Voice Classification in Opera
and
the German Fach System

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Introduction

For hundreds of years, singers have been categorized into voice types. Women can be sopranos, mezzo-sopranos, or contraltos, and men can be tenors, baritones, or basses. A singer's voice type can have a huge impact on his or her perception of self, and even his or her career. Today, singers are even more bound, a more specific system of voice categorization that arose in Germany in the late 19th century and is used by opera houses all over the world to determine which roles are appropriate for singers. However, this system has many iterations and can be subject to current and regional tastes in casting. Singers and voice teachers everywhere can be confused by the many *Fach* categories that are explained so differently by various authors. Whether this system is more a hindrance than a help to singers is subject to opinion, and whether this system should be abolished, kept in place, or modified remains to be seen.

This bibliography is intended to be an exhaustive bibliography of research dealing with the matter of voice classification in opera and the more specific German *Fach* system. Since these areas are subjective and lack a general consensus among pedagogues and opera professionals, this bibliography can be used as a starting point to become aware of the existing research, clear up confusion, and come to a more unified understanding of these systems of voice categorization.

This research has a focus on opera, and thus research on choral voice categorization, children, and castrati is not included, as they merit their own fields of research.

Most of this research consists of journal articles and doctoral dissertations. Many of these papers cited common sources, which are also included. The most prominent types of research are pedagogical, historical, qualitative, and scientific research.

Some highlight studies include Dr. Sandra Cotton's comparisons of the German Kloiber (*Handbuch der Oper*) and the American Boldrey (*Guide to Operatic Roles & Arias*) guides, theses and dissertations that discuss *Zwischenfächer-* or voices that don't seem to fall neatly into any one category, and writings by the great vocal pedagogue of the 20th century, Richard Miller. Also, many of the scientific studies attempt to find a more objective system of voice categorization by using tools such as spectral analysis and CT imaging and thus yield important information that can be used towards the genesis of such a system.

It is important to note that this bibliography was composed during the COVID 19 pandemic. As such, many libraries were closed at the time of this writing, and many sources are unverified. Also, for the same reasons, the author was unable to locate the full texts and/or abstracts of several sources.

Bibliography

Âkovleva, Antonina S. "Из истории классификации певческих голосов" In *Музыкальные инструменты и голос в истории исполнительского искусства: Сборник научных трудов* edited by Valery Vladimirovich Berezin, 65-80. Moskva: Gosudarstvennaâ Konservatoriâ imeni P.I. Čajkovskogo, 1991.

Unavailable for verification.

Allen, Jennifer. "An Analysis and Discussion of *Zwischenfach* Voices." DMA diss., Arizona State University, 2012.

A dissertation that attempts to clear confusion about the *Zwischenfach* voice and "gain insights into the relevance of Zwischenfach in today's marketplace." First, pedagogical research about voice categorization is set forth, focusing on timbre, registration, and range. Then, a history of the *Fach* system is discussed. Lastly, data is analyzed from several interviews conducted among opera professionals including "two casting directors of national and international opera houses, an emerging American mezzo-soprano, a mid-career working European mezzo-soprano, an operatic stage director, an education director for opera houses and a composer." Examples of singers who can be considered as *Zwischenfach* voices are given.

Antman, Rachel A. "A Matter of *Fach*: Classification and its Discontents." *Classical Singer* 20 (May 2007): 8-11.

Unavailable for verification.

Armstrong, William. "The Art of Classifying Voices." *Etude* 62 (February 1944): 87.

A treatise on voice classification that discusses various aspects, including bone structure.

Baxter, Deborah Elaine. "Women's Voice Classification in Selected Operas of Jules Massenet: Computer Analyzation and Anecdotal Study." DMA diss., University of Missouri, Kansas City, 1989.

Can greater objectivity be brought to voice classification? To this end, a system of computer analysis was created to quantify both primary vocal determinants (range, weight, tessitura) as well as peripheral compositional aspects. The analyses were done through manipulation of computerized data on pitch, rhythm, tempo, meter, phrasing, key, vocal texture, and scenic designations for fifteen roles from Massenet operas (information from secondary sources such as critical notices and other historical references was also taken into account). Statistical analysis yielded clear delineations between voice categories, and subtle relations between voice classification and both melodic intervals and keys were noted. The system of analysis is capable of quantifying even fine distinctions between adjacent voice categories. (unavailable for verification, adapted from *RILM Abstracts*)

Beghelli, Marco. *Ermafrodite armoniche : Il contralto nell'ottocento*. Personaggi della musica. Varese: Zecchini, 2011.

Women's and castrato voices are described, which u. a. were used in so-called "opposite sex" roles. (unavailable for verification, adapted from BMS Online)

Boldrey, Richard. *Guide to Operatic Roles & Arias*. Dallas: Pst…Inc., 1994.

> A guide for singers, to help them find roles and arias suitable for their vocal capacities. (unavailable for verification, adapted from *RILM Abstracts*)

Bubicz-Mojsa, Aleksandra. "Specyfika sopranu koloraturowego w perspektywie pedagoga śpiewu." In *Kształcenie wokalne*, 79-91. Zielona Góra: Uniwersytet Zielenogórski, 2016.

> Examines selected issues of vocal pedagogy as seen from the perspective of a singing teacher who, simultaneously, is an active coloratura soprano vocalist. The author presents her own method of training this type of voice, underlining the importance of direct communication within the master-apprentice relationship, and listing several features which distinguish coloratura soprano from other female voice types. (unavailable for verification, adapted from *RILM Abstracts*)

Calico, Joy H. "Composing Clémence in *L'amour de loin*." *Contemporary Music Review* 38 (June-August 2019): 389-417.

> An examination of the conception of *L'amour de loin* by Kaija Saariaho through primary sources, mostly the composer's manuscripts. This opera is unique in that the heroine, Clémence, was originally composed for a coloratura soprano, and later revised to fit a lyric soprano. The author analyzes these two iterations of the role through the lens of *Fach* and argues that they are so different that they convey two different heroines.

Cart, Jon R. "Performances of *Il matrimonio segreto*, *Gianni Schicchi*, and *The Face on the Barroom Floor* Illustrating the Evolution of the Lyric Tenor from the Eighteenth Century to the Twentieth Century." DMA diss., University of Maryland, College Park, 2001.

> Historical and musical analyses of the above listed lyric tenor roles from the 18th to the 20th centuries. The *tessiture* of these are compared with other lyric tenor roles of their times. Detailed program notes and a discography from these performances are included.

Chen, Yunyi. "The Emergence of the Lyric Soprano in Verdi." DMA diss., Boston University, 1995.

> A survey of the lyric soprano roles in Verdian operas, namely Lida, Gilda, Violetta, and Nannetta. Close examination of these roles and their musico-dramatic elements seeks to "clarify the position of Verdi's lyric soprano roles."

Clark, Mark R. *Guide to the Aria Repertoire*. Bloomington: Indiana University Press, 2007.

> A long-awaited resource for the young operatic singer, this annotated guide brings together many sources to start the journey toward powerful, informed performance. An extensive discussion of *Fach* and audition repertoire is followed by more than 400 arias organized by voice type, including canonical, contemporary, and obscure works from different languages. Each entry includes level of difficulty, voice/character type, special techniques, tessitura, and accompaniment. Commentary from internationally renowned singers, directors, coaches, and other professionals is also included. (unavailable for verification, adapted from *RILM Abstracts*)

Clarós, Pedro, Aleksandra Z. Sobolewska, Antonio Doménech-Clarós, Astrid Clarós-Pujol, Carmen Pujol, and Andrés Clarós. "CT-Based Morphometric Analysis of Professional Opera Singers' Vocal Folds." *Journal of Voice* 33 (July 2019): 583.e1-583.e8.

A scientific study that used CT imaging technology to compare 93 opera singers' vocal fold length (VFL) with their voice categorizations, vocal range, gender, height, weight, and body mass index (BMI). A negative correlation was found between VFL and vocal range, with the narrowest ranges in basses. A linear correlation was found between VFL and features of the body such as height and BMI.

Cleveland, Thomas F. "The Acoustic Properties of Voice Timbre Types and the Importance of These Properties in the Determination of Voice Classification in Male Singers." *Speech Transmission Laboratory: Quarterly Progress and Status Report* 17 (January 1976): 17-29.

An experimental study that seeks to "assist in the development of a theory of voice classification for both speaking and singing voices." Eight male professional singers sang five vowels on common pitches, and vocal pedagogues were asked to ascertain the voice classifications of tenor, baritone, or bass based on these samples. A dependence on pitch and voice formant frequencies was shown. Other conclusions demonstrate that average formant frequencies are better indicators of voice type than separate frequencies, spoken formant frequencies were higher among tenors than in basses, and formant frequency percentage differences among tenors and basses were similar to those that differentiate men and women.

_____. "A Teaching Tool for Voice Classification in Singers." *The NATS Journal* 47 (September 1990): 35-36.

Instructions for making a simple demonstration tool from a duck call and plastic tubing. (unavailable for verification, adapted from *RILM Abstracts*)

_____. "Toward a Theory of Voice Classification." *The NATS Journal* 49 (January 1993): 30-31.

Brief discussion of historical highlight studies on voice classification that deal with factors such as vocal fold length, subglottal pressure, and amplitude of the voice source fundamental.

_____. "Voice Classification." *The NATS Journal* 49 (March 1993): 37-40.

Discusses the average formant frequencies of male voices and their role in voice classification. (unavailable for verification, adapted from *RILM Abstracts*)

Cook, Patrick M. "Charmers, Comedians & Conquerors: Operatic Repertoire for Tenor." DMA diss., University of Maryland, College Park, 2013.

Detailed program notes, an annotated bibliography, and a discography accompany performances of tenor roles from the 18th to 20th centuries- Monostatos in *Die Zauberflöte*, the title role in *Idomeneo*, Luigi in *Il tabarro*, Man with Old Luggage in *Postcard from Morocco*, and Bentley Drummle in *Miss Havisham's Fire*. This project aims to "offer a glimpse of the varied techniques, styles, and developments that composers of the 18th, 19th, and 20th centuries utilized when creating operatic roles for tenor."

Cotton, Sandra. "Voice Classification and *Fach*: Recent, Historical and Conflicting Systems of Voice Categorization." DMA diss., The University of North Carolina at Greensboro, 2007.

A dissertation in three parts that discusses the differences between voice classification and *Fach*. Chapter 1 discusses four classification criteria, namely range, *tessitura* and *passaggi*,

timbre and agility. This chapter takes a pedagogical research approach and cites sources from pedagogues such as Ingo Titze and Richard Miller. Chapter 2 looks at "earlier concepts of voice classification" by examining two treatises by Manuel Garcia and Johann Hiller. A historical research approach is taken here. Chapter 3 compares two leading guides on *Fach*-Rudolf Kloiber's *Handbuch der Oper*, which is used widely in Europe, and Richard Boldrey's *Guide to Operatic Roles & Arias*, which is used in the United States. Emphasis throughout the dissertation is placed on the fluidity of the *Fach* system- that role casting changes depending on region and current tastes, and many defining characteristics of *Fächer* are non-vocal- and the need for differentiating it from voice classification.

_____. "*Fach* vs. Voice Type: A Call for Critical Discussion." *Journal of Singing* 69 (November 2012): 153-66.

A condensed version of Dr. Cotton's dissertation that focuses more upon *Fach*. It includes the introduction and the third chapter comparing the Kloiber and Boldrey guides. Dr. Cotton ends with a "call for conversation" to singers and pedagogues to avoid the conflagration of voice classification and *Fach*, arguing that this can "adversely affect the future career of a singer".

Daniell, W.H. "Talks on the Voice and Kindred Topics VIII" *The Musical Herald* 5 (1884): 244-45.

A pedagogical treatise that defines the voice types for men and women-*basso profundo*, *basso cantante*, baritone, *tenor robusto*, *tenore leggiero*, contralto, mezzo-contralto, mezzo soprano, and soprano. Emphasis is placed on not training outside of one's voice type and *tessitura,* rather than range, being the determinant for voice classification.

Dennis-Rigney, Leslie M. J. "The Significance of the Soubrette: From *Commedia dell'arte's* Colombina to Early 21st Century Comic Opera Sopranos." DMA diss., University of California, Los Angeles, 2007.

An in-depth examination of the *soubrette* operatic *Fach* throughout history. Attempts to "provide historical understanding of the origins of the operatic soubrette and to follow her development and growth through the 18th, 19th, and 20th centuries in order to better comprehend her significance in opera today." Also included are interviews of industry professionals throughout, and a quick guide that lists *soubrette* roles.

Erickson, Molly L. "Dissimilarity and the Classification of Female Singing Voices: A Preliminary Study." *Journal of Voice* 17 (June 2003): 195-206.

A quantitative study that sought to understand how pitch and timbre react in womens' voices, and the resulting perceptions of dissimilarity. Two lyric sopranos, one lyric mezzo-soprano, and one dramatic mezzo soprano sang the same six pitches on an [a] vowel and were recorded. Groups of experienced listeners vs. unexperienced listeners were asked to rate the difference in quality of two samples. Results showed that "although listeners cannot ignore pitch differences in the perception of dissimilarity, non-pitch-related timbre differences can be perceived within the context of pitch." (unavailable for verification, adapted from *RILM Abstracts*)

_____. "Dissimilarity and the Classification of Male Singing Voices." *Journal of Voice* 22, no.3 (2008): 290-99.

A quantitative study that aims to understand timbre transformation in relation to pitch within voice categorization. Also compares the perception of these relationships with inexperienced

v. experienced listeners. 2 tenors and 2 baritones sang 6 pitches for groups of inexperienced and experienced listeners. Spectral analysis of these samples was also carried out. This study found that "while listeners cannot ignore pitch differences in the perception of dissimilarity, non-pitch-related timbre differences can be perceived within the context of pitch."

_____. "Perception of Pitch and Timbre and the Classification of Singing Voices." In *Proceedings of the Sixth International Conference on Music Perception and Cognition*, edited by Chris Woods, Geoff Luck, Renaud Brochard, Frederick A. Seddon, and John A. Sloboda. Keele: European Society for the Cognitive Sciences of Music (ESCOM), 2000.

A study used multidimensional scaling procedures to discover the dimensions underlying voice timbre for trained and untrained listeners and investigated whether timbre, independent of pitch, can be used as a perceptual cue to group vocal stimuli into traditional voice categories. Two basses, tenors, mezzo-sopranos, and sopranos were recorded singing the vowel /a/ on six different pitches. Twelve experienced listeners and 18 inexperienced listeners were asked to rate all possible pairs of male and female stimuli in terms of dissimilarity and to categorize each stimulus. ...Listeners perceived greater dissimilarity across pitch range within individual singers than between singers in the same category…. Although voice timbre and classification have been assumed to be independent of pitch, judgments of timbre similarity are to a large degree based on pitch differences…. (adapted from *RILM abstracts*)

Erickson, Molly L., Susan R. Perry, and Stephan Handel. "Discrimination Functions: Can They be Used to Classify Singing Voices?" *Journal of Voice* 15 (December 2001): 494-502.

A quantitative study in which groups of experienced vs. inexperienced listeners were asked to pick (out of three recorded samples) the odd singer (two of the samples were the same singer). The aim of this study was to "determine whether timbre, independent of pitch, can be used as a perceptual cue to discriminate between female singers, both within traditional voice categories (e.g., to discriminate one soprano from another soprano) and between traditional voice categories (e.g., to discriminate a soprano from a mezzo-soprano)." Results indicated that this task was difficult even for experienced listeners if the stimuli varied greatly in pitch. (unavailable for verification, adapted from *RILM Abstracts*)

Festeu, Adriana. "Exploring *Zwischenfach*: Understanding Vocal Classification and its Professional Significance." PhD diss., Royal Academy of Music, 2016.

Unavailable for verification.

_____. "Voice Classification: Terminology and Practicality." *Bulletin of the Transilvania University of Braşov Series VIII: Performing Arts* 11, no. 2 (2018): 41-52.

Based on Dr. Festeu's dissertation. A qualitative study that includes semi-structured interviews with industry professionals and extensive review of relevant literature. Seeks to "illustrate the differences between the voice- and role-categorisation systems and to identify a functional, consistent way in which the term *Zwischenfach* can be used within the operatic industry."

Field, Rebecca. "The Application of Vocal Classifications by Theaters in the Federal Republic of Germany, Switzerland, and Austria." DM diss., Indiana University, 1991.

A qualitative study that surveyed opera singers employed full time at theatres in West Germany, Switzerland and Austria. The intent was to "determine to what extent the *Fach* system was utilized over the five-year period 1984-1989…" Results showed that, although

singers had to sign contracts designating *Fach*, there was some relaxation of these guidelines and singers often performed roles outside of their assigned *Fächer.*

Formento, Evert L. "Acerca de la clasificación de los cantantes." *Revista de investigaciones en técnica vocal* 4, no. 2 (2017): 25-53.

> This article reviews aspects that are rarely considered in the papers about vocal classification and summarizes criteria used by a select group of authors. Cristina Jackson Menaldi, Renato Segré, and Susana Naidich are included for the importance and diffusion of their works in the field of professional voice in Argentina. Richard Miller and Ingo Titze are included due to their contributions to vocal pedagogy and research on the voice. Sandra Cotton is included because of the ground-breaking dissertation she wrote on the topic of the *Fach* system, and Brenda Smith and Robert T. Sataloff deal with the topic from a choral point of view.

Fresenel, Élisabeth, Raphaël Sikorsky, and Anna Zumbansen. "Plus haut, plus bas? Comment aider au classement d'une voix chantée lyrique." *Médecine des arts* 57 (September 2006): 22-27.

> A study conducted on professional lyric artists by comparing the usual fundamental of their speaking voice and their vocal category. Results showed that this is not an absolute method for singing voice classification.

Frič, Marek, and Angelika Pavlechová. "Listening Evaluation and Classification of Female Singing Voice Categories." *Logopedics phoniatrics vocology,* 4 February 2019.

> A scientific study that compared two demographic groups's assessment of recordings of "Una voce poco fa" sung by different female voice types. The evaluation criteria were timbre, resonance, vowel placement, suitability of vibrato, aesthetic impression, and voice flexibility. The purpose was to "verify whether a group of experienced voice pedagogues and singers can determine the vocal type of the artist based on listening to a part of the aria better than a group of musicians can, and to determine what acoustic properties of the recordings are linked with the perceptual results of their evaluation." (unavailable for verification, adapted from *RILM Abstracts*)

Fussi, F., and Sérgio Magnani. "Fonetografia e tessiturografia nella valutazione della voce artistica." *Acta phoniatrica latina* 12, no. 3 (1990): 403-8.

> The tessiturogram can be used to assess the vocal range and demands of a given musical role, and to determine the most suitable performer for this role on the basis of his or her phonetogram. S. Thurmmer's tessiturogram is presented as a statistical method for defining objectively a given musical tessitura. The application of the tessiturogram is demonstrated by testing it with a tenor's phonetogram for Mozart's *Die Zauberflöte*. (unavailable for verification, adapted from *RILM Abstracts*)

Garcia, Manuel. *École de Garcia : traité complet de l'art du chant en deux parties*. Paris: Heugel, 1911.

> A well-known treatise on singing.

Han, Seung-Hee. "Transcending the *Fach*: A Search for Identity Inside and Out of Mezzo-Soprano Repertoire." DMA diss., University of Maryland, College Park, 2006.

This dissertation comprises three different programs that reflect my search for identity as a mezzo-soprano and my desire to transcend the limitations of *Fach*. The three programs, all presented at The Clarice Performing Arts Center, contain repertoire written for male and female voices thus allowing me to explore areas outside of the mezzo-soprano *Fach*, gain a better understanding of the *Fach* system and guide me as I strive to become a more mature performer. (unavailable for verification, adapted from *RILM Abstracts*)

Hanganut, Lucia. "Contributia fiziologiei fonatorii în problema clasificarii vocii cîntate." *Lucrări de muzicologie 4* (1968): 293-304.

Data provided through phonatory physiology shows that the correct classification of voices is dependent upon vocal amplitude, intensity, and timbre, as well as upon the use to be made of the voice in the lyric theatre.

Harris, Elisabeth. "*Zwischenfach*: Paradox or Paradigm?" MMA thesis, Massey University and Victoria University of Wellington, 2014.

A master's thesis in four parts that attempts to define and examine the *Zwischenfach* voice category and its implications within the professional opera world. Chapter 1 gives an overview of the aspects of voice categorization, namely range, *tessitura*, *passaggi*, timbre, and other considerations such as speaking voice and scientific measurements. Chapter 2 looks at the history of the *Fach* system and discusses the conundrum of the *Zwischenfach* voice within such parameters. Chapter 3 attempts to compare and contrast the *Zwischenfach* voice with the lyric mezzo-soprano and refers to particular roles that defy categorization-Cherubino, Idamante, and Der Komponist. Chapter 4 looks at singers who have successfully and unsuccessfully navigated careers in *Zwischenfach* roles, and case studies of Christa Ludwig and Dame Gwyneth Jones are given.

Hiller, Johann A. Anweisung zum musikalisch-zierlichen Gesange**.** Leipzig: J.F. Junius, 1780. Reprint, Frankfurt am Main: C.F. Peters, 1976.

Unavailable for verification.

Höslinger, Clemens. "Wandlungen im dramatischen Sopranfach." In *Frauengestalten in der Oper des 19. und 20. Jahrhunderts: (mit besonderer Berücksichtigung der deutschsprachigen, italienischen und französischen Oper): 6. Internationale Franz-Schmidt-Symposion* 2001, ed. Carmen Ottner, 199-210. Wien, München: Ludwig Doblinger, 2003.

Treats the evolution in the dramatic soprano roles in the period when Franz Schmidt was active as an orchestra musician (Wiener Philharmoniker until 1911, Hofopernorchester until 1913/14). Four singers who created or premiered roles in his two operas are discussed: Marie Gutheil-Schoder, Barbara Kemp, Elisabeth Klepner, and Wanda Achsel. (adapted from *RILM abstracts*)

Huie-Armbrister, Faith J. "The Lyric Soprano Voice: Pedagogy and Repertoire from 1600-1980." Ed.D diss., Columbia University, 1982.

A review of historical and pedagogical literature that traces the history, pedagogy and repertoire of the lyric soprano voice from the late 16th to 20th centuries. Sources include pedagogical treatises, historical documentation of composer/artist collaborations, and compositional excerpts.

"The Human Voice." *Church's Musical Visitor* 11 (August 1882): 299.

> Dr. Durant's explanation of character by voice type. (unavailable for verification, adapted from *RILM Abstracts*)

Husson, Raoul. "The Classification of Human Voices." *The NATS Bulletin* 13 (1957): 6-11.

> Presents research on vocal classification dealing with vocal fold length, nerve excitability, register shifts, and timbre.

Jarvis, Patricia J. "The Mature Female Voice in Transition." DMA diss., Arizona State University, 1987.

> A dissertation that seeks to understand why some female singers move from mezzo-soprano to soprano as they mature. Contains a review of relevant literature and results from two questionnaires mailed to such transitional singers and voice teachers. The author emphasizes the need to avoid misclassification and to know how to train transitional singers.

Jeremus-Lewandowska, Anna. "Sopran koloraturowy—specyficzny rodzaj głosu sopranowego." *Wokalistyka w Polsce i na świecie* 7 (2011): 86-102.

> The article is an attempt to bring the subject of teaching methodology closer and the functioning of the coloratura soprano voice as a specific species the soprano voice. I discuss in individual parts of the presentation the specificity of the coloratura soprano, special possibilities, predispositions, but also weaknesses and threats. I describe in detail the various appropriate for this type of voice, vocal techniques, and I also analyze their use, in effect voice work of a colorful soprano. In the light of the issues discussed, training of this kind of voices appears in the field of artistic vocalism extremely complex phenomenon. (unavailable for verification, adpated from article abstract)

Johnson, Aaron M., and Gail B. Kempster. "Classification of the Classical Male Singing Voice Using Long-Term Average Spectrum." *Journal of Voice* 25 (September 2011): 538-43.

> A descriptive study that seeks to establish a more objective way to classify singing voices. A comparison was made of nine professional classical male singers' Long-Term Average Spectrum (LTAS) scores from singing "The Star-Spangled Banner" and their self-reported voice classifications. Moderate correlation was found between these parameters, with the strongest being between LTAS score and the full song (as opposed to excerpts). Strong correlation was also found between range and singing voice classification.

Jordan, Eva-Elena. "The Soprano Voice Type and Its Importance within the Operetta Genre." *Studia Universitatis Babes-Bolyai, Musica* 63, no. 2 (2018): 103-14.

> Discusses the importance of soprano voices within Hungarian operetta. Details the difference between *prima donna* and *grande dame* roles, and then presents 14 operettas that contain soprano roles of these types. Some historical context is given, and famous singers who originated and have sung these roles are also presented.

Kloiber, Rudolf, Wulf Konold, and Rober Maschka. *Handbuch der Oper*. Stuttgart: Metzler, 2016.

> The classic, now up to date. The authoritative reference work for connoisseurs, practitioners and enthusiasts combines scientific reliability, practical orientation, and readability. For all questions about roles, playing time, cast, libretto, plot, the historical background, and the

stylistic position. ...Over 100 new opera portraits from early baroque to the most recent, written by Robert Maschka and other high-ranking opera experts. The current opera repertoire in around 340 detailed work descriptions. Register of specialist games, titles, composers, and librettists. (unavailable for verification, adapted from Bärenreiter website)

Koehler, Hope E. "The Effects of the Perception of Voice Type on the Practice and Pedagogy of Singing Opera." DMA diss., University of Kentucky, Lexington, 2004.

A two-part qualitative study that seeks to analyze the social implications of holding a particular voice type or *Fach* in opera. One hundred eleven people responded to an online survey of twenty-five questions. These respondents ranged from singer, voice teachers, conductors, stage directors, coaches, general managers, opera lovers, and one agent. Then, a series of interviews were conducted, some of which were respondents to the survey. This research highlights the need for more communication in the opera community of what is expected for singers, in order to maintain vocal health and the integrity of the art form.

Kosowski, Richard. "A Survey of Voice Teachers' Perceptions of and the Characteristics Used to Identify the Leggiero Tenor Voice." DMA diss., University of Houston, 2008.

A dissertation in five parts that discusses the *leggiero* tenor voice using several research methodologies. Chapter 1 takes a pedagogical approach and cites sources from pedagogues that have to do with voice classification and the *leggiero* tenor. Chapter 2 takes a historical research approach and reviews the development of the tenor voice, especially regarding Gioachino Rossini. Chapters 3 and 4 contain descriptive research in which two hundred thirteen voice teachers and twenty-five opera professionals hoping to transition to university teaching filled out an online questionnaire. The purpose of this survey was to determine what characteristics they use to identify and how they perceive the leggiero tenor. Chapter 5 details a pilot study which was used to create the online questionnaire. Seven voice teachers and one conductor were interviewed about their strategies of voice classification and the identification of the leggiero tenor voice.

Krueger, Nathan E. "Gaetano Donizetti, Saverio Mercadante, and the Evolution and Development of the Verdi Baritone." DMA diss., University of Arizona, 2011.

A dissertation that intends to "examine the careers of singers active in Italy between 1830 and 1845 and to provide insight as to which roles written before the premiere of Verdi's *Nabucco* contained similar vocal and characterization demands." Biographical information is given on these ten singers, and musical analysis is given of three roles- Torquato Tasso, Manfredo, and Nabucco. Emphasis in these analyses is on *tessitura* and characterization and shows that the Donizetti and Mercadante roles created the foundation for the Verdi baritone, as first evidenced in *Nabucco*.

Lamborn, Ciera. "The Lyric Wagnerian Soprano." DMA diss., University of California, 2004.

Seeks to define and understand the Wagnerian lyric soprano. Sources include Wagner's essays, the Bayreuth opera house, and the roles (and associated orchestrations) of Gutrune, Elsa, the Rheinmaidens, Eva, and Elisabeth.

Large, John W. "The German *Fach* System." *Journal of Research in Singing* 7, no. 2 (1984): 45-53.

Brief definition of the German *Fach* system, followed by a list of roles categorized by the various *Fächer*.

Lawrence, Christie L. "Mezzo Sopranos Who *Zwisch*." MA thesis, California State University, Los Angeles, 2017.

> Discusses the special qualities of *Zwischenfach* voices and the advantages for such singers in a sexist system. Historical background is given of the *Fach* system, and special attention is given to historical *Zwischenfächsängerin*, namely Pauline Viardot, Maria Malibran, Giuditta Pasta, Marilyn Horne, Susan Graham, Frederica Von Stade, and Cecilia Bartoli.

Ling, Peter A, ed. *OperAria: Das Repertoire für all Stimmgattungen in 16 Bänden*. Wiesbaden: Breitkopf & Härtel, 2015.

> *OperAria* is a publication that lists operatic repertoire suggestions for different voice types. Each volume is dedicated to a specific *Fach* within voice types, including subcategories for the following voice types: soprano, mezzo-soprano, alto, tenor, baritone, and bass. Sheet music, historical background, librettist information, premiere date, range of the piece, duration of the piece, and synopsis for each aria is included. (unavailable for verification, adapted from *RILM Abstracts*)

_____. *Stimme, Stimmfach, Fachvertrag: Die Bedeutung der Opernstimmfächer am Beispiel der männlichen Stimmfächer*. Augsburg: Wißner-Verlag, 2008.

> An overview and discussion of the *Fach* system and its implications for singers' employment. Extensive examination of all of the male *Fächer*. Also includes interviews with voice teachers, singers and opera directors.

Luther, Hermann Einhard, ed. *Wagnertenöre in Bayreuth* (1884-1914), volume 2 of *Helden an geweihtem Ort: Biographie eines Stimmfaches*. Trossingen: Omega Layer, 2002.

> A complete encyclopedia of Wagnerian tenors. (unavailable for verification, adapted from *RILM Abstracts*)

Lycke, H., W. Decoster, A. Ivanova, M.M. Van Hulle, and F.I.C.R.S. de Jong. *Folia phoniatrica et logopaedica* 64, no.2 (2012): 80-86.

> Aims to assess whether individual parameters or combinations of voice range profile parameters (also called 'features') are able to yield a clear cluster separation with which three basic female voice categories can be discriminated and can provide a basis for settling the issue of voice classification. Methods: The voice range profiles of 206 female conservatory singing students were recorded, parameterized into more compact descriptions ('features'), and subjected to a cluster analysis. Results: The three-cluster case provided the most consistent solution across all feature combinations. The feature that led to the best cluster separation was the ratio of the perimeter length of the chest voice part of the voice range profile versus the total perimeter length. Conclusions: Based on a statistical analysis of voice range profile parameters, the ratio of the perimeter length of the chest voice versus the total perimeter length was shown to yield a clear separation into three basic female voice types, which in turn may give us a basis for settling the issue of voice classification. (adapted from *RILM Abstracts*)

_____. "Discrimination of Three Basic Male Voice Types by Voice Range Profile-Derived Parameters." *Folia phoniatrica et logopaedica* 65, no. 1 (2013): 20-24.

> Same study as above, but done on two hundred fifty-six male singing conservatory students.

Manén, Lucie. *Bel canto: The Teaching of the Classical Italian Song-Schools, Its Decline and Restoration*. Oxford: Oxford University Press, 1987.

> A manual of bel canto singing. The vocal spectrum of human emotions and the establishment of a natural relationship between vocal tone and emotion are described. Rules for posture, respiration, and the understanding of the mechanism of the larynx, the pharynx, *imposto*, resonance, *messa di voce*, *vibrazione*, and *mezza voce precede*, guidance on voice production, tessitura singing, articulation, and coloratura. A gramophone record of examples is included. (unavailable for verification, adapted from *RILM Abstracts*)

Mangini, Maurício M., and Andrada e Silva, Marta A. "Classificação vocal: Um estudo comparativo entre as escolas de canto Italiana, Francesa e Alemã." *Opus* 19 (December 2013): 211-24.

> The aim of this study was to identify, through the literature, similarities and/or differences between the Italian, French, and German schools of singing, in relation to their vocal classification criteria. The analysis of the collected material revealed that the Italian and German schools demonstrate greater systematization regarding vocal classification criteria, and they classify voices according to the music of particular composers. The French school proposes alternative classifications for voices outside the traditional standards. The classificatory parameters used most frequently by three schools are, respectively, vocal range and timbre. It was concluded that the classification of voices involves anatomical, functional, psychological, and cultural aspects, and therefore should be seen as a slow and gradual process for construction of the opera singer's vocal identity. (unavailable for verification, adapted from *RILM Abstracts*)

Martin, William A. "Highs and Lows of the Baritenor Voice: Exploring the Other Male Hybrid." DMA diss., University of Alabama, 2010.
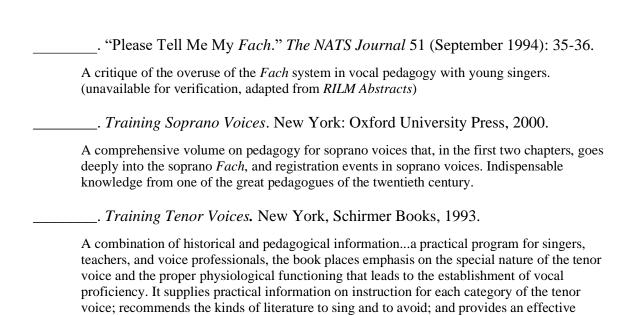
> A dissertation in two parts that explores the special baritenor voice from a pedagogical perspective using range, *tessitura*, timbre, and registration. The second part is a repertory for the baritenor that includes art songs in appropriate keys, opera and oratorio repertoire.

McGinnis, Pearl Y. *The Opera Singer's Career Guide: Understanding the European Fach System*. Lanham: Scarecrow Press, 2010.

> McGinnis presents valuable information to help readers learn, understand, and use the Fach system to their professional advantage. More than just soprano, alto, tenor, or bass, students and professionals alike should know the 25 different *Fach* categories fully defined here, along with the examples of roles, audition arias, and European opera houses and agents provided. Based on careful research and personal experience, singer and teacher Pearl Yeadon McGinnis describes the features, characteristics, and benefits of the *Fach* system, including voice categorization and classification and using *Fach* to train the young voice. ... A glossary and several appendixes supply tools for auditioning, such as newly classified roles for children, lyric, and Beginner singers; roles for the established *Fach* categories; lists of opera agents and houses in the German speaking countries; and suggested audition arias by *Fach*. (unavailable for verification, adapted from *RILM Abstracts*)

Miller, Richard. *National Schools of Singing: English, French, German and Italian Techniques of Singing-Revisited*. Lanham, Maryland and Oxford: Scarecrow Press, 2002.

> A guide to the various national schools of singing that delves into voice types and classifications. (unavailable for verification, adapted from *RILM Abstracts*)

_____. "Please Tell Me My *Fach*." *The NATS Journal* 51 (September 1994): 35-36.

> A critique of the overuse of the *Fach* system in vocal pedagogy with young singers. (unavailable for verification, adapted from *RILM Abstracts*)

_____. *Training Soprano Voices*. New York: Oxford University Press, 2000.

> A comprehensive volume on pedagogy for soprano voices that, in the first two chapters, goes deeply into the soprano *Fach*, and registration events in soprano voices. Indispensable knowledge from one of the great pedagogues of the twentieth century.

_____. *Training Tenor Voices.* New York, Schirmer Books, 1993.

> A combination of historical and pedagogical information...a practical program for singers, teachers, and voice professionals, the book places emphasis on the special nature of the tenor voice and the proper physiological functioning that leads to the establishment of vocal proficiency. It supplies practical information on instruction for each category of the tenor voice; recommends the kinds of literature to sing and to avoid; and provides an effective system for voice building, including registration factors, techniques for breath coordination, vowel modification ("covering"), resonance balancing, range extension, the development of vocal agility, and maintaining the high tessitura and sostenuto. (unavailable for verification, adapted from Google Books)

Mitchells, K. "Operatic Character and Voice Type." *Proceedings of the Royal Musical Association* 97 (1970-1971): 47-58.

> A discussion of the use of voice type by composers to evoke personality characteristics, emotions, morals etc. of operatic characters.

Owens, Richard. *Towards a Career in Europe*. Kansas City, Missouri: American Institute of Musical Studies, 1983.

> Unavailable for verification.

Pack-Smith, Piper. "Rediscovering the Unique Role of the Contralto in the Operas of Gioachino Rossini." *Opera Journal* 52 (June 2019): 1-44.

> A historical perspective on Rossini contraltos that includes a history of the contralto voice, Rossini writings, and the notable singers that originated his contralto roles.

Pierre, Maxime. "Passages entre registres et classification vocale: Une enquête auprès de chanteurs lyriques professionnels." *Médecine des arts* 87 (2019): 44-55.

> A qualitative study that seeks to understand register shifts, or *passaggi*, in relation to voice type. Survey of professional 183 opera singers through questionnaires and analysis of auditory samples of these singers singing ascending glissandos on the [a] vowel.

Ray, Marcie. "Archeology of the Soubrette." PhD diss., University of California, Los Angeles, 2009.

> Unavailable for verification.

Reetz, Jarod. "Contemporary Perspectives on the Countertenor: Interviews with Kai Wessel, Corinna Herr, Arnold Jacobshagen, and Matthias Echternach." *Journal of Singing* 75 (November 2018): 131-40.

Reveals contemporary thought on the topic of countertenor by Prof. Kai Wessel, Dr. Corinna Herr, Dr. Arnold Jacobshagen, and Dr. Matthias Echternach. Specific topics investigated include pedagogic application, the voice type historically, and the vocal mechanism.

Reverter, Arturo. "El cantar de los cantares: Criterios de clasificación." *Scherzo* 19, no.190 (2004): 150-151.

An overview of parameters for classifying vocal types. (unavailable for verification, adapted from *RILM Abstracts*)

Riemens, Leo. "Wuchtiglieben, zierlich sterben. Die Farbenpalette des Gesangs: Rollenfacher und ihre Stimmen." *Musik und Medizin: Organ für Musik und Musiktherapie: Internationale Fachzeitschrift für Medizin* 3 (1976): 70-72, 75-77.

Unavailable for verification.

Roers, Friederike, Dirk Mürbe, and Johan Sundberg. "Predicted Singers' Vocal Fold Lengths and Voice Classification—A Study of X-Ray Morphological Measures." *Journal of Voice* 23, no. 4 (2009): 408-13.

A scientific study that took X-ray images of one hundred thirty-two singers at the University of Music in Dresden, Germany. The postulated theory was that vocal fold length (VFL) correlated with a singer's voice classification, and that, given such classification, VFL could be predicted. Results supported this hypothesis.

Rogers, Francis. "The *Basso Profondo* Voice." *The New Music Review and Church Music Review* 12 (June 1913): 252-54.

A commentary on the rare *basso profondo* voice that includes biographical and career information on two of the great *basso profondos* of the time- Carl Formes and Myron Whitney.

Root, Frederic W. "About Voice Teaching. Answers to Correspondents." *The Musical Visitor* 20 (November 1891): 284.

Considerations for the training of young male voices, the assigning of voice types, correct breathing while singing.

Rugger, David G. "Seeing the Voice, Hearing the Body: Countertenors, Voice Type, and Identity." PhD diss., Indiana University, 2018.

This dissertation attempts to answer the question "Why has falsetto been systematically excluded from normative modes of western masculine vocality?" ... More broadly, this project examines how the voice became an organ of identity, supposedly capable of revealing the furtive truth of a subject's being through vocal sound. I explore these issues through a series of case studies. Chapter 2 explores the intersection of national musical identity, gender identity, and historically informed performance practice through an examination of the early career and reception of countertenor Alfred Deller. ... Chapter 4 explores the representation of countertenor bodies on the operatic stage in repertoire written specifically for the voice type

since 1960, especially in the operas of Benjamin Britten, Philip Glass, and John Adams. This dissertation traces how the link between voice, body, and identity was forged, and how that negotiation plays out in the case of male falsetto. Ultimately, this project offers a critique of the way we currently think about our voices and ourselves. (unavailable for verification, adapted from *RILM Abstracts*)

Salgado, António G. "Rethinking Voice Evaluation in Singing." In *The Music Practitioner: Research for the Music Performer, Teacher and Listener*, edited by Jane W. Davidson, 193-99. London and New York: Routledge, 2004.

A phenomenological study that interviewed 40 European singers-20 students and 20 professionals- on the effects of Traditional Voice Evaluation (TVE) on their sense of self, learning process, and professional development. The use and study of a more scientific and objective method of voice classification- *chronaxie recurrentielle* (CR) is encouraged.

Seay III, James H. "The Evolution of the *Heldentenor*: Siegmund, Grimes, Samson, and Otello." DMA diss., University of Alabama, 2014.

A dissertation that offers pedagogical and historical context to the *Heldentenor fach*. Discusses voice type v. *Fach*, and examples of historical *Heldentenors* are given. According to the author, the purpose of this document is to "provide a better understanding of both the historical and developing trends that contribute to the Heldentenor voice in order to provide new singers with better insight regarding the training and performance practice of the *Fach*."

Seedorf, Thomas. "Ein neuer Held! Ein neuer Held? Zur aktuellen Diskussion über ein Stimmfach." *Wagnerspectrum* 8, no. 1 (2012): 55-67.

The remarkable success of the German tenor Klaus Florian Vogt has given new impetus to the longstanding controversy regarding the specific characteristics of a heldentenor. Wagner's own remarks about the *Fach* of heldentenor and their implications for vocal technique. Both admirers and detractors of Vogt agree on the unusual timbre of his voice. His detractors think he is unfit for Wagner's heroic parts, while his admirers appreciate the almost androgynous timbre of his voice. Vogt's problematical sonority is the vocal equivalent of the problematical notion of the hero in our post-heroic age. (unavailable for verification, adapted from *RILM Abstracts*)

Seesholtz, John C. "The Origin of the Verdi Baritone." *Journal of Singing* 68 (May 2012): 521-25.

A discussion of the Verdi baritone voice that attempts to define the voice type of and trace its origins. Historical context is provided using quotes from Verdi himself.

Seidner, Wolfram. "Ist die Klassifizierung von Stimmtypen noch zeitgemäß?" In *Man singt nur mit dem Herzen gut...: Gesang im Spannungsfeld zwischen Alltagskultur und Professionalität*. Schriftenreihe Schriften zur Kulturwissenschaft 44. Hamburg: Verlag Dr. Kovač, 2002.

The classification of vocal ranges, as well as voice categories, in Western opera and concert singing is neither old-fashioned nor is it primarily relevant to aesthetic categories or career potential. Rather it serves to identify the natural possibilities of a voice, including the limits of what it can accomplish, and to direct vocal training or professional employment accordingly. (unavailable for verification, adapted from *RILM Abstracts*)

Shewan, Robert. "Voice Classification: An Examination of Methodology." *The NATS Bulletin* 35 (January 1979): 17-27.

> Shewan organizes concepts on voice classification and synthesizes them into a viable methodology. The voice classification is based on range, timbre, optimum pitch for speech, vocal registers (transition notes), and anatomical considerations.

Shin, Jae E. "Managing Technical and Stylistic Challenges of 5 Soprano Roles in 3 Different *Fachs*." DMA diss., University of Maryland, College Park, 2006.

> This dissertation follows the demands of one soprano's journey through five diverse works covering and incorporating four different musical periods (Classical, Bel Canto, Romantic, and Verismo), three German *Fächer* (Soubrette, Lyric Coloratura, and Dramatic Coloratura), and two languages (Italian and French). Ultimately, this project is a study and presentation of the challenges of singing diverse roles effectively while remaining healthy, both vocally and psychologically…. While the works within this dissertation show both contrasting characters and, thus, differing *Fach* categorizations, I will argue that the German *Fach* System is a subjective framework…. In my dissertation, I will discuss whether the roles I selected to perform provided a healthy regimen and how the preparation and performance of works from different musical periods has required special techniques and posed unusual psychological demands…. (unavailable for verification, adapted from *RILM Abstracts*)

Siemon, Brittnee M. "An In-depth Examination of the Defining Parameters of the Lyric Mezzo-Soprano: Its Place in History and Future in Pedagogical Study and Performance Venues." DMA diss., University of South Carolina, 2007.

> A review of historical and pedagogical literature that attempts to define the Lyric Mezzo Soprano voice type, trace its history, and provide "relevant suggestions for training and repertoire, as well as its projected future in pedagogical study." Also biographical information on notable Lyric Mezzos.

"Soprano or Alto?" *Dwight's Journal of Music*, 23 January 1875, 375.

> Offers a schematic, based on a well-known pedagogues opinion, for voice categorization in choral and solo work. Solely determined by range.

Teresi, Enrico, Giovanni De Poli, and Franco Ferrero. "Mel Cepstrum Parameterization and Classification of Opera Singers' Voices." *Acta Acustica United with Acustica* 86 (May 2000): 568-77.

> A quantitative study that seeks to link the unique spectral qualities of different opera singers' voices to their respective categorizations. Fourteen singers from five different vocal categories underwent vocal analysis using Mel Cepstrum parameterization. This method proved useful for "spatially representing the acoustic differences among different categories of singing voices."

Thomas, Sara. "The *Fach* Follies of my Youth." *Classical Singer* 20 (May 2007): 5.

> A phenomenological perspective that details one young soprano's experience with the *Fach* system, followed by a discussion of voice classification in pedagogy. Stresses the need to establish solid technique before any classification attempts are made.

Thompson, Frank S. "Classification of Voices." *The Negro Music Journal* 1 (May 1903): 165-68.

> A pedagogical treatise that seeks to aid singing teachers in categorizing men's and women's voices. Focus is given to range, *passaggi* and timbre. Some discussion is given to characteristics of parts of the vocal apparatus that make a good singer and that, if not endowed by nature, can be developed through physical drill.

von Hoff, Bonnie. "Vocal Health and Repertoire for the Dramatic Mezzo-Soprano: A Suggested Course of Study." DA diss., Ball State University, 2013.

> A curriculum guide for young dramatic mezzo-sopranos that focuses on vocal health. According to the author, the aim is to "explore repertoire for the dramatic mezzo-soprano and provide a suggested course of study that helps to ensure continued vocal health." Includes interviews with dramatic mezzos Mignon Dunn and Dolora Zajick.

_____. "Repertoire for the Young Dramatic Mezzo Soprano." *The Opera Journal* 48, no. 3 (2015): 3-19.

> Based on Dr. von Hoff's dissertation. Gives a suggested course of study for beginning, intermediate, and advanced dramatic mezzo-sopranos and their teachers. Dr. von Hoff stresses the importance of having a foundation of art song and not jumping into arias before solid technique is established. This facilitates vocal health and musicianship.

Walker, Jamison. "The Spectral Analysis of the Heldentenor." DM diss., Florida State University, 2015.

> A scientific study that compares and contrasts the spectral properties of heldentenor and non-heldentenor voices. It was found that heldentenors, either through technique or natural talent, had richer harmonic presence that enables the voice to pierce through thick orchestration. Some attention is given to the Wagner heldentenor roles and their place within the *Fach* system. Tessitura and role length are examined and some qualitative context is given.

Wanja, Ingrid. "Jennifer Wilson: Durchstart im schweren Fach." *Orpheus: Oper international— Das Magazin zum Musiktheater* 40, no. 7-8 (2012): 98-99.

> An interview with the dramatic soprano. (unavailable for verification, adapted from *RILM Abstracts*)

Weiss, Stephanie. "*Zwischenfach* - A Distinct Voice Type: A Study of Fach through Specific Roles in the Works of Richard Wagner and Richard Strauss." *Opera Journal* 51 (June 2018): 1-42.

> An aesthetic inquiry looks at five roles in Wagner and Strauss operas considered to be part of the *Zwischenfach* voice category. The roles are Adriano, Venus, Kundry, Octavian, and the Komponist. Some historical context is also given regarding these roles. Dr. Weiss points out that *Zwischenfach* is an underrepresented category when it comes to pedagogical literature. Analysis of the "range, tessitura, and orchestration, and the use of vowels demonstrate that the *Zwischenfach* is an important and distinctive category."

Wetherbee, J.Q. "The Voice" *Dwight's Journal of Music*, 6 January 1855, 106-8.

An excerpt from a university lecture. Designed to "notice some of the characteristics of the different classes of voice; as, the Soprano, Contralto, Tenor, and Bass." Emphasis is given on timbre and flexibility of these voices and the associated expressions or emotions.

Wildgruber, Jens. "Zur Entwicklung der Sopranfächer in der deutschen Oper des 19. Jahrhunderts." In *Beiträge zur Geschichte der Oper*, edited by Heinz Becker, 15:147-64. Regensburg, Gustav Bosse, 1969.

In female operatic roles, there is no clear correspondence between vocal register and the age of the character that is portrayed - a soprano can play the part of a young lover, a heroine, or a mature woman. There are three basic soprano types: lyric, dramatic, and a combination of the two. The characteristics of each type are discussed; examples, drawn largely from the operas Richard Strauss, are given. (adapted from *RILM Abstracts*)

Yan, Nan, Manwa L. Ng, Edith K. Chan, Dongning Wang, and Chengxia Liao. "Vocal Fold Vibratory Differences in Different Registers of Professional Male Singers with Different Singing Voice Types." In *Proceedings: The ICMPC--ESCOM 2012 Joint Conference— 12th Biennial International Conference for Music Perception and Cognition; 8th Triennial Conference of the European Society for the Cognitive Sciences of Music*, edited by Emilios Cambouropoulous, Konstantinos Tsougkras, Panayiotis Mavromatis, and Konstantinos Pastiadis, 1150-53. Thessalonikī, Greece: Aristoteleio Panepistīmio (Department of Musical Studies), 2012.

...This study examined the relationship between different singing voice types and the associated vocal fold vibratory characteristics. A total of 19 tenors, 10 baritones professional singers participated in the study. A total of 84 vowel sounds sung in chest, head, and falsetto registers at a constant loudness and most comfortable pitch level were analyzed by using electroglottography (EGG). The open quotient (Oq) and fundamental frequency (F0) parameters were extracted and the gradient Oq/log(F0) were determined. Results showed that tenors had significantly higher Oq/log(F0) gradient than baritones in chest and head registers, while no significant difference was found in falsetto register between the baritones and tenors. Moreover, gradient Oq/log(F0) was significantly greater in falsetto register when compared with chest and head registers produced by baritone singers. The present results provide insights to the application of vocal fold vibratory characteristics in voice classification for male singers. (adapted from *RILM Abstracts*)

Zuckerkandl, Viktor. Musikalische Gestaltung der großen Opernpartien. Jugendlich-dramatisches Fach. Leipzig: M. Hesse Verlag, 1932.

Unavailable for verification.