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Singing Scientifically: A Content Analysis of *Choral Journal* and Science-Based Discussion of the Voice

Andrew P. Schmidt¹

Abstract

The purpose of this investigation was to determine the number of voice-related articles published in *Choral Journal* that included scientifically researched, evidence-based knowledge. Understanding the voice directly impacts the overall vocal health of singers. A content analysis of *Choral Journal*, the flagship publication of the American Choral Director's Association, yielded 159 scientifically informed, voice-related articles published between 1959 and January 2022. The analysis demonstrated that authors employed three primary fields of science: physiology and anatomy, acoustics, and phonology. They used these areas to inform four broad categories of vocal pedagogy: resonance, diction, blend, and an uncoded category that included discussions of breath and body alignment. Many such articles appeared early in *Choral Journal* history, followed by fewer scientifically informed, voice-related pedagogical articles decade over decade until a notable rebound in the 2000s. The author concluded that more research in the areas of gender diversity, non-traditional vocal styles, and the explicit linkage between breath and body is needed. The author curated 52 previously published works for further reading as well as a QR link to all 159 articles analyzed. Revisiting this research may ameliorate potentially harmful misconceptions regarding the voice and singing as well as encourage further scientifically informed, evidence-based publications.

Keywords: choral pedagogy; content analysis; vocal health; voice science; *Choral Journal*

¹ Georgia State University School of Music, Georgia State University, Atlanta, GA., USA

Corresponding authors:

Andrew P. Schmidt, Georgia State University, P. O. Box 3965, Atlanta, GA 30302, USA.

Email: aschmidt16@gsu.edu

Singing Scientifically: A Content Analysis of *Choral Journal* and Science-Based Discussion of the Voice

In 2017, *Choral Journal* (*CJ*) published an article by Sharon Hansen, founder, and then-editor of *On the Voice*, celebrating the first 18 years of the column. In *Singing in ACDA's First Fifty Years: Celebrating the "On the Voice" Chai Anniversary (1999-2017)*, Hansen chronicled *Choral Journal's* history of publishing voice-related articles and discussing voice-related issues at ACDA interest sessions, both regional and national, over the journal's first 50 years. Notably, Hansen calculated the percentage of voice-related articles compared to the number of *CJ* issues published during those 50 years. They identified 236 articles as voice-related or approximately 12% of articles published in *CJ* (2017). Two years later, McCoy, associate editor of *Journal of Singing* pointed out that vocal pedagogy's mixed history included false information where teachers assumed certain physiologic functions and more truthful information that relied upon scientifically researched, evidence-based knowledge (2020). Edwin (2020) another associate editor of *Journal of Singing*, affirmed the singing teacher's dilemma, noting a propensity to perpetuate myths, biases, and inaccuracies. This history necessitated the establishment of voice science as the "flag-bearer" of the singing profession (2020). The purpose of the current research project was to ascertain, through content analysis, the number of voice-related *CJ* articles that included scientifically researched, evidence-based knowledge. Investigating how the published authors have contributed to an understanding of vocal practices revealed how the journal supported the development of vocal health.

Many content analyses explore correlations between multiple related or loosely related variables, e.g., analyzing articles about band pedagogies in non-western countries. Authors of these analyses endeavor to draw extrinsic conclusions based upon collected data. Other analyses correlate readily available data to illuminate intrinsic conclusions, e.g., who are the most cited authors in a particular journal. Related to the latter paradigm and germane to this article were content analyses of like-journals. Aside from Hansen's article, no other detailed content analyses published by or about *CJ* exist in circulation. *CJ* published a review of literature about the development of the female adolescent voice in 2016 (Sweet). In Yarbrough's 1984 review of the *Journal of Research in Music Education*, they noted that reflection on past accomplishments provides perspective and helps to establish future goals. For instance, a 1961 article called upon all future authors to utilize the International Phonetic Alphabet (IPA) when writing vocalizations (Cappadonia, 1961). The [u] vowel, containing physiological and acoustical information, informs a potentially different vocal result than the 'oo' or 'ooh' sounds. Authorial reflections in other journals established journal eminence (Hamann & Lucas, 1998), examined citations to determine influences of past research (Hancock & Price, 2020), categorized articles, and tracked methodologies (Killian et al., 2012; Nichols, 2013; Rohwer, 2018; Yarbrough, 1984), and provided context for the development of historical trends (McCarthy, 2012; Volk, 1993). The current review analyzed *CJ* for scientifically informed, voice-related articles. Results highlight a wealth of relevant, useful information, scientific areas of focus, pedagogical areas of focus, articles of historical interest, and emerg-

ing research trends. This article concludes with a categorical index of this *CJ* content; readers may both assess past contributions and identify areas needing further investigation.

Method

Hansen's 2017 article lacks an index of the sources included; therefore I identified 398 voice-related articles for initial analysis from three previous indexes completed in 1985, 1993, and 2020 (Butler, 2020; Dorsey, 1993; Hammett, 1993). Those indexes organized *CJ* articles into broad, topical categories. One of the authors, Dorsey, continues to provide an updated index of articles to *CJ* (Dorsey, 2021). In the cases of categories including vocal pedagogy/vocal health, I sourced all articles. In categories including rehearsal techniques and music education, I first examined articles with titles that easily lent themselves to inclusion, such as "Choral Diction with a Phonological Foundation", or "How and Why Vocal Solo and Choral Warm-Ups Differ". Next, I scanned articles with titles that ambiguously referenced vocal pedagogy such as "Practices of Successful Women's Choir Conductors" for voice-related content. Finally, I examined each index for hard-to-identify articles. In the 1970s, for instance, the column "Da Capo" reported on a variety of topics, yet online databases listed all these articles as "Da Capo"; therefore they would be missed in many keyword searches. For the last few years of publication, access occurred through the ACDA website. Similar to Hansen's results, each of the three indexes analyzed revealed approximately 9-11% of articles as voice-related.

Inclusion and Exclusion of Articles

Articles included in this content analysis focused primarily on three scientific areas. Common traits found in articles that included fact-based, scientific descriptions of the body and vocal anatomy through direct observation, laryngoscopes, stroboscopes, and the like established the first area, physiology and anatomy. The second area, acoustics, formed through the identification of articles that included physics of sound and evidence from spectrography. I excluded articles with a focus on room acoustics or studies that moved singers in various formations. The final area, phonology, looked at articles that included mention of the International Phonetic Alphabet (IPA) or other phonemic systems. I did not include non-phonemic systems in this analysis. While the areas of physiology, anatomy, and acoustics more readily mapped to issues of pedagogy and practice, phonology and the use of IPA established standardization. In voice science, standardization of sounds allows for a more precise application of other sciences. For example, the vowel [a] has pitch and associated adjustments of vocal articulators, whereas the vowel in the word *father* can vary widely from person to person. Articles that discussed psychology were not included in this content analysis. Employing inclusionary and exclusionary measures yielded 159 articles for analysis.

Coding

The 159 articles were coded in two cycles using MAXQDA2020. This helped conceptualize and collapse patterns into concepts and sub-categories (Boletto, 2018). By analyzing the results, an explanatory framework emerged that illustrated relationships between concepts and data. I adopted Descriptive and Pattern Coding methods from Saldaña (2009). Descriptive coding is used to assign a code, usually a noun, as the identifier of a topic of a passage of qualitative data. Utilizing pattern coding, a second cycle method, established meta-codes, grouping first cycle codes into sets. The overall approach, therefore, relied upon both inductive and deductive methods.

To achieve rigor, transparency, and inter-coder reliability (ICR), I recruited an independent coder with a doctoral degree in voice and extensive professional choral experience to examine a random sample of the collected articles. Other researchers have disagreed as to the number of required independent coders and sample size to achieve sufficient ICR (O'Connor & Joffe, 2020). For this analysis, the independent coder first analyzed approximately 10% of the articles. The researcher and coder met to discuss the codes created, and after determining procedures for the next round, the researcher supplied a second sampling of approximately 10% of the articles. The independent coder coded and re-coded all their articles. After meeting a second time, Scott's pi was used to calculate an ICR rating of .81 (Stambaugh & Dyson, 2016).

Results

The content analysis yielded 26 first cycle codes and 10-second cycle, or parent codes, as displayed in Table 1 and Table 2 on the next page. To clarify, articles often included multiple first-cycle codes, therefore the parent codes' numerical values could exceed the total number of articles analyzed. The three most used scientific methodologies were acoustics ($n = 79$), physiology and anatomy ($n = 282$), and phonology ($n = 52$). Consult Figures 1, 2, and 3 on page 168 to see how many articles using these methodologies appeared each decade. In all cases, a sinusoidal ebb and flow of articles were published decade over decade with a shared low in the 1990s followed by a sharp rebound in the 2000s. Other areas of scientific discussion were biochemistry ($n = 2$), cybernetic principles ($n = 1$), endocrinology ($n = 5$), and neurology ($n = 6$). Because articles containing these other areas appeared overwhelmingly during the last two decades, it was difficult to determine if they were niche interests or methods of future focus.

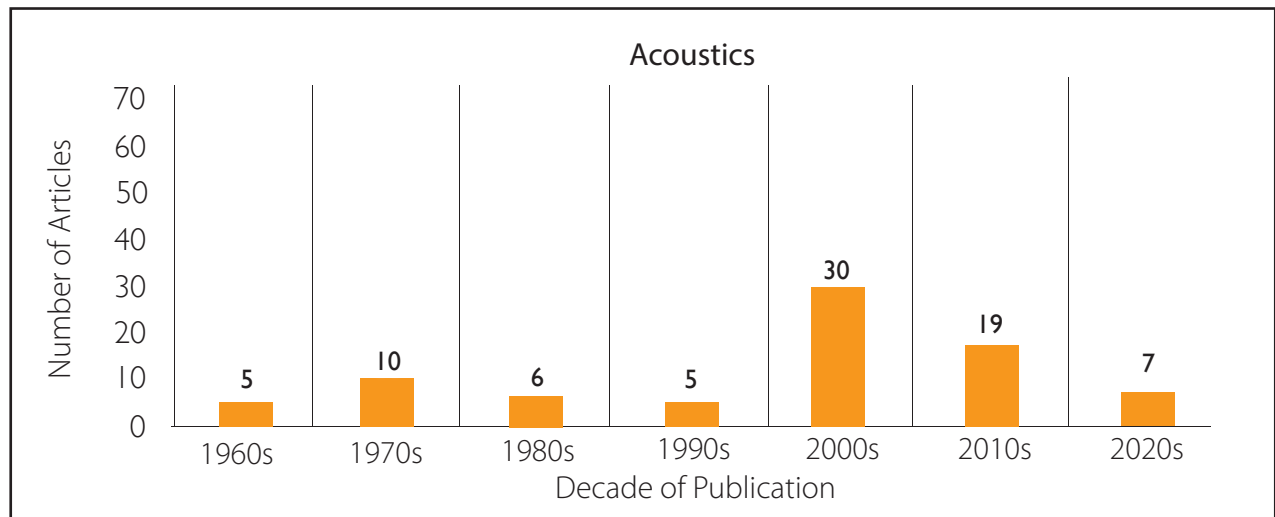
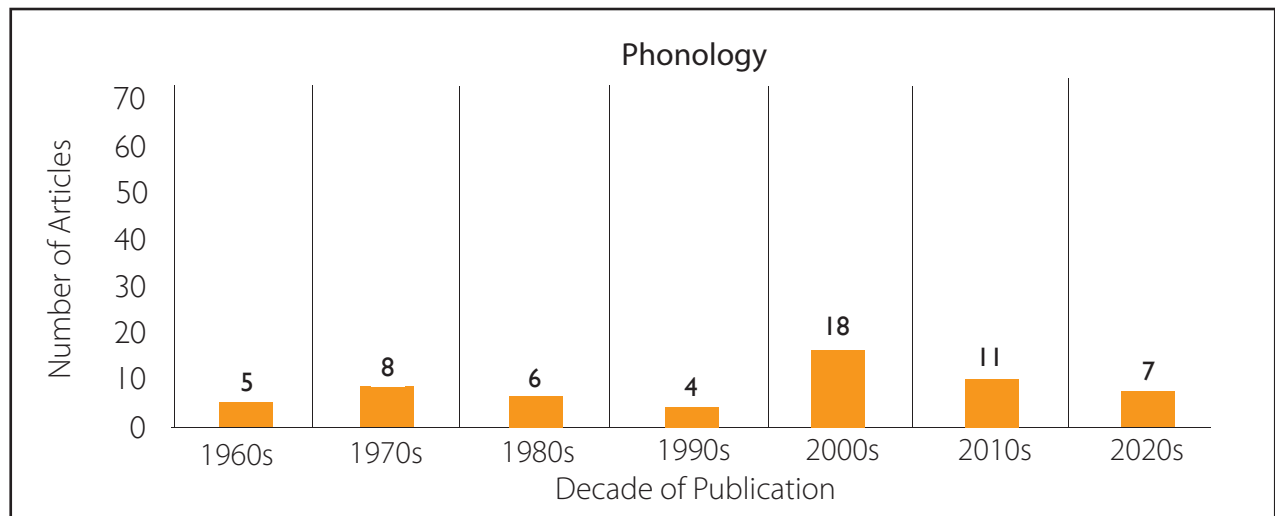
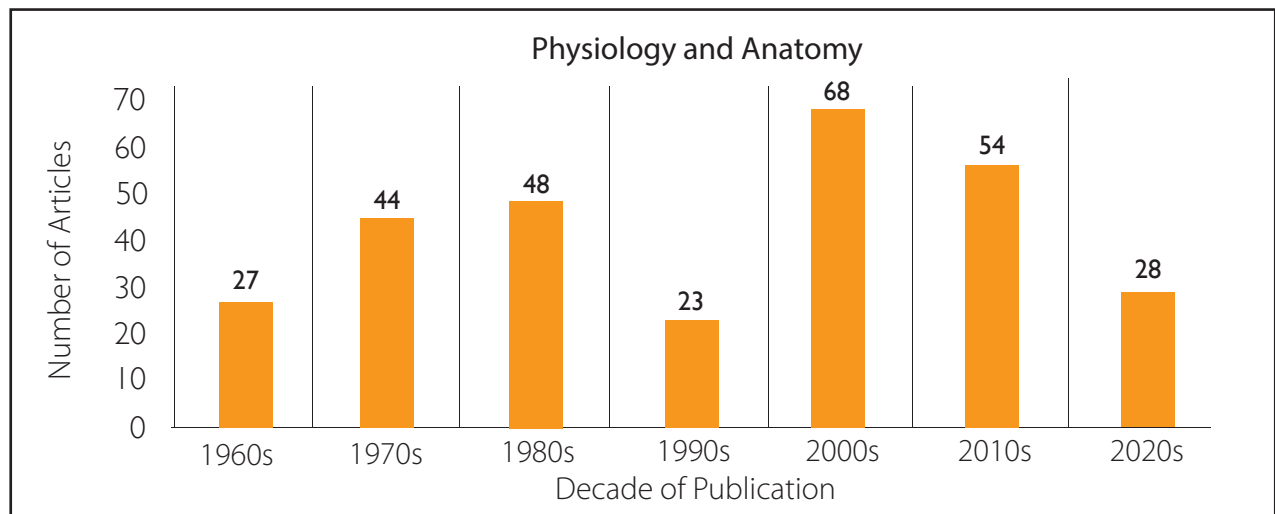
Of the three most used methods, authors employed acoustical science to discuss general acoustics ($n = 32$) and harmonics ($n = 30$). Vocal formants ($n = 17$) could have been grouped with harmonics, however; because vocal formants were explicitly mentioned, I separated the code. Authors used the science of physiology and anatomy to discuss the voice most often in terms of anatomical description ($n = 80$), vocal articulators such as the jaw, tongue, velum,

Table 1
Number of Articles Where Specific Scientific Coding Appears

Scientific Parent Codes	Scientific Codes	Number of Articles (<i>n</i> = 159)
Acoustics	General acoustics	32
	Harmonics	30
	Vocal formants	17
Physiology & Anatomy	Anatomical description	80
	Resonators	39
	Vocal articulators	85
	Vocal folds	78
Phonology	Bell vowel chart	1
	Declamation	2
	IPA	49
Biochemistry	General biochemistry	2
Cybernetic principles	Brain	1
Endocrinology	Hormones	5
Neurology	Brain	2
	General nervous system	4

Table 2
Number of Articles Where Specific Vocal Pedagogy Coding Appears

Choral Parent Codes	Choral Codes	Number of Articles (<i>n</i> = 159)
Diction	Vowels	70
	Consonants	35
Resonance	General resonance	23
	Intonation	14
	Range	41
	Tone	63
Blend	Balance	4
	General blend	14
	Vibrato/Non-vibrato	24
No Parent Code	Breath	70
	Posture/Alignment	34

Figure 1*Number of Articles Coded as Acoustics by Decade***Figure 2***Number of Articles Coded as Phonology by Decade***Figure 3***Number of Articles Coded as Physiology and Anatomy by Decade*

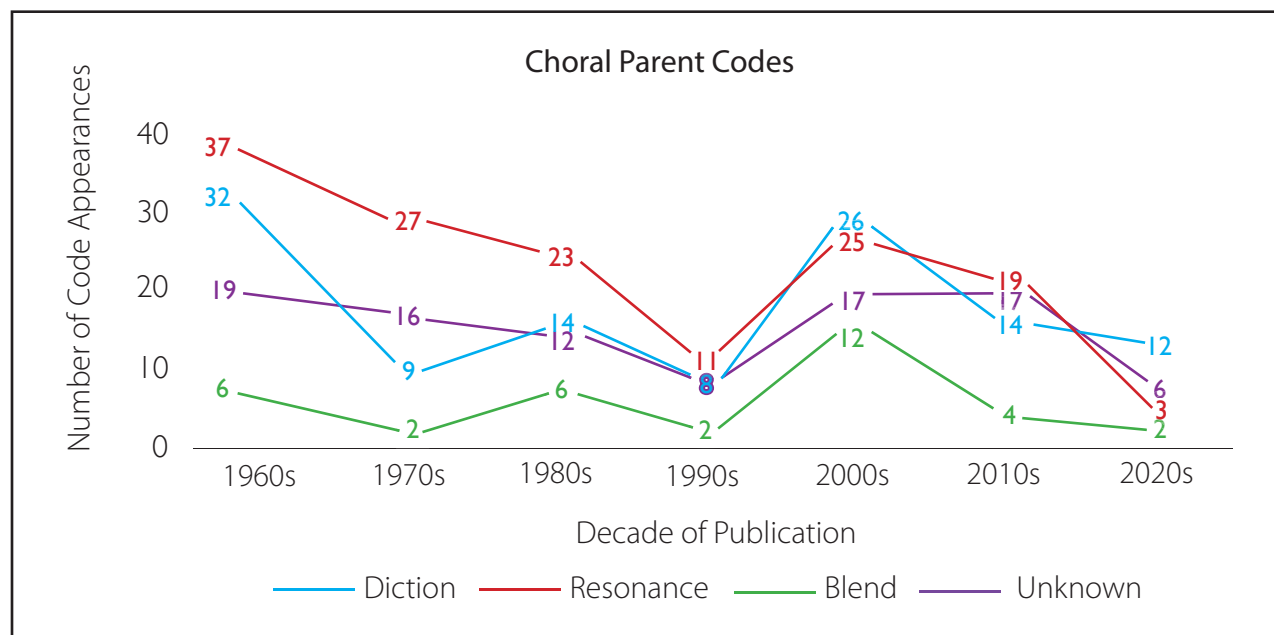
laryngeal position, etc. ($n = 85$), and vocal folds ($n = 78$). Authors used the science of phonology to discuss IPA ($n = 49$).

The three most discussed areas of vocal pedagogy were resonance ($n = 141$), diction ($n = 105$), and blend ($n = 42$). The code vowels ($n = 70$) was difficult to assign to a parent code because it was often discussed in terms of tone, intonation, range, and resonance. Uniform vowel production was also established early on as the primary contributor to choral blend (Wyatt, 1967). Rather than parsing out multiple vowel codes, I assigned it to the parent code, diction. This illustrated vowels as having a general, rather than a specific function. Authors discussed resonance most often in terms of tone ($n = 63$). They discussed blend most often in terms of vibrato/non-vibrato ($n = 24$), though as stated earlier, the code vowel could have featured prominently in this category.

I did not assign the first cycle, vocal pedagogy codes breath ($n = 70$) and posture/alignment ($n = 34$) parent codes. Authors discussed these areas separately, together, and with blend and resonance. Unsatisfied, a brief search for a possible parent category ensued. In terms of the power-source-filter model of vocal pedagogy, which was adapted from the source-filter model of speech pathology, breath and alignment would fit under the category of power (Estill Voice, 2021). No authors discussed the power-source-filter model in *CJ* so I did not think it appropriate to use power as a parent code. Articles with methodologies like Alexander Technique, Feldenkrais Method, and Tai Chi, which address these two pedagogical areas, appeared once each in voice-related articles. Articles mentioning Yoga appeared twice. Figure 4 depicts the appearance of pedagogical codes by decade. Note that articles included more than one pedagogical code. The figure reflects the relative density of each pedagogical focus over time.

Figure 4

Number of Times Choral Parent Codes Appeared by Decade



As a reminder, Hansen's analysis calculated the percentage of voice-related articles as related to the number of *CJ* issues and as a percentage of total articles. Hansen reported some difficulty determining what constituted an article as a feature article (2017). The 2020 index for this analysis listed approximately 2400 articles, Dorsey's online catalog had organized approximately 3500 printed items, excluding advertisements and photographs (Butler, 2020; Dorsey, 1993). Based upon this analysis, the number of articles relying upon scientific methods to discuss vocal pedagogy was approximately 4.5 – 6.6% of all articles, or 159 articles from 580 *CJ* issues.

Discussion

The analysis of the 159 articles illuminated various simple, as well as some nuanced observations. *CJ*'s publication of scientifically-based, voice-related articles occurred in waves of increased and flagging numbers, with a most notable decline in the 1990s and a surge in the 2000s. This pattern perhaps reflected either the editorial board's interests or reflected the general interests of the readership. The related content published in the 2000s may have indicated a decade with very increased scientific output. The volume of related output during the 2020s would determine whether this sinusoidal, or pendulous pattern persists or not.

Data showed that from the 1960s thru the 1990s, *CJ* continuously released fewer vocal-pedagogy-related publications overall. This may have reflected an expansion of content areas found within *CJ* or a change in focus from one matter of interest to others. As subscriptions grew, perhaps the scope of desired interests broadened. It also perhaps indicated a turn towards vocal pedagogy textbooks as the primary vehicle for scholarship. Regardless, published authors in the 1960s demonstrated significant interest in how to sing and how singing worked. Only two years into the 2020s, *CJ* published nearly as many scientifically-based, voice-related articles as were published during the 1990s.

I excluded 46 vocal-pedagogy-related articles from analysis because their authors did not employ scientific or evidence-based information. While the purpose of this article was not to compare one article or author to any other in terms of quality, it is important to point out that authors tackled voice-related issues by other means. Because the language used in many scientifically-informed articles aimed at "setting the record straight," it seems an ambiguously defined campaign against misinformation played out over the decades. A category in Appendix A titled Combating Falsehoods contains some of these articles. It is unclear whether authors directed their "record correction" at other authors or the field at large.

Next, this content analysis found that the discussion of physiology and anatomy overwhelmingly surpassed any other area of scientific interest. How the body sings and how an ever-changing body affects our singing fueled most authors' contributions. The narrative within the pages of *CJ* began with attention to adult voices, and expanded to include children's voices, but mostly those identified as male, with specific interest in those identified as female in the 1980s. This in-depth scholarship sparked reactionary interest in aging voices,

and most recently, the voices of individuals who identify as transgender. While authors expanded the types of voices included in *CJ*, they barely looked beyond Euro-centric notions of singing. Nearly all authors' scientifically-related research reinforced one culture of singing, with vocal jazz as the exception. While *CJ* is a publication based in the United States, singing in a gospel, popular, spiritual, musical theater, barbershop, or folk style received little to no pedagogical coverage in a scientific or evidence-based manner.

Additionally, despite coding breath in 70 out of 159 articles, and posture/alignment in 34, no clear pedagogical parent code linked these areas as diction-linked vowels and consonants, or as resonance accounted for intonation, range, tone, and general resonance. As mentioned previously, the vowels code could have easily appeared under the parent codes resonance or blend, inferring relatively intense pedagogical prioritization upon vowels. Within the pages of *CJ*, there exists a scientific, evidence-based pedagogy of diction, blend, and resonance. Authors tended, however, to silo the study of breath and posture/alignment with the exception of a handful of articles related to Alexander Technique, Feldenkrais Method, Tai-Chi, or Yoga. As many authors mentioned diaphragmatic misunderstandings, this gap in coding may reflect scholars, practitioners and teachers wrestling with pedagogy of breath and posture/alignment in the field at large.

Finally, the *Choral Journal printed* relatively fewer articles on how understanding the physics or acoustics of sound can affect how we make sound. Hansen mentioned that in 2017, after surveying sixty-one universities with music education degrees, less than 40% of the programs surveyed required courses in diction or vocal pedagogy (2017). Hansen made no mention of acoustics-related coursework. That between 4%-6% of articles in *CJ* fit this study conjures the paradoxical question, "Does art imitate life, or does life imitate art?" This collection of statistics revealed how the overall breadth of topics covered in *CJ* (over 3000 articles exist that are not voice-related) reflect the wide-ranging interests of the choral field. They also, perhaps, infer a prioritization of certain topics over others. Unpacking this prioritization requires further research.

Conclusion

Each year, *Choral Journal* releases new scholarship and fresh ideas about the voice, how singing and sound work, and how to teach singing. A content analysis of all voice-related articles, since the journal's inception, yielded 159 scientifically informed, evidence-based articles, approximately 4%-6% of all articles written. In the 2000s, *CJ* released the highest volume of these kinds of articles, perhaps in response to an overall continuous decline in related output through the 1990s. While authors in the first two years of this decade nearly matched the level of publication seen in the 90s, the future will show whether the fervor of the earlier part of this century persisted. Certainly, more scholarship is needed. More articles that explicitly link and explain the breath-body alignment connection would fill a current gap in the literature. With only one *CJ* article about transgender singers, authors

need to explore gender diversity and its many facets. Furthermore, aside from a handful of articles, little instruction exists within *CJ* on how to sing in any other style than a Western-ly-conceived, *bel canto*-informed manner. For choristers attempting any other genre, except for Jazz, *CJ* provided no articles with explanation or aids.

Finally, while the three indexes created by Butler (2020), Dorsey (1993; 2021), and Hammett (1985) provided broad categorical analysis, I located only one other content analysis of a specific subset of *CJ* articles (Hansen, 2017). Both Hansen's 2017 article and this analysis focused primarily on voice-related articles. Only a handful of articles contained summaries of previous research related to changing voices. More retrospective and histographic work are needed. Through analyzing the output of scholarly journals, a picture of that journal emerges. That picture may clearly point to gaps in needed research, over and under prioritization of topics, and an esteemed or wanting history of rigorous scholarship. These types of reviews illuminate historical narratives, document achievements, and contextualize changing editorial values. In the case of *CJ*, this analysis focused on 4–6% of the content published. Much of the picture remains unexamined. This portion, however, showed that with regards to scientifically, evidence-based articles about the voice, the range of topics and approaches shared by *Choral Journal* continues to move towards the expansion and inclusion of people and traditions. Any journal's editorial board or editors can only consider for publication the manuscripts submitted for review, a point that seems obvious but that bears emphasis. Readers wishing for more article content related to vocal health need to advocate for—and perhaps write themselves—manuscripts related to vocal health.

By taking a moment to look back, not only does an appreciation of others' work emerge but also a need to keep looking ahead. Readers are encouraged to revisit the articles listed in Appendix A and access all 159 analyzed articles via the QR code provided. By building upon the knowledge therein and allowing science as the “flag-bearer” moving forward, future authors may stave off misleading practices or vocal misinformation. Authors need do more than simply emphasize the maintenance of good vocal habits. Authors can establish the scientific foundations upon which choristers may engage with a multiplicity of singing cultures and traditions in a healthy, informed manner.

Appendix A

A Sample of Articles with Brief Commentary

The remainder of this article includes 52 titles categorized by general area of focus and with limited commentary. These articles were not selected as “the best of the best” as any reader could determine for themselves the qualities and merits of an author's scholarship. For that purpose, a QR link to all 159 articles appears at the end of this article. The selected titles below represent areas of historical context, old, continuing, and new areas of focus, and

a rich presentation of scientific knowledge or the use of science in explaining the practicalities of singing.



QR link to all 159 articles

Vocal Health

Choral Journal's publication of articles related to vocal health began in 1979 (Thurman). Authors wrote about topics ranging from interviews with medical professionals concerning various surgical procedures to daily health tips on maintaining the instrument. While most authors focused specifically on areas in and around the larynx, others focused on general health and well-being practices.

1979 – *Voices*, by L. Thurman.

Volume 20, Issue 2, pages 10-11.

1983 – *Vocal Nodules and the Choral Conductor*, by P. E. Ingram and A. L. Keaton

Volume 24, Issue 3, pages 5-6.

1988 – *Voice Health and Choral Singing: When Voice Classifications Limit Singing Ability*, by L. Thurman, Volume 23, Issue 7, pages 15-21.

2008 – *Getting the Most From the Vocal Instrument in a Choral Setting*, by I. Titze

Volume 49, Issue 5, pages 34-41.

Combating Falsehoods

Many *CJ* authors noted that certain voice-related myths perpetuate the choral field. Central to the research behind this article has been a desire to detangle ideas and set minds upon a more fact-based course. Fortunately, many authors have taken up this mantle. By interviewing teachers of singing, medical professionals, and voice scientists, authors have endeavored to set the record straight or at least release some steam after navigating years of disinformation and misinformation.

2008 – *Voice Training in the Choral Rehearsal* by A. H. Jones

Volume 49, Issue 5, pages 8-15.

2013 – “*You Want Me to do What?*”: *Twenty-First-Century Voice Pedagogy Encounters Pedagogical Fundamentalism* by J. Nix, Volume 53, Issue 10, pages 43-51.

2014 – *Choral Directors are From Mars and Voice Teachers are From Venus: “Sing From the Diaphragm” and Other Vocal Mistructions: Part I* by S. A. Hansen et al
Volume 54, Issue 10, pages 47-53.

2014 – *Choral Directors are From Mars and Voice Teachers are From Venus: “Sing From the Diaphragm” and Other Vocal Mistructions: Part II* by S. A. Hansen et al
Volume 55, Issue 11, pages 47-53.

Explaining Singing

Writing about how singing works provided an alternative approach to educating readers about the voice and battling misinformation. Authors of these articles presented scientifically-informed, evidence-based information whereby readers could understand and perhaps utilize new knowledge to inform vocal pedagogy. While there were some suggestions for practice included, authors generally stuck to disseminating information rather than prescribing teaching tools. Readers will note the wide variety of methods with which authors discussed various topical issues. Some articles relied solely upon physiology and anatomy, while others employed acoustic knowledge, biochemical references, and even spectrographic support.

1975 – *What Happens in Singing: Number 1- Breathing* by J. L. Jones
Volume 15, Issue 7, pages 5-7.

1975 – *What Happens in Singing: Number 2 – Phonation* by J. L. Jones
Volume 15, Issue 9, pages 5-6.

1975 – *What Happens in Singing: Number 3 – Resonance* by J. L. Jones
Volume 15, Issue 2, pages 13-17.

1978 – *Da Capo: The Relationship of Phonation and Resonation* by R. Woodward & B. Coffin
Volume 19, Issue 3, pages 21-23.

1979 – *Da Capo: The Relationship of Phonation and Resonation* by R. Woodward & B. Coffin
Volume 19, Issue 7, pages 34-37.

1983 – *Putting Horses Before Carts: Voices and Choral Music* by L. Thurman
Volume 23, Issue 6, pages 5-9.

1984 – *Heads Up!* by B. M. Doscher
Volume 24, Issue 10, pages 5-8.

- 1987 – *Breathing: The Motor of the Singing Voice* by B. M. Doscher
Volume 27, Issue 8, pages 17-22.
- 2014 – *Viva La Vagus!* by M. van Mersbergen
Volume 55, Issue 3, pages 67-73.
- 2015 – *Pedagogy for the Jazz Singer* by D. Spradling & J. Binek
Volume 55, Issue 11, pages 6-17.
- 2019 – *On the Voice: Seven Essential Voice Science Tools for Choral Singing* by D. Harris
Volume 59, Issue 8, pages 47-58.

Suggestions for Singing

As to be expected, many of the voice-related articles published in *CJ* contained suggestions, routines, and exercises for singing. Though this project identified 46 other articles as ‘excluded’ due to a lack of fact-based evidence and research to substantiate their claims, there were many that endeavored to wed both science and pedagogy. While the first issue of *CJ* focused mainly on the formation of the journal (Constitution, 1959), the second issue contained the first relevant, voice-related article. The brief article by V. A. Christy included an advertisement for a forthcoming book on singing (Christy, 1960). It contained five rules for legato singing. The articles below offer more depth.

- 1976 – *Can Your Choristers Sing? Posture* by W. Decker
Volume 17, Issue 4, pages 15-16.
- 1977 – *Can Your Choristers Sing? Breathing* by W. Decker
Volume 17, Issue 5, pages 16-18.
- 1977 – *Can Your Choristers Sing? Relaxation* by W. Decker
Volume 17, Issue 6, pages 25-28.
- 1983 – *Putting Horses Before Carts: A Brief on Vocal Athletics* by L. Thurman
Volume 23, Issue 7, pages 15-21.
- 2007 – *On the Voice: Building Strong Voices: Twelve Different Ways!* by S. F. Austin
Volume 48, Issue 6, pages 55-66.
- 2008 – *On the Voice: Building Strong Voices: Twelve Different Ways! (Part II)* by S. F. Austin
Volume 48, Issue 8, pages 59-73.

2020 – *The Horse Before the Cart: Redefining the Choral Warm-Up* by B. J. Winnie
Volume 60, Issue 9, pages 28-39.

Changing Bodies, Changing Voices

Even though early studies looked at all genders, puberty-related information about those singers' assigned male at birth was of primary interest. The published research varied widely in methodology until Cooksey shared their seminal work in 1977. In 1985, Gackle began leading *CJ's* inclusion of studies focused on pubescent changes to those singers' assigned female at birth. The 2010s saw an increase in publications about vocal changes over a lifespan. Inclusion of topics like transgender voices appeared most recently.

1977 – *The Development of a Contemporary, Eclectic Theory for the Training and Cultivation of the Junior High School Male Changing Voice: Part II, Scientific and Empirical Findings; Some Tentative Solutions* by J. M. Cooksey, Volume 18, Issue 3, pages 5-16.

1977 – *The Development of a Contemporary, Eclectic Theory for the Training and Cultivation of the Junior High School Male Changing Voice: Part III, Developing and Integrated Approach to the Care and Training of the Junior High School Male Changing Voice* by J. M. Cooksey, Volume 18, Issue 4, pages 5-15.

1985 – *The Young Adolescent Female Voice (Ages 11-15): Classification, Placement, and Development of Tone* by L. Huff-Gackle, Volume 25, Issue 8, pages 15-18.

1991 – *The Adolescent Female Voice: Characteristics of Change and Stages of Development* by L. Gackle, Volume 31, Issue 8, pages 17-25.

2006 – *Finding Ophelia's Voice: The Female Voice During Adolescence* by L. Gackle
Volume 47, Issue 5, pages 28-37.

2010 – *On the Voice: The Evolving Voice: Profound at Every Age* by K. Brunssen
Volume 51, Issue 1, pages 45-51.

2012 – *Boy's Changing Voices: What do We Know Now?* by L. Thurman.
Volume 52, Issue 9, pages 8-21.

2017 – *One Voice, One Life: Many Changes Throughout a Lifetime of Song* by K. Brunssen
Volume 57, Issue 7, pages 43-49.

2020 – *Research Report: A Brief Discussion on the Potential Vocal Hurdles for Singers Who are Trans and Suggested Vocalists for Navigating a New Voice* by G. Gurs
Volume 60, Issue 9, pages 73-81.

Vibrato vs. Non-Vibrato

Debating the merits of vibrato within a choral setting first showed up in *Choral Journal* in 1961. Yet according to an article published in 1962, this controversy had been in full swing for at least 40 years (Regier et al., 1962). The 2000s saw amplification of this debate and the advent of explaining ‘healthy straight-tone,’ a controversial term itself. The articles below dealt specifically with this issue. Other mentions of vibrato can be found in articles about vocal health, intonation, blend, and elsewhere.

2006 – *Good Vibrations: Vibrato, Science, and the Choral Singer* by G. Walker
Volume 47, Issue 6, pages 36-46

2021 – *Healthy Minimization of Vibrato: An Exploration of “Straight Tone”* by D. Katok
Volume 62, Issue 4, pages 8-19

Blend and Tuning

Scholars poured over methods to garner a blended choral sound well before *CJ*’s inception. One could argue that the genesis of most voice-related issues eventually circles back to the conductor’s desire for a perfect blending of voices. Similarly examined was the need for choirs to sing in tune. The authors below sample myriad solutions and approaches offered. Readers of these articles should start with Wyatt’s offerings (1967). Plenty of misinformation persisted in the field despite early scholarship that included such rich material as a starting point.

1967 – *Blend in the Choral Sound: Factors Related to its Achievement: Vowels* by L. Wyatt
Volume 8, Issue 1, pages 15-18.

1967 – *Factors Related to Choral Blend: Tone Quality, Vibrato, Intonation* by L. Wyatt
Volume 8, Issue 2, pages 7-9.

1967 – *The Individual in the Choral Situation* by L. H. Diercks and E. M. Boone
Volume 7, Issue 4, pages 25-29.

1983 – *The Fixed Formant Theory and Its Implications for Choral Blend and Choral Diction* by S. C. Bolster, Volume 23, Issue 6, pages 27-33.

1986 – *Choral Diction with a Phonological Foundation* by R. E. Fisher
Volume 27, Issue 5, pages 13-18.

1991 – *Exploring the Whys of Intonation Problems* by B. M. Doscher
Volume 32, Issue 4, pages 25-30.

2005 – *Choral Intonation* by K. D. Skelton
Volume 46, Issue 3, pages 28-43.

2017 – *Student Times: Intonation* by B. Dalby
Volume 57, Issue 7, pages 85-90.

International Phonetic Alphabet (IPA)

Cappadonia (1961) wrote the first *CJ* article explaining IPA. They called upon future authors to utilize IPA whenever discussing lyrics or other sung sounds. By the 2010s, consistency of usage was broadly achieved. A brief scan of the 159 articles uncovered that a general IPA primer emerged roughly once per decade. Each decade, however, added new language applications.

1961 – *The Importance of the Clarity of Production of Consonants* by A. C. Cappadonia
Volume 2, Issue 2, pages 11-12.

1961 – *The Importance of the Clarity and Production of Consonants* (continued)
Volume 2, Issue 3, pages 15-16.

1962 – *The Formation of Vowel Sounds in Singing* by A. C. Cappadonia
Volume 2, Issue 5, pages 21-27.

1972 – *Toward a Better Concept of Choral Diction Through the International Phonetic Alphabet* by R. R. Moore, Volume 13, Issue 1, pages 22-23.

1981 – *Building a Sound Basis for Effective Multi-Lingual Choral Diction* by J. Mags
Volume 22, Issue 4, pages 5-8.

2016 – *The Latin Problem: How much does a singer really need to know?* by L. De'ath
Volume 57, Issue 5, pages 20-39.

2021 – *Singing in Hebrew* by J. R. Jacobson
Volume 62, issue 3, pages 24-35.

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