benefits this analysis may have for violinists since many existing methodologies make no mention of specific muscles that are used while vibrating.

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58 Christopher Redlinger, “Review and Analysis of Violin Vibrato Pedagogy With Beginning Violin Students” (DMA diss., University of Houston, 2000), vi.
60 Szende and Nemessuri, The Physiology of Violin Playing, 13.
61 Ibid., 68.
The physiological studies of violin vibrato by Hauck, Cheslock, Seashore and Szende and Nemessuri take a more scientific approach and explanation to the technique than exists in method literature. Examinations of a successful, good vibrato by way of a measuring instrument have revealed that the motion is a “general bodily vibration” and can incorporate muscles all the way up the arm, into the shoulder joint and in the chest. 62 Szende and Nemessuri’s observations revealed that the process of learning vibrato involves the development of two sets of “muscle rows” in the shoulder, upper arm and lower arm that must be stimulated to become active.63 All observed that a coordinated motion resulting in a good vibrating tone was free of tension in any joint of the arm or hand. This is in agreement with pedagogues and master teachers that a student will be without vibrato as long as the muscles are not free. Additionally implied was the idea that the motion cannot be segregated to one part of the hand or arm as there is an “interplay of the neighboring muscles,” which produces motion of all types.64

Galamian, Rolland and Mutschler, Fischbach and Frost, Menuhin and Applebaum all observe that a good vibrato motion employs the use of more than one joint, while both Menuhin and Galamian also recognize that this happens naturally when one muscle group is engaged to create the motion. If more than one major muscle group is activated (as if to isolate the movement of a certain joint), the result is a “seize” rather than a relaxed oscillation.65 This popular pedagogical belief was reinforced in Cheslock’s study using light-bulb sensory mechanisms when he discovered that one

63 Szende and Nemessuri, *The Physiology of Violin Playing*, 68.
“cannot have complete isolation [of movement] in one joint” and “[There will be] a slight arm participation in even the purest so-called ‘wrist-vibrato.’”66

Despite these early scientific studies into vibrato motion, there remain gaps in the research. Cheslock’s study examined seven experienced violinists to document the components of a “typical vibrato motion.”67 Although this is a valuable observation, the problems in vibrato motion need to be examined with the same thoroughness. Seashore’s Scientific Approach to Musical Esthetics encourages the student to rely on the “automatic nature of vibrato,” describing vibrato as the “most natural and essential of musical ornaments.”68 While most research and pedagogy is in agreement of it as an essential technique, there is a disconnect between the goal of achieving a “natural sound” by way of, for many, an unnatural movement that can lead to problems within the technique.

Few authors in the existing literature have examined problematic vibratos. Sabrina Green addressed problems in vibrato development amongst junior high students. The reason for her study was familiar: the prolific amount of different teaching methods for vibrato confused the beginning music teacher. The study provided a “best-approach” guide for the intermediate-level violin student.69

Green surveyed private lesson and public school violin teachers on their preferred vibrato teaching method and found that a wrist vibrato was most endorsed and thus, may be the best method to use for the beginning junior high student. Additionally, the author provided a list of “common vibrato faults” with a guideline on

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66 Cheslock, Research Studies in Music, 34.
67 Ibid., 40.
68 Seashore, In Search of Beauty in Music, 61.
69 S. Green, “Problems in Vibrato Development for the Junior High School Violin Class,” 1.
how each should be fixed. The list included problems with: speed, width (too narrow),
pitch, direction of motion, tension within the left wrist hand and fingers, coordination,
continuity, use, sound quality and problems with intonation while vibrating, but the
source of her list was not revealed.\textsuperscript{70} Green’s recommendations to the instructor
included having to be prepared to work with individual student problems and using an
individualized approach to find the teaching method that best suits the student. Despite
her efforts, the author was not able to find a standardized “best-approach” method that
could be applied to the intermediate-level student.

As demonstrated by the above review of literature, extant research investigating
vibrato focuses predominantly on the beginner to intermediate student. This is perhaps
not surprising, as this is the appropriate level to begin the study of vibrato. Students
wishing to pursue music at the advanced college level have most often developed their
vibrato successfully through their intermediate training. However, physical problems that
remain unsolved in earlier learning may continue to plague the student beyond high
school. For these students, college becomes an especially revealing environment.

\footnotesize{\textsuperscript{70} Ibid., 36-37.}
CHAPTER 3

METHOD

The design of this descriptive study was intended to collect a spectrum of data on existing physical problems with vibrato amongst the first year college population of violinists. My research is intended to present these problems to a benefitting audience of students and educators by simply “obtaining data to determine specific characteristics of a group.”\(^7\) Survey research was conducive to this topic as it allowed me to draw my purposive sample from a wide geographic pool of professors across the United States through written questionnaires. Since vibrato is a learned violin technique, I chose to access my data through the college professor in observation of their students within a natural learning environment. For this reason the professor, not the student, was my participant.

Sample

The responding sample consisted of 16 violin professors from four-year schools across the United States. Though 25 violin professors submitted questionnaires, only 16 completed the initial demographic questions and continued on to complete at least one part of the questionnaire. Nine incomplete questionnaires were submitted. This was most likely unintentional due to the design of the online tool (Qualtrics), which submitted the results automatically once the participant scrolled to the end of the document.

During the report of results from each portion of the questionnaire, \(N\) must be recognized, as it decreases throughout the progressing sections of the questionnaire.

During the first demographic portion of the questionnaire, \( N = 16 \), but decreases to 15 during the second quantitative portion. During part three, \( N = 16 \), but decreases to 15 during the last three open-ended questions of the section. The last part of the questionnaire received the lowest response rate from participants due to incomplete submissions. During the last part of the questionnaire, \( N = 14 \) throughout, except for the open-ended questions following each Likert response where \( N \) fluctuates between 8 and 13, depending on the question. These changes in \( N \) will be clarified throughout the report of results.

The participants included in the study did not include professors of two-year colleges in order to provide results from what might be considered a normal population of schools, without outliers. Participants included both part-time (adjunct) and full-time faculty status. The selected sample population of 165 professors was chosen via a random number generator from the College Music Society Directory of Music Faculties list of 1261 violin professors. This particular sample was chosen deliberately and purposefully to allow for a more representative set of data on issues related to physiological vibrato problems at the collegiate level.

Data Collection

A questionnaire was electronically administered to the sample population to identify and describe physical problems in vibrato experienced by their 2013-2014 pool of first-year students. The questionnaire was designed and administered through the University of North Texas online survey software, Qualtrics. Participants were emailed an anonymous link to access the online questionnaire. The questionnaire was
constructed using a literature review on the physiological analysis of violin vibrato as well as common and literature-based teaching methods. Though teaching methods are a large component of effectively learning vibrato, this current study focused its attention on the physical problems that exist amongst college students, rather than the types of methods that are used amongst professors. The questionnaire allowed the participants to freely discuss vibrato methods that are used within their teaching environments, but this topic does not overwhelm the intent to collect data on physiological issues within the technique.

The questionnaire included four parts with a total of 32 questions. The first part addressed the demographics of the sample. The participants ($N = 16$) were lecturers ($n = 4$), artist teachers ($n = 1$), directors of orchestras ($n = 1$), assistant professors ($n = 3$), associate professors ($n = 3$), professors ($n = 3$) and visiting professors ($n = 1$) within four- year universities from 14 states (and 1 unknown) in the United States. All participants taught violin ($n = 16$) while almost half of the participants also taught viola ($n = 7$) within their positions. The average number of years of college teaching amongst the participants was 13.9 (ranging from 2 to 35, $SD = 9.7$) and the average number of first year violin students they had for the 2013-2014 school year was 3.8 (ranging from 1 to 10, $SD = 2.2$).

The second part consisted of quantitative questions identifying vibrato issues amongst the first-year population of students (5) and questions identifying students’ vibrato type (4). The third part asked professors to provide words and definitions in relation to a good-sounding vibrato (4), words and definitions in relation to a problematic vibrato (3), and a description of the method used to teach vibrato to their college
students (1). The fourth part of the questionnaire addressed research-based existing physical problems in vibrato amongst the students using the Likert scale; each paired with a descriptive follow-up asking professors to explain how he/she may address the vibrato issue in a lesson (9). These particular physical issues were chosen based upon their appearance within research literature, as well as the researcher’s personal experience with learning and teaching vibrato. The questionnaire concluded with Likert scale questions related to the importance of vibrato (2). It should be noted that during the open-ended written portion of the questionnaire, $n$ may exceed the responding sample size due to participants providing multiple categorical vibrato issues within each question.

Apart from the demographic questions, all questions included in the survey were research and literature based. All were designed to serve the purpose of this study in finding physical problems in vibrato amongst the first-year college population and were checked for content validity by a panel of three violin experts within higher education. Based upon the review, one descriptive question related to vibrato teaching methods was removed from the survey. It should be noted that although participants were given an opportunity to include methodology-based responses within nine of the questions to deepen their physiological discussion, vibrato methodology is a much larger topic worthy of its own study outside of this narrower examination.

Since the questionnaire combines qualitative and quantitative research, a pilot study was also conducted prior to the main study to test the reliability of the numerical answer and Likert scale portions of the survey. The questionnaire used within the pilot study did not include the open-ended written questions. Eight violin professors were
asked to participate and all agreed. After receiving their responses, their names were removed from the full population list in order to prevent their sampling during the main study. Based on the results of the pilot study, amendments to the quantitative questions were made before administering it to the main population: Five technical issues and two instructional questions were removed from the questionnaire.

All participants for the pilot and full study were asked to complete IRB consent forms before submitting their questionnaires electronically. During the full study, average completion time for the questionnaire was 90.00 minutes (ranging from 50 seconds to 21:01:06, $SD = 535.41$, or 8.9 minutes). To note is that the lower and upper ends of the range of completion times were extreme outliers.

Reliability

A calculation for reliability was performed upon participants’ coded responses to validate the process of content analysis. Vibrato-based components were used to code responses throughout and were chosen from the following labels: accuracy of intonation, width of vibrato, speed of vibrato, sound quality, use, parts of the hand/wrist, parts of the arm, combination parts, vibrato type, body movement, movement description (positive), movement description (negative), mental approach, learning techniques, existing vibrato methods/exercises and improvised vibrato methods/exercises.

To calculate reliability, 52 (20%) of the responses were randomly selected from a total of 272 participant responses and given to one reliability observer to label. The expert check selected the labels provided to her by the researcher to code 179 vibrato-
based components within the selected responses. The observer responses agreed with mine in 157 of the total components (87.7% agreement).
CHAPTER 4
RESULTS

The purpose of this descriptive study was to first identify to what extent first-year college violinists physically struggle with vibrato motion, and further, to identify physical problems within the motion that are contributing to their challenges during the learning process. Both the researcher and an external evaluator coded the responses within the categories of pitch, tone, application, anatomy, physiology, psychology, and pedagogy. Participants’ responses were organized first statistically, then descriptively within the scope of: 1) definition of problems in vibrato, 2) definition of a good-sounding vibrato and 3) vibrato methodology.

The participants ($N = 15$) were asked to complete the questionnaire with respect to their 2013–2014 populations of first-year violin students. Professors reported an average of 2.5 students (ranging from 0 to 10, $SD = 2.4$) that had a physical problem with their vibrato motion that was negatively affecting their sound and an average of 2.8 students (ranging from 0 to 10, $SD = 2.6$) that were actively working on correcting a physical problem with their vibrato motion during lessons (in percentages of total number of students amongst participants these figures are 62% and 70%, respectively). The higher number of students working on their vibrato than had a physical problem with the motion may be explained by one participant’s discrepancy in the answer. The participant reported that he/she had 0 students with a physical problem in the motion, but had 7 students working on this problem in a lesson. It is possible the participant reported the number of students working to improve the motion in lessons even though

* Total responding population for this questionnaire was $N = 16$, but was reduced to 15 after the demographic portion of the questionnaire due to incomplete submissions.
there were no visible or audible physical problems, or it is possible the answer is a mistake.

Participants also reported that the average number of students addressing their vibrato motion during lessons was 2.8 (ranging from 0 to 10, SD = 2.7). One-third of the professors (n = 5) reported that all of their students were addressing their vibrato motion during lessons and all but two professors had at least one student addressing motion in lessons. The average number of students that came to their professor without any vibrato motion was 0.6 (ranging from 0 to 3, SD = 1.1) indicating that most professors (n = 10) had students that had some type of motion when beginning lessons, however, one third (n = 5) of the professors reported taking on students that were not able to create a vibrato motion when they entered college (in percentages of total number of students amongst participants these figures are 70% and 15%, respectively).

Participants categorized their students’ vibrato into four different categories of wrist, arm, finger, and combination vibrato. Professors reported that an average of 1.7 students (ranging from 0 to 5, SD = 1.4) had arm vibrato only, 1.2 students (ranging from 0 to 7, SD = 2) had a combination motion of these three types of vibrato (wrist, arm, finger), 0.9 students (ranging from 0 to 5, SD = 1.3) had wrist vibrato only, and 0.1 students (ranging from 0 to 2, SD = 0.5) had finger vibrato only. The results indicate that the most commonly seen types of vibrato amongst these first year students were arm vibrato and a combination motion of wrist, arm, and finger vibrato.
Defining Problems in Vibrato

The “Problematic” Vibrato

Participants were asked to identify words that they use when describing or addressing a “problematic” vibrato with students. Most participants \( (n = 13) \) listed aspects of the motion that were negative movement descriptions such as, “uneven,” “tense,” “uncontrolled,” and “wobbly.” Over half the participants \( (n = 7) \) listed words related to the quality of sound to describe a problematic vibrato such as, “nervous,” “shrill,” “tweaky,” “angled,” and “wiry.” A few participants \( (n = 3) \) listed width of the motion, whether too wide or too narrow, as being the source of a problematic vibrato and over half the participants \( (n = 7) \) listed words related to speed and whether it was too fast or too slow. Only one participant responded with words related to the use of vibrato: “on and off.”

Table 4.1. Participants’ descriptions of a problematic vibrato

<table>
<thead>
<tr>
<th>Descriptive Categories</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Movement Descriptions</td>
<td>13</td>
</tr>
<tr>
<td>Sound Quality</td>
<td>7</td>
</tr>
<tr>
<td>Width of Vibrato</td>
<td>3</td>
</tr>
<tr>
<td>Speed of Vibrato</td>
<td>7</td>
</tr>
<tr>
<td>Use</td>
<td>1</td>
</tr>
<tr>
<td>Accuracy of Intonation</td>
<td>5</td>
</tr>
<tr>
<td>Parts of the Hand/Wrist</td>
<td>2</td>
</tr>
</tbody>
</table>

Note. The number of participants refers to the population of participants whose responses fall within the corresponding descriptive categories.

Participants also listed problems with the pitch or intonation as being problematic, with five participants listing a distortion of pitch through the motion. Few

* In the case of this study, “problematic” was used to mean having an issue with any aspect of producing a good-sounding vibrato. It was not defined specifically in the questionnaire in order to allow the participants to convey their own definition through their responses.
participants \((n = 2)\) listed the hand or wrist as contributing to a problematic motion, and when they did it was within the context of a negative movement description as in, “wriggling fingers, but not changing pitch” and “stopping, tight, [and] fast wrist.” It should be noted that no participants listed a part of the arm or combined parts of the arm and hand or wrist when describing a problematic vibrato motion. Refer to Table 4.1 for a list of these categorical problems reported by participants.

*Physical Problems in Vibrato Amongst First-Year Students*

After describing a problematic vibrato, participants were also asked to list all the physical problems with vibrato seen amongst their first year violin students. The responses to these two questions contained similar categories of movement descriptions, sound quality, width, speed, use and accuracy of intonation.

Most participants \((n = 13)\) reported that tension*, a negative movement description, was the cause for a problematic vibrato motion. The two participants that did not list tension as a problem responded that the problem was the “inability to differentiate the pivot points and muscles needed to control vibrato” and “a low awareness of how the different parts of their arm function differently but in a coordinated way”—a physiological misunderstanding.

This list of negative movement descriptions was far less varied than participants’ descriptions of a problematic vibrato, mostly including only “tension” as a descriptor. Only two participants reported a problem in sound quality amongst students and when

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* Within the context of this study “tension” was categorized by the researcher and external evaluator as being a negative movement description. Here, it is used to mean a tightening of the muscles in the specified part of the body involved in producing a vibrato motion.
they did, their descriptions indicated problems in motion or width: “Sounds tense, nervous, narrow.”

Because of the tension, participants also reported that the vibrato motion was too narrow \((n = 3)\), a problem with width, and too fast, too slow, or a lack of variety \((n = 3)\), a problem with speed. Participants also reported a problem with the use of vibrato, citing selective or intermittent vibrato motion based on technical difficulties \((n = 2)\) and a problem with accuracy of intonation in that the pitch is obscured or not accurate because of the motion or because the intonation is not secure enough before the motion begins \((n = 2)\). Seven participants cited the source of these problems within the hand/wrist of the violinist, six participants cited the source of these problems in motion within both the arm and hand and one participant cited the source within the arm only (see Table 4.2).

Table 4.2. Physical problems seen amongst students

<table>
<thead>
<tr>
<th>Descriptive Categories</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement Descriptions (negative)</td>
<td>13</td>
</tr>
<tr>
<td>Sound Quality</td>
<td>2</td>
</tr>
<tr>
<td>Width of Vibrato</td>
<td>3</td>
</tr>
<tr>
<td>Speed of Vibrato</td>
<td>3</td>
</tr>
<tr>
<td>Use</td>
<td>2</td>
</tr>
<tr>
<td>Accuracy of Intonation</td>
<td>2</td>
</tr>
<tr>
<td>Parts of the Hand/Wrist</td>
<td>7</td>
</tr>
<tr>
<td>Combination Parts</td>
<td>6</td>
</tr>
<tr>
<td>Parts of the Arm</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. The number of participants refers to the population of participants whose responses fall within the corresponding descriptive categories.

Eight literature-based technical issues with vibrato were also presented within the final section of the questionnaire to be rated on their presence amongst students. To note is that all these physical issues were also mentioned during the previous
descriptive questions independently by participants and included the three common
categories mentioned in earlier responses: negative movement descriptions (tension),
width of vibrato and speed of vibrato.

These issues included 1) inflexibility* of the first knuckle joint on each left finger,
2) excessive tension in the left shoulder joint, 3) excessive tension in the left hand,
4) stiff or unbending left wrist, 5) vibrato stops between note or bow changes*, 6) vibrato
is too wide, 7) vibrato is too narrow, 8) fatigue or pain in the forearm.

Participants (\(N = 14\)** were asked to rate how often these issues were seen with
a student who had a problematic vibrato motion on a rating scale with response options
ranging from never (0) to always (10). The issues seen most frequently in lessons
amongst students were: vibrato stopping between note or bow changes, with an
average of 8.7 on a 10 point scale (ranging from 6 to 10, \(SD = 1.3\)); excessive tension in
the left hand, with an average of 8.2 (ranging from 6 to 10, \(SD = 1.5\)); and inflexibility of
the first knuckle joint on each left finger, with an average of 7.2 (ranging from 3 to 10,
\(SD = 2.3\)).

In order of most seen to least seen are the remaining technical issues in students
with problematic vibrato motions. Vibrato that is too narrow at an average of 6.8
(ranging from 2 to 10, \(SD = 2.3\)), a stiff or unbending left wrist, with an average of 5.9
(ranging from 2 to 10, \(SD = 2.7\)), excessive tension in the left shoulder joint, with an
average of 5.6 (ranging from 3 to 9, \(SD = 1.7\)), fatigue or pain in the forearm while

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* Within the context of this study the term, “inflexibility,” is defined by a build-up of tension caused by
excess pressure that prevents a natural response of body motion. In this case, it prevents the natural
response of the first knuckle joint on each left finger.
* Though this is included here as a technical issue, this issue is less a physical one, and more a problem
with hand coordination.
** Total population of responding participants for this portion of the questionnaire was \(N = 14\).
vibrating, with an average of 4.5 (ranging from 1 to 7, $SD = 1.7$). The least commonly seen technical issue in a student with a problematic vibrato was a vibrato that was too wide, with an average of 4.2 (ranging from 1 to 7, $SD = 1.9$).

**Correcting Problems in Motion Amongst First-Year Students**

Participants were asked to follow-up with these rated technical issues and describe how they would be addressed in a lesson with a student. Addressing the most commonly seen issue of vibrato stopping between bow changes, almost all participants ($n = 11$)* proposed exercises or suggested learning techniques that would help the student eliminate the issue such as practicing the motion without the bow at first, slurring the bow between notes while vibrating continually, practice “air” vibrato while simultaneously air bowing and “put new finger down before lifting previous finger to get a continuous motion within [the] hand/arm.” Two participants felt the problem could be corrected through the student’s mental approach to the issue writing, “I think it is a matter of attention and commitment to the sound you want that helps correct this” and “I have the student focus on accurately hearing what they are playing.” Only one participant suggested an existing method within literature to correct this problem, which was an exercise based upon Simon Fischer’s “fuzz vibrato” technique.

To correct excessive tension in the left hand, many participants ($n = 8$)* reported using positive movement descriptions with students during lessons. The descriptions included words such as, “release,” “balance,” “no gripping,” “freedom,” “no squeezing,” “light touch” and “loose” in reference to the left thumb and fingers. Six participants

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* $N = 13$ for this portion of the questionnaire.
* $N = 13$
suggested learning techniques that could aid in the correction of this problem such as
“practicing without the bow so the left hand doesn’t have to depress the string as much,”
“work on scales and arpeggios without the thumb on the neck,” and “practice playing a
passage with a ‘harmonic’ touch, then gradually increase finger pressure.” While one
participant described a teacher-improvised vibrato method to aid in this problem, none
suggested using existing methods within literature.

To address inflexibility of the first knuckle joint on each left finger, many
participants (n = 8) proposed motions within parts of the hand/wrist (n = 8) or parts of
the arm (n = 1) that would increase flexibility of this joint such as, “rhythmic exercises to
open the first knuckle,” “start with the correct arm motion (but with the instrument in
guitar position),” “put finger in place then slowly pull hand back, then push forward,
repeat,” “rock back and forth between lines on fingerboard” and “produce a rolling
motion which collapses then re-rights the base knuckle.” Five participants also
proposed positive movement descriptions within these motions that would assist with
flexibility such as “create softness in the joint,” “release thumb” and “no clenching.” Two
participants proposed an arm vibrato motion to help with the inflexibility. As with all the
open-ended questions pertaining to correcting each rated technical issue, most
participants (n = 8) included learning techniques and exercises (mostly self-improvised)
in their descriptions to correct the problem. Though most participants (n = 10) advised
the student to address the issue with the fingers on the violin, two participants
suggested the student work on increasing flexibility in the first knuckle joint away from
the violin by repeatedly bending and manipulating this joint. Again, no participants

** N = 13
mentioned a specific method within literature used to correct this. All described a scenario within their own teaching they would use.

Aside from the least commonly seen issue that vibrato is too wide, the most common correction to the remaining physical issues amongst participants was ridding parts of the hand or wrist and parts of the arm of tension, a negative movement description, by advising positive movement descriptions, such as “relax,” “loosen” and “balance.” Notably, although excessive tension in the left shoulder was seen somewhat often, few participants were descriptive in their suggestions for correcting this. Many felt it was important to just “generally monitor tension” and one had never seen this problem before. Participants also addressed physical issues with vibrato type, suggesting that students correct a vibrato that is too wide by developing a wrist vibrato \((n = 3)\) and correcting vibrato that is too narrow with an arm vibrato \((n = 2)\). Only two participants suggested positive movement descriptions for a student that had a vibrato that was too wide and suggested “relax[ing] the wrist inward towards [the] shoulder because this can quicken the vibrato” and “not overextending the fingers past their relaxed bending limits.”

**Aural Problems in Vibrato Amongst First-Year Students**

When asked to list the aural problems in vibrato amongst their students, only some participants \((n = 5)\) used words describing the quality of sound that were similar to physical terms used, but clarified by the context: “Uneven, jagged sounding, jerky sounding,” and “tight (it sounds constipated).” All of these words could be categorized as movement descriptions, but participants used them here to describe sound, as
requested by the researcher. Notably, a majority of participants \((n = 9)\) listed words that described movement (negative movement descriptions) instead of words to describe sound in this question. Participants included familiar words such as, “being tight,” “routine wobbling,” “rigid, inflexible,” just as they did when asked to list the physical problems amongst their first-year students.

The remaining categories of aural problems mentioned by participants in this question were also similar to physical problems mentioned. These included problems with the width of the motion \((n = 5)\) such as “non-pitch-changing” and “too narrow, quasi non-existent” and problems with speed \((n = 5)\) such as, “too fast,” “always the same speed,” “neurotic,” and “inconsistent speed.” Also listed were problems with accuracy of intonation \((n = 7)\), reporting that the pitch was “wavering,” “not centered,” “distorted,” and “unfocused” and that the motion was “on the wrong side of the pitch” and there were “intonation problems.

A category that emerged prominently in this report of aural problems that had not been seen to this extent was a problem with the use or application of vibrato \((n = 6)\). This may be because a problem in use can exist even if the actual motion created to vibrate is correct.

Table 4.3. Aural problems seen amongst students

<table>
<thead>
<tr>
<th>Descriptive Categories</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement Descriptions (negative)</td>
<td>9</td>
</tr>
<tr>
<td>Sound Quality</td>
<td>5</td>
</tr>
<tr>
<td>Width of Vibrato</td>
<td>5</td>
</tr>
<tr>
<td>Speed of Vibrato</td>
<td>5</td>
</tr>
<tr>
<td>Use</td>
<td>6</td>
</tr>
<tr>
<td>Accuracy of Intonation</td>
<td>7</td>
</tr>
</tbody>
</table>

Note. The number of participants refers to the population of participants whose responses fall within the corresponding descriptive categories.
Five participants listed problems such as, the “vibrato [is] not continuous,” there are “dead tones,” there is a “lack of reason for use,” “it is often executed as a routine wobbling of the left hand, without report to the intent of the vibrato” and a “disconnect between vibrato and [the] specific note, dynamic and harmony they play.” Refer to Table 4.3 for this comparison of categorical issues.

*Mentally Approaching Sound and Motion*

The category of “mental approach” was seen throughout participants’ responses, but had significant presence within the portion of the questionnaire when participants were asked to list any additional technical problems seen amongst their first-year students not presented by the researcher. For this question, half the responding participants (n = 4) listed an issue caused by the mental approach to the technique, though the type of mental approach varied. In the following two responses, the participants discussed the problem with mentally approaching the sound: “The lack of objective [listening skills] is a GREAT issue” and

A big issue is students not imagining or conceptualizing an ideal sound and vibrato; this is at the heart of finding a great vibrato- one must first conceive of an ideal sound in order to realize it.

Two participants discussed the problem with mentally approaching the motion of vibrato: One participant listed the issue of fearing pinky vibrato while another responded with issues of “not understanding,” “vague ideas of motions” and “no awareness of motion”:

* Within this study, “mental approach” is defined by approaching the sound or motion of vibrato cognitively, rather than physically.
Categorizing vibrato into wrist or arm and not understanding use of all regardless of primary generator of motion and incorrect/vague idea of actual motions, no/little awareness of what finger motions are necessary.

The ‘mental approach’ category was also seen amongst participants’ descriptions of how they would correct excessive tension in the left hand. Two participants emphasized the importance of mentally approaching this problem with tension: “Practice without [the] bow so…the motion of the vibrato can be focused on rather than the actual tone” and “Tension is…the result of a fuzzy mapping of the hand by the brain. The brain needs to get to know closer and feel more each separate section of the hand.” Though the participant references the mental approach to the motion, they are non-specific in their description of “mapping of the hand by the brain.”

One participant also discussed this category within their methods: “I have a set of standard exercises to awaken the muscle-awareness of each part of the left hand.” Again, though the participant mentions creating “muscle-awareness” within the motion when teaching vibrato, they were non-specific in what this awareness is and how it is built.

Defining a Good-Sounding Vibrato

A Physical Definition

Similar to the report of all the physical and aural problems seen amongst students, the two most common categories found amongst participants defining a good-sounding vibrato were movement descriptions, now positive rather than negative, and aspects related to sound quality. Participants were asked to provide definitions of a
good-sounding vibrato using both physical and aural terminology in their definitions. When asked to provide physical terms to define vibrato, almost all participants (n = 14*) described a positive movement description needed to create a good-sounding vibrato such as, “flexibility,” “balanced,” “relaxed,” “released,” “loose” and “controlled.” Two participants provided the same definition, indicating that it was accessed from the same unknown resource:

A balanced and relaxed combination of movements in all joints in the entire arm (including fingers/wrist/elbow/shoulder) to produce the desired vibrato in result (speed and width) in all registers, independent from but in relation to bow usage to produce the desired sound.

A term frequently used amongst participants to describe this motion was “relaxed” and most participants (n = 11) described the motion or parts of the body being “loose” or “flexible” in order to achieve a good-sounding vibrato.

These positive movement descriptions were accompanied by terms of movement in either combined parts of the arm and wrist/hand (n = 12), only parts of the hand (n = 3), or only parts of the arm (n = 1), indicating most participants referred to the combination of parts when physically defining vibrato. One participant only listed movement descriptions without describing where the movement occurs or what type of movement takes place by writing, “smooth, relaxed, balanced.” Most participants (n = 11) used several different types of words to depict movement, “combination of movements,” “oscillation,” “bending” and “moves,” or “motion.” One participant listed the movement as, “motion of the finger…either up and down, or slightly side to side.”

* Total responding population for this question was N = 16.
Some participants also described the speed \((n = 4)\) and width \((n = 4)\) of vibrato to define vibrato physically, though they were non-specific in their descriptions. Participants often mentioned the two components together as in, “with speed and width creating a palette of colors,” or “produce the desired vibrato in result (speed and width) in all registers.”

A few participants \((n = 2)\) discussed the use of vibrato as being “continuous,” or “that can be modified according to the expression needed for a piece.” A few participants \((n = 3)\) also discussed the pitch, or accuracy of intonation within their physical definition. For example: “A good vibrato is one which alters the angle of the fingertip knuckle of the finger so that it subtly moves the pitch below and back to the desired pitch of the note.” In this description, the participant describes the vibrato as oscillating below the pitch. Another participant described the importance of intonation: “intonation has to be secure to not detract from the music” and also “oscillation of the finger within the pitch,” indicating that the oscillation does not go above or below the pitch. Table 4.4 shows categories used by participants within responses.

Table 4.4. Defining a good vibrato, physically

<table>
<thead>
<tr>
<th>Descriptive Categories</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement Description (positive)</td>
<td>14</td>
</tr>
<tr>
<td>Width of Vibrato</td>
<td>4</td>
</tr>
<tr>
<td>Speed of Vibrato</td>
<td>4</td>
</tr>
<tr>
<td>Use</td>
<td>2</td>
</tr>
<tr>
<td>Accuracy of Intonation</td>
<td>3</td>
</tr>
<tr>
<td>Combination Parts</td>
<td>12</td>
</tr>
<tr>
<td>Parts of the Hand/Wrist</td>
<td>3</td>
</tr>
<tr>
<td>Parts of the Arm</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. The number of participants refers to the population of participants whose response fall within the corresponding descriptive categories.
An Aural Definition

When asked to define a good-sounding vibrato using aural terms, most participants \((n = 10)\) used words to describe the quality of sound such as, “easy,” “ring,” “life,” “sinuous sound,” “shimmer,” “warmth,” “rich,” “variable,” “excitement” and “spin.” Three participants used the same movement descriptions as listed in the physical definition including, “relaxed,” even, “supple” and one participant stated that good vibrato would be defined exactly the same aurally as it is physically providing no difference in language between the two. Notably, unlike the list of aural problems with vibrato, only a small number of participants listed movement descriptions to aurally define a good vibrato, indicating that movement was used to describe problems with sound, but not used to describe definitions of a good vibrato sound.

Half the participants also aurally defined a good-sounding vibrato in terms of the correct, or appropriate speed of vibrato \((n = 8)\). Six participants were non-specific in their descriptions, “controlled nuances of speed,” “appropriate speed,” “slow or fast” and “can also vary in speed.” Two participants specified the speed of a good-sounding vibrato, “a good vibrato [measures]...between 6 and 7 oscillations per second” and “the standard being somewhere between 3 to 6 oscillations per second.”

Many participants \((n = 7)\) described the width of vibrato \((n = 7)\) as part of the aural definition both non-specifically and specifically writing, “controlled nuances of width,” “wide in its pulses,” “varied in intensity (width),” “vary width,” “an average width of 1/3[rd] of a Ω step (around 17 cents on either side of the pitch)” and finally, A measured fluctuation of the pitch of up to a quarter tone up and down in pitch span (more regularly: an 8\(^{th}\) or 6\(^{th}\) of tone), following a smooth mathematical curve
such as a sinusoid (as opposed to nervous peaking and flat-lining of the pitch. Half the participants \((n = 8)\) also described how vibrato is used or applied as an aspect of defining a good-sounding vibrato writing, “appropriate to the needs and context of the music,” depending on the style of the music,” “depending on [the] situation,” “depending on repertoire and register on the instrument,” “depending on the musical needs of the composition and performer” and “depending on the style of composition, goal of the phrase, dynamic, mood….” Three participants aurally described a good vibrato by discussing intonation as in, “creating vibrations within the pitch,” and “slight flattening of the pitch.” The latter less describes accurate intonation, however, and instead may be unintentionally describing poor intonation. Table 4.5 shows this inclusion of categories within participants’ responses.

Table 4.5. Defining a good vibrato, aurally

<table>
<thead>
<tr>
<th>Descriptive Categories</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Quality</td>
<td>10</td>
</tr>
<tr>
<td>Movement Description (positive)</td>
<td>3</td>
</tr>
<tr>
<td>Width of Vibrato</td>
<td>7</td>
</tr>
<tr>
<td>Speed of Vibrato</td>
<td>8</td>
</tr>
<tr>
<td>Use</td>
<td>8</td>
</tr>
<tr>
<td>Accuracy of Intonation</td>
<td>3</td>
</tr>
</tbody>
</table>

*Note. The number of participants refers to the population of participants whose responses fall within the corresponding descriptive categories.*

When asked to rate the importance of having a good-sounding vibrato, all participants felt it was important to have a good-sounding vibrato prior to the first year of college, with an average of 7.6 on a 10 point scale (ranging from 5 to 10, \(SD = 1.9\)) but, more important to have a good-sounding vibrato as a first-year college music major violinist with an average of 8.3 on a 10 point scale (ranging from 4 to 10, \(SD = 1.9\)).
Identifying Vibrato Type in a Good-Sounding Vibrato

When asked to name the body parts involved in a discussion of a good-sounding vibrato, almost all participants ($n = 13$) listed the combined parts of the arm and parts of the hand or wrist. Three participants listed only the parts of the hand and wrist as being involved in a good-sounding vibrato and no participants listed only the arm as being involved. Participants listed a part of the hand or arm in addition to a part of the arm when discussing a good-sounding vibrato.

When asked to physically define a good-sounding vibrato, most participants ($n = 12$) described a combination of the arm and parts of the hand or wrist as being employed, “combination of movements in all joints in the entire arm (including fingers/wrist/elbow/shoulder) to produce the desired vibrato….” When describing a combination of the parts of the arm and parts of the hand or wrist, these participants used the phrase “all joints,” or individually listed parts of the arm and hand as in “left hand and arm.” Some participants ($n = 5$) described only parts of the hand or wrist as being involved in producing a good-sounding vibrato writing, “A relaxed wrist and finger knuckle that moves or ‘wiggles,’” or “a combination of wrist and finger motion” and one participant implied a preference for motion from the wrist, “alteration of the pitch induced by either wrist or forearm movement (preferably wrist).” One participant described a vibrato motion of the arm without describing use of the wrist responding, “A good vibrato begins with the rocking of the arm that moves individual 1st knuckles on the left hand.”

Most participants defined a good-sounding vibrato by describing the left arm and/or hand in motion, not by naming a type as in, “Oscillation of the finger within the pitch, made by releasing the string up/down with finger pressure and arm/hand

* $N = 16$ for this portion of the questionnaire.
movement.” Only two participants defined a specific vibrato type in their definition of a good vibrato. When they did, both mentioned all three types of vibrato in their definitions writing, “The ability to utilize all three major types of vibrato (arm, wrist, finger)…” and

A good arm vibrato displays a relaxed and loose motion of the arm….A good wrist vibrato (hand vibrato) comes from a relaxed and loose motion of the hand starting at the wrist joint….A good finger vibrato is generated by rapid motion of the finger on the fingerboard….”

The results of both these questions also coincide with one of the most commonly seen types of vibrato amongst participants’ first-year students as being a combination vibrato.

When asked, participants (n = 2) also listed additional issues related to students using one type of vibrato exemplified by: “Categorizing vibrato into wrist or arm and not understanding use of all regardless of primary generator of motion” and “Stuck in forearm vibrato- students who were taught forearm vibrato first have trouble incorporating wrist vibrato.” Here, participants refer to a problematic motion as coming from the use of only one type of vibrato.

Few participants (n = 4) described a specific vibrato type that they teach within their vibrato methods and when they did, they described more than one type as in, “Exercises developing each of the three main types of vibrato,” “exercise using whichever vibrato (wrist/arm) student already uses,” implying that the student is assumed to already have developed a vibrato motion. One participant described teaching all three types (arm, hand, finger) separately and does not imply they are combined together:
Arm vib- start with pivoting finger on strings to and fro, while open and closing arm at elbow. Gradually increase speed. Can also practice with a small container of beans, in a rhythmic way (like maracas). Hand vibrato- practice moving hand from wrist to and fro at rhythmic intervals and gradually increasing speed. Finger vibrato- practice isolating fingers in turn and moving them to and fro at rhythmic intervals and increasing speeds.

Many participants \((n = 8)\) mentioned parts of the hand/wrist in their method descriptions and it was mostly within the context of how the motion begins as in, “the first joint (nearest nail) in the finger needs to flex,” “keep finger rocking,” “do the wave with the hand” and “awaken the muscle-awareness of each part of the left hand.” One participant described additional parts of the arm and hand (combination parts) in their method, including the shoulder: “Slowly back and forth relaxed bending of the shoulder, elbow, wrist, and finger joints.”

Vibrato Methodology Amongst Participants

Participants were asked to describe the method used to teach their first-year violin students vibrato in order gain further knowledge into their identifications and definitions of both physical problems with vibrato and a good-sounding vibrato. Similar to the results of their descriptions of technical problem corrections, most participants \((n = 11)\) described themselves using techniques to assist the student in learning the correct motion. Participants listed such learning techniques as, “start [the exercises] without bow,” “air bow,” “demonstrate, then help [the] student (hands on),” “with metronome,” “guitar position,” “[violin] help with bow hand or against a padded wall,” “4th
position with wrist blocked,” “isolating fingers in turn” and “work in small groupings.”
Techniques involving learning without the bow or the violin in various stages of unsupported and supported positions were most present amongst participants.

Some participants described improvised vibrato methods ($n = 8$) and existing vibrato methods ($n = 3$) with teacher improvised methods being far more present amongst responses. The methods varied in level of detail within the descriptions. Improvised method descriptions included, “Many methods, depending upon the student…various exercises developing each of the three main types of vibrato,” and

Exercises for relaxing the tip of the finger, exercises to strengthen the first knuckle to allow it to swing freely, lifting exercises for the fourth finger to assist in stabilizing the curvature of the fourth finger

A few participants ($n = 4$) were much more descriptive, giving a step-by-step account of their method such as,

The exercise given to me when I was a college student and that I use involves placing a student in 4th position with wrist blocked against the shoulder of the instrument and first finger planted on B on the E string. You then "slap" the other fingers down together in good quick hammer like motion onto the strings (on their finger tips). You start with one quick slap and then progress into two or three or even up to five quick successive slaps to create a passive muscle response to the slapping. The physical response that happens as the fingers relax after the slapping usually produces a wiggle that happens on its own-passive, not an active purposeful vibrato. When the student sees and feels that the wiggle or vibrato happened simply without so much effort, they begin to capture the idea
that vibrato is a subtle motion and then they have to work on flexibility in the finger joints and wrist joint. There is still "work" to be done to encourage flexibility and looseness, but that exercise helps a student grasp the feeling of vibrato.

One participant described part of their improvised method as “the ‘vibrato space’ approach”:

On a blackboard, I design a system of Cartesian coordinates, with frequency on one axis, and width on another one. Then we pick random points (ie. random combinations of vibrato width and vibrato frequency), and then I have them transition from one ‘point’ to another within one and the same long note. In other words, within one long note (say, a whole) with one given finger on one given string, then need to move from a certain artificially designed vibrato (say, slow-mo and narrow) to another (medium motion- wide) and yet another (fast motion-narrow).

Only three participants described an existing vibrato method used to teach vibrato. The existing methods include published literature that is often used within classrooms or studios by teachers and pedagogues. These responses included, “Galamian- *Principles of Violin Playing and Teaching* the vibrato section,” “a set of standard exercises to awaken the muscle-awareness of each part of the left hand…combine it with the rhythmic exercise by Carl Flesch *[The Art of Violin]*,” and “exercises from *Viva Vibrato!* to help the development of wrist motion.”

Most participants’ method descriptions (n = 10) included types of movement needed to implement the technique. Positive movement descriptions were included when describing the movement needed (n = 8). A few participants (n = 4) mentioned
width of vibrato in their methods such as “[move] in rhythmic intervals” and “move from a certain artificially designed vibrato (say, slow-mo and narrow) to another (medium motion- wide) and yet another (fast motion- narrow).” Very few participants ($n = 3$) mentioned the speed of vibrato, except when referring to it within a learning technique, such as, “tap fingers…in different rhythm/speed” or as in advice “keep finger rocking…at even speeds throughout the motion.” Only three participants included when the vibrato should be used or applied as in, “basic rules of harmony that impact vibrato choices, basic rules of musical period and musical interpretation that impact the use of vibrato” and discussing the transition of continual vibrato throughout different fingers, implying continuous use of vibrato.
CHAPTER 5

DISCUSSION

The nature of this study is inherently subjective and thus, the results must be interpreted with caution. Additionally, the responding sample of this study was smaller than expected and professors varied in expertise and experience. However, the results do provide an initial report on the extent to which first-year college violinists experience physical problems in the motion that may prevent them from achieving a good-sounding vibrato. These results also bring attention to specific problems within the technique that are experienced by these students. Additionally, the results explore the topic of vibrato from the pedagogical perspective of the four-year college violin professor and describe both what it means to have a problematic vibrato motion and what it takes to have a good-sounding vibrato from this viewpoint.

The results of this study indicate that 62%, a majority, of participants’ first-year students had a physical problem with vibrato, 70% of participants’ students were working on correcting physical problems in vibrato during lessons and 70% were addressing the technique in lessons. Participants also reported that 15% of their students were not able to create a vibrato motion at all. This is a small minority of participants’ students, which might be expected at the college level. However, two participants reported that three out of three of their students came to them with no vibrato motion, which is a significant percentage of students struggling to create the initial motion. Although many students successfully learn vibrato when it is introduced early in the learning process, these results indicate that physical problems in the vibrato
motion can exist amongst students in their first year of college and in this case, they existed in a majority of first-year students.

Common Physical Problems

Participants’ responses revealed that the issues within the vibrato motion for these first-year students included problems in arm and hand/wrist motion and problems with how the vibrato sounds. Also, there were problems in vibrato width, vibrato speed, the use or application of vibrato and the accuracy of intonation. Additionally, an emerging category amongst participants was problems with the mental approach to the technique. All of these categories of problems were also included within responses defining a good-sounding vibrato and describing a teaching methodology. This uniform presence of categories reveals that participants observed issues in vibrato technique based upon their own definitions of a good vibrato amongst their students.

The overwhelmingly present movement description used to identify problems in vibrato motion amongst students by participants was “tension,” which participants reported to be found in the left hand/wrist and/or arm. Specific problems also included vibrato being too narrow, but rarely too wide, vibrato being too fast or too slow caused by tension, problems with when and how vibrato is being applied, problems with maintaining intonation before or during use of vibrato, and problems with not understanding the motion needed or imagining an intended sound. Based upon the results, participants found these issues in tension, continuity, and width to be seen quite often, if not almost always, in a lesson with a student that had a problematic motion.
Tension

As a movement description, the word “tension” has been used prolifically within method books, pedagogy books, and studies that seek to understand and convey the complexities of a successful vibrato technique. Similar to the responses by participants throughout the questionnaire, authors and teachers warn students and teachers of monitoring tension in the left side while learning and teaching vibrato. In his guidebook, Galamian emphasizes the importance of the teacher monitoring and loosening the student’s hand while teaching vibrato: “The hand must never squeeze the neck.”72 Rolland and Mutschler advise that “problems of vibrato are those of motion technique….This pressure [of the finger holding down the string] must not stiffen the finger joints or wrist because this makes the vibrato impossible or labored.”73 In their method book, Fischbach and Frost include a “Vibrato Readiness Checklist,” which addresses tension in each part of the arm, hand, thumb and fingers before taking the student through the initial vibrato exercises: “Does your elbow swing freely? If not, you are tense in the shoulder, and you may also be squeezing [with your hand]” and “Does [your hand] move freely from the wrist?” and finally, “No squeezing allowed [in your thumb and fingers].”74

Awareness of the issue of tension has become common knowledge amongst violin teachers and pedagogues in knowing that it is a negative movement description and leads to problems with sound, especially with vibrato. Its presence within pedagogical literature for students beginning the violin as well as its presence amongst participants’ responses depicts this knowledge. However, based upon this study,

74 Fischbach and Frost, Viva Vibrato!, 2-3.
tension continues to be a source of physical problems in the vibrato of first-year college violinists. This reveals that the issue is not being resolved before beginning vibrato studies at a younger age, as is advised within literature. Though there may be many reasons for a student to develop tension over time, it is most likely that early attention to set-up, parts of the arm, wrist and hand and a student’s understanding of left side movement can address tension before vibrato is learned so this will not be a problem at the college level. Additionally, within participants’ responses on how they teach vibrato, only a few mentioned exercises to target tension within the hand/wrist or arm or advised an awareness of this matter, even though it was such a commonly seen problem amongst their students.

It is recommended that teachers accurately monitor and fix tension within the arm and hand/wrist motion of beginner violinists before they begin to play and most certainly before they begin vibrato studies. Many method books such as *Viva Vibrato!* as explained above, provide exercises for the teacher to use within classrooms or within private study that assist in monitoring levels of tension. This process can be challenging for group class teachers especially, as noticing, monitoring, and fixing tension with students takes individual attention and time. Processes must be set in place to make this stage of learning a priority, however, as these initial building blocks clearly have an impact on the physiological success and comfort of the vibrato motion later in studies. Also, though teaching vibrato to a student from the beginning is not common for a college professor, it is advised that teachers at this higher level understand the building blocks in teaching a vibrato from beginning to end even though they might not need to use this full process.
Width, Speed, Use, Accuracy of Intonation

The remaining issues with vibrato have also been present within past and current research studies and pedagogical guides. Geringer, Allen, and MacLeod have conducted multiple studies together and apart in recent years that have sought to address problems with pitch center, vibrato speed, vibrato width and continuity; a few of the “central issues debated by string pedagogues.”75 After recent studies found that the vibrato motion moved below and above the central pitch without affecting intonation, MacLeod recommended students learn a vibrato motion that incorporates both a forward and backward movement.76 However, a few responses from participants in this current study conflicted with the results of past studies on pitch center and advised the student develop a vibrato motion by only oscillating the finger below the pitch. Though it is possible students naturally learn an oscillation that goes above and below the pitch even after being exposed to exercises that only go below (as many violinists have been doing long before these literary investigations), it is recommended that teachers be aware of the possible differences between vibrato training and the sound of a performing vibrato. It is also possible that some professors may not be aware of current research literature that addresses these “central issues.” Because of the recent influx of vibrato studies in recent years, it is recommended that all violin teachers keep themselves up to date on current literature so as to better prepare them for students who have problems learning the correct motion.

75 MacLeod, “Achieving an Artistic Violin Vibrato: Applications of Research to the Classroom,” 18.
76 Ibid., 24; Ho, Lin, Chen and Tsai, “Development of a quantitative learning system,” 71-81.
Mental Approach

Beyond these common categories found, another emerging response from participants regarding physical problems within vibrato was within the mental approach to the technique—how a student conceptualizes motion or sound, or how they imagine sound before attempting the motion physically. Many participants advised this approach be taken for a student that was fixing a physical problem within their motion, or pointed to the mentality behind the technique as an influence in physical or aural problems. This has been discussed by Rebecca Lynn Atkins in her study investigating how trained singers’ vocal tone is affected by their focus of attention while singing, but it has not been selectively studied within the topic of violin vibrato. In her study, Atkins discovered that singers performed better when they thought less of their own movement and focused their attention on external, rather than internal “targets.” Participants in this study mostly discussed the “concept of sound” or “conceptualizing a sound before realizing it,” which refers to imagining a sound before physically attempting the motion. However, participants did not discuss how they would teach a student to conceptualize the sound, or if not focusing on the actual physical motion needed for vibrato was beneficial, as Atkins found. Some participants did discuss the importance of hearing a good vibrato before attempting it physiologically, though it is not known if this is helpful for students or not. The current vibrato literature could benefit from additional attention and research within this category, based upon participants’ responses to see if a study on the focus of attention in violinists can have the same outcome as it did with singers.

77 Rebecca Lynn Atkins, “Focus of Attention Affects Singer's Tone Production” (PhD diss., University of Texas at Austin, 2013), vi.
The Relationship of Aural and Physical Problems

A relationship between movement and sound emerged in responses from participants regarding students’ physical and aural problems with vibrato. When describing the physical problems amongst their students, most professors used negative movement descriptions as discussed above, which was expected. However, when professors described the aural problems with vibrato amongst their students, most also used these similar negative movement descriptions, which was unexpected. Only a few professors discussed aural problems in vibrato using terminology depicting the sound.

This misalignment of physical and aural descriptors can be misleading. For example, to correct tension it may be necessary for students and teachers to understand the difference between physiological movement that requires muscular effort and tension—a negative muscular response that inhibits natural movement. Common positive movement descriptions used amongst participants were “relaxed” and “flexible,” but, as Carl E. Seashore describes, “Vibrato as we hear it is entirely different from the vibrato as it is performed.”78 The descriptors, “relaxed” and “flexible” may be used to describe an effortless sound, but they do not describe physiological effort. In past physiological studies of vibrato, researchers describe the motion as a “contraction,” “impulse” and “thrust”—words to describe the muscle movement, rather than the sound. Amongst those learning vibrato, it is important to delineate the physical motion from the sound for this reason.

It is recommended that teachers be especially aware of this difference between muscular effort and tension as the motion to implement vibrato may not seem relaxed to

78 Seashore, In Search of Beauty in Music, 55.
some students when they are first learning vibrato. Approaching the motion by isolating muscles that are engaged and muscles that are released, or tending to the balance of the hand and arm, or discussing how the motion feels all more accurately address tension as a negative movement description.

The results reveal that all professors used language to describe the physical motion and to describe how it sounds, interchangeably. Many found no difference in the two, possibly because of the relationship of physicality to sound: In order for a student to sound good, the correct motion has to exist. Even though motion and sound are inextricably linked within a discussion of how to physically make a good-sounding vibrato on the violin, it is important for teachers to delineate physical language versus aural language that is used with a student learning vibrato, since both descriptors can be useful in learning the technique. Furthermore, relying only on sound to describe motion may not effectively convey the correct vibrato movement to students.

Vibrato Type

Participants revealed that the most commonly used types of vibrato amongst their first-year students were arm vibrato (reported in 42% of students) and a combination vibrato (use of wrist, arm and finger vibratos) (reported in 30% of students). Most participants also listed these combined parts of finger, wrist and arm in their own definitions of a good-sounding vibrato. Also, combined parts were most mentioned throughout the questionnaire amongst participants. Although, participants were not asked to report what type of vibrato they personally use, or believe is best to use, their responses to questions about vibrato favored motion using the combined parts of finger,
wrist and arm. These results coincide with well-known violin pedagogues, Galamian, Fischbach, Frost, Rolland, Mutschler, Flesch and Applebaum who all believe a good vibrato incorporates motion from the finger, wrist and arm. As Galamian says, “all types of vibrato should be developed and used because it gives the performer a far wider range of coloring and expressiveness.”79 These results also align with physiological research that has been conducted finding that there cannot be complete isolation in one joint during vibrato and parts of the arm and hand/wrist will participate together in the motion.80

Notably, the most common type of vibrato seen amongst their students was not a combination type, even though this type is most reflected within literature and is most reflected amongst participants’ responses throughout the questionnaire. Instead, 42% of the first-year college students were reported to have an arm vibrato. It is important to note that the exclusive use of the arm within vibrato is not common in the pedagogical literature. There is no direct evidence from this particular study linking the physical problems with arm vibrato amongst these first-year college students since this was not an observational study. It may still, however, be likely that a trend can be seen between the two groups of data. If, as some participants stated, a student is using a strict forearm vibrato with no sympathetic motion of the hand/wrist, it is possible that tension is preventing movement of all types and thus, leading to a problematic vibrato motion and sound. If the motion, instead, appears to be initiated mostly by the forearm with smaller motion of the wrist, this would more appropriately be categorized as a combination vibrato. It is important for teachers and pedagogues to accurately identify


66
the specific vibrato type that is being used by their student in order to better identify any physical problems that may be preventing a student from achieving a good-sounding vibrato.

Finally, only one participant reported that two of his three students used a finger vibrato only. The participant also reported that two students had arm vibrato and one had a wrist vibrato. It is possible that the participant incorrectly identified vibrato type amongst students, or they identified students as having only a combination of two types of vibrato, rather than three, so did not label the movement as a combination vibrato.

Though literature includes the explanation of a finger vibrato, its sole use is rarely seen amongst performers. Galamian describes finger vibrato as only being taught after the arm vibrato and wrist vibrato have been introduced, as it is part of the combination motion. He describes that the impulse comes from the finger with a narrow oscillation by “pulling the elbow to the left, flattening fingers then mak[ing] the knuckle floppy.”\textsuperscript{81} He does not describe the finger vibrato as being used apart from the arm or the wrist. Though “finger vibrato” is a term used within method literature and was identified within this study as existing amongst 3% of students, it is rarely taught or used independently. This implies that, again, the motion of the fingers is a sympathetic movement occurring because of the lack of tension within the hand, which is corroborated by existing physiological literature. It is recommended that teachers examine this type of vibrato within the technique, since it is so uncommon for a good-sounding vibrato to be initiated by only the finger, without the use of arm or wrist.

\textsuperscript{81} Galamian, \textit{Principles of Violin Playing}, 40.
Methodology

Discovering a standard method or a best method to use amongst students learning vibrato has been proven to be challenging in past studies, nor was it the purpose to this study. However, gathering information on how vibrato may be taught within college can be helpful in understanding problems with vibrato motion or sound that exist at this level. Sabrina Green surveyed both private violin teachers and orchestra directors to find that teaching a wrist vibrato to junior high students was the most popular approach to vibrato instruction, but whether or not this was a successful approach was not addressed. Redlinger also studied high school orchestra violinists and completed a survey of literature to find the commonalities within vibrato methods and teaching strategies and documented that the missing element was giving vibrato study enough time. Conclusions from the latter study were not clearly reflected in the results of this current study amongst participants. But, most participants acknowledged vibrato begins with wrist motion in their descriptions and some explained their methodology by only discussing the wrist, though descriptions were not always labeled as “wrist vibrato.” Very few participants also described teaching a specific type of vibrato (wrist, arm, finger) and when they did, they described all three types of vibrato.

Interestingly, when participants named body parts involved in a good-sounding vibrato, most referenced a combination of parts (finger, wrist, arm), but when describing their methodology, few participants clearly described teaching a combination vibrato. Overall, participants did not use descriptions of existing methods to describe how they taught vibrato; instead, they described their own improvised methods or exercises.

82 Sabrina Green, “Problems in vibrato development,” 49.
83 Christopher Redlinger, “Review and Analysis of Violin Vibrato Pedagogy With Beginning Violin Students,” vi.
Participants also did not include a timeline in their descriptions of their methods, nor did they discuss differences between learning vibrato from the beginning and applying remedial vibrato instruction. There was also a difference between participants in the detail of their descriptions. For participants who provided a simpler description such as, “various relaxation techniques,” it is not known if the short answer was to avoid writing out a potentially long answer within a questionnaire, or if the participant did not utilize a step-by-step approach to teaching vibrato.

Finally, though participants independently discussed problems with how the student mentally approaches vibrato, they did not discuss this to be an aspect of their vibrato methodology, for the most part. This could be because there has been little study on how effective this aspect of learning vibrato is for students. This was also congruent with existing vibrato methods as most approach vibrato physiologically, focusing on the movements of the left arm and hand/wrist.

Future Research

Aside from further investigations into the success or impact of the focus of attention on the physiological success of learning violin vibrato mentioned above, current literature could also benefit from a closer study of successful vibrato methods used at the college level. Because of its subjective nature, there have been few studies that have examined the best approaches to teaching vibrato within college or if they would differ from methods used for younger students. Related to this, further study revealing how types of language can affect the way in which a student learns vibrato is needed. Because of the close relationship between physiology and sound in violin
vibrato, isolating how teachers express the motion or sound of vibrato may be beneficial in understanding how to best communicate with a student who has problems learning vibrato.

Lastly, the participants in this study were not purposively chosen based upon their pedagogical reputation or expertise within their field. The current vibrato literature could benefit from an investigation of how expert pedagogues within a more selective environment may address problems in vibrato with students and if this differs from the approach of teachers with younger students or teachers with students of college age, but lower playing level. Because the expert pedagogue within an elite program may be far more selective in their population of students, the results within a future study may differ from the results of this current one, which would be a beneficial contribution to research.

Conclusion

The descriptive results within this study reveal that problems of motion and sound are perceived to be present within first-year college violinists and may affect the success of the violinist in achieving a good-sounding vibrato. This study also describes common problems amongst these first-year college violinists that have been present within recent vibrato research literature and that have been identified to be important within a discussion of how to physically and aurally rate a good-sounding vibrato. Though these common problems may be recognized as having been studied in younger students and in past research, it is clear that these issues are not being resolved before a student enters college to possibly study music. This research also bridges a gap in
literature in identifying the extent to which first-year college students have physical problems in vibrato.

My hope, as a researcher, violinist, and teacher is that results from this study can be directed to the attention of classroom teachers, studio teachers and private instructors to these specific physical and aural problems before a student begins to study vibrato early in learning, especially since this research has indicated that a majority of first-year college violinists have a physical problems within the motion. Since these are problems that, as literature indicates, can be avoided with proper monitoring, attention and instruction early in violin study, it is surprising that a majority of first-year college students had problems with the motion. My biggest motivation for conducting this study was to build awareness that I was not alone in my challenges during my own vibrato study and that problems in creating a vibrato motion can stay with a student that may be otherwise technically advanced. Finally, because of its subjective nature, vibrato can be a challenging technique to learn or fix, especially if problems persist for years after being exposed to the technique. Conducting research to help in understanding the physical intricacies of violin vibrato, such as this study, is important in advancing knowledge of the technique amongst students, teachers, pedagogues and researchers.
APPENDIX A

FULL QUESTIONNAIRE
At what university do you currently teach?

What is your position title in your university?

Please specify the instrument you teach in your position: violin viola both

How many years have you been teaching college students?

How many first-year violin students did you have for the 2013-2014 school year?

Please consider this 2013-2014 population of first-year violin students as you complete each part of the following questionnaire:

Part I.

How many of your first-year violin students are actively addressing their vibrato motion during private lessons?

How many of your first-year violin students came to you without the ability to create a vibrato motion?

How many of your first-year violin students have a technical problem with their vibrato motion that is negatively affecting their sound?

How many are actively working on correcting the technical problem with their vibrato motion during private lessons?

How many of your first-year violin students use wrist vibrato only?

How many of your first-year violin students have arm vibrato only?

How many of your first-year violin students have finger vibrato only?

How many of your first-year violin students have a combination of the three?

Part II.

Please provide your definition of a good vibrato using physical terms:

Please provide your definition of a good vibrato using aural terms (the way it sounds):

Consider a situation in which you are teaching a student as you answer the following questions:
List words you use when describing a good-sounding vibrato.

List words you use when describing a problematic vibrato.

List body parts you name while discussing a good-sounding vibrato.

Please list all the physical problems with vibrato amongst your first-year students.

Please list all the aural problems (how it sounds) with vibrato amongst your first-year students.

Describe the method you use to teach your first-year violin students vibrato.

Part III.

On a 10 point scale (1 being the issue is never present and 10 being the issue is always present) please rate the following researched issues affecting vibrato:

How often do you see the following technical issues in private lessons with a student that has a problematic vibrato motion?

Inflexibility of the first knuckle joint on each left finger

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Describe how you would address this problem in a lesson:
### Excessive tension in the left shoulder joint

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Describe how you would address this problem in a lesson:

### Excessive tension in the left hand

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Describe how you would address this problem in a lesson:

### Stiff or unbending left wrist

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Describe how you would address this problem in a lesson:

### Vibrato stops between note or bow changes

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Describe how you would address this problem in a lesson:

### Vibrato is too wide

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Describe how you would address this problem in a lesson:

**Vibrato is too narrow**

Never                      Always

1          2          3          4          5          6          7          8          9          10

Describe how you would address this problem in a lesson:

**Fatigue or pain in forearm**

Never                      Always

1          2          3          4          5          6          7          8          9          10

Describe how you would address this problem in a lesson:

Besides the ones above, please list any additional technical issues you see in lessons with first-year violin students that have a problematic vibrato.

On a 10 point scale (1 being unimportant and 10 being important) please rate your perception of the importance of the following:

**Having a good vibrato motion as a first-year college music-major violinist**

Unimportant                      Very Important

1          2          3          4          5          6          7          8          9          10

**Having a good vibrato motion prior to the first year as a music-major violinist**

Unimportant                      Very Important

1          2          3          4          5          6          7          8          9          10
APPENDIX B

UNT IRB INFORMED CONSENT NOTICE
Before you agree to participate in this study, it is important that you read and understand the following explanation of the purpose, benefits and risks, and how the study will be conducted.

**Title of Study:** Physical Problems in Vibrato Amongst First-Year College Violinists: A Descriptive Study

**Supervising Investigator:** Rebecca Roesler, Assistant Professor of Music Education at the University of North Texas (UNT).

**Student Investigator:** Zo Manfredi, a Doctor of Musical Arts (violin) student at the University of North Texas (UNT).

You are being asked to participate in a descriptive study, which involves answering 32 questions regarding your observations and expertise with first-year violin students having physical problems in their vibrato. The purpose of this study is to first identify to what extent first-year college music majors physically struggle with vibrato motion, and further, to identify physical problems within the motion that are contributing to their challenges during the learning process. It is expected that the results of this study will direct the attention of classroom teachers and private instructors to the specific physical problems early in learning that may otherwise prevent students from achieving a good vibrato.

The questionnaire is designed to gather statistical data as well as descriptive data on the physical problems in vibrato that may prevent a music-major from achieving a natural-sounding vibrato. The entire questionnaire should take you 15-25 minutes. There are no foreseeable risks for you in your participation in this study, but if you find any question too invasive, or wish not to answer, you may skip the question or discontinue your participation altogether. Though there is no monetary compensation for you in your participation, benefits may include assisting in providing pertinent data to the string pedagogy vibrato literature. Additionally, answering these questions may strengthen your own pedagogical philosophies regarding vibrato technique, as you will be called upon to analyze and describe the problems and your methods.

Confidentiality will be maintained to the degree possible given the technology and practices used by the online survey company. Your participation in this online survey involves risks to confidentiality similar to a person’s everyday use of the internet. I will only have access to your email as listed in the College Music Society Directory of Music Faculties and this email will not be linked to your completed questionnaire. No names will be linked to data in the study and the confidentiality of information you provide will be maintained in the dissertation publication and any future publication or presentation regarding the study.

If you have any questions about this study, you may contact the Student Investigator, Zo Manfredi at (406) 672-7755 or at zomanfredi@my.unt.edu. This study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions you may have on your rights as a research subject.

**Research Participants’ Rights:** By participating in this survey, you will confirm that you have read all of the above information in this consent notice and that you agree to all of the following:
• I (Zo Manfredi) have explained the study to you and you have had an opportunity to contact me with any questions you have about the study. You have been informed of the possible benefits and the potential risks (none foreseeable) of this study.
• You acknowledge that you do not have to take part in this study and that your refusal to participate or your withdrawal from the study will not result in a penalty or a loss of your participants’ rights or benefits.
• You understand how and why this study is being conducted.
• You acknowledge your rights as a research participant and you volunteer consent as a participant in the study.
• You understand that you may print and keep a copy of this form for your records.

Button to proceed with the study here
BIBLIOGRAPHY


MacLeod, Rebecca B. “Achieving an Artistic Violin Vibrato: Applications of Research to the Classroom.” American String Teacher 64, no. 2 (May 2014): 18-27.


