How do heavy metal singers develop and maintain vocal health while performing extreme vocal effects?

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PART ONE: INTRODUCTION, PLAN OF STUDY, & METHODOLOGY

INTRODUCTION

As a voice and speech coach primarily focused on the classical theatre world, the desire to learn about the world of extreme vocal effects in metal singing may seem at first like an incongruous decision. However, as the world of theatre continually evolves, we see more and more contemporary rock and pop music incorporated not only into musical theatre, such as in shows like *Rock of Ages* and *We Will Rock You* which played the West End and Broadway, toured internationally, and are continually remounted by regional theatres in the United States and abroad, but in Shakespearean performances and adaptations such as Whitney White's *Macbeth in Stride* and Broadway's recent hit *Stereophonic*, which became in April 2024 the most Tony nominated play in history (Soloski, 2024). Additionally, in my own professional circles in New York City and New Haven, the actors I have worked with are not confined to one artistic discipline, with many theatre performers also headlining bands of all genres, with a particular bent towards rock music. Many performers who began in theatre have found commercial success in rock and metal music (Huston, 2024; Greene, 2022). Knowing I am a voice coach, I have fielded many questions about how to achieve a certain sound or effect and have been made aware of the gaps in my own voice knowledge. This study hopes to begin to lessen those gaps as I broaden the field of voice in which I feel confident to advise.

The present issue with extreme vocal effects would be the assumption that these vocals are dangerous to perform and therefore, there is great stigma around engaging with them in "traditional" vocal education (Guzman et al., 2019). As my previous research into the connections between vocal dysphonia and anxiety have displayed, fear of stigma regarding vocal injuries is extremely common among performers of all backgrounds (Estes et al., 2023) and I am interested in exploring the problem of stigma in vocal education - whether that stigma is related to vocal injury or the sounds themselves.I hope this study will illuminate whether that fear of vocal injury related to extreme vocals is founded or unfounded in present literature and if founded, explore further techniques to lead to healthier practices. If that stigma is discovered to be unfounded, I am interested in how these perceptions came to be believed and maintained in the greater vocal health consciousness.

My previous research has been mostly around lifestyle factors of performers and the potential connection to dysphonia, and I am interested in how metal singers, with performances styles

and venues very different to the traditional theatre actor, may perform these vocal effects in a healthy way so that I may pass that information along to the actors I work with, for both their theatrical and musical work.

PLANNED PROGRAM OF STUDY

AIMS & OBJECTIVES

Aims

- To evaluate literature on techniques metal and rock singers utilize to keep their voices injury-free
- To review the lifestyle factors professional metal singers keep in mind when performing in a variety of venues with environmental hazards
- To begin to consider how theatre actors may incorporate these techniques into their own vocal regimens when undertaking roles that utilize extreme vocal effects

Objectives

- Identify vocal techniques to prevent injury in extreme vocal effects
- Identify if lifestyle factors play a part in preventing injury and dysphonia for metal singers
- Consider the thematic similarities between a variety of sources

LEARNING OUTCOMES

I hope to learn how rock and metal singers perform extreme vocal effects physically and how they take care of their voices while performing, what may appear to an outsider, as harsh and dangerous vocal effects, in a variety of environments not often suited to vocal health. I hope to then use that knowledge in the future to create a way for theatre actors to incorporate this research into their vocal warmups and day to day practice, increasing the range of their vocal abilities and therefore, the types of jobs and roles they are able to take on.

TIMELINE

As my work schedule requires me to be in the office five days a week, all day, I am primarily breaking this review into pieces and undertaking it in larger sections of time. For this to work best for me, I have put in a few deadlines which I will work around to make sure I am on track for completing this module:

Review All Component 1 Lectures: March 25

1v1 with Course Tutor to discuss Research Question/Method: April 1

Acquire all sources and begin writing Component 1: April 15

Complete Component 1 and Begin Component 2 Lectures: May 1
Begin Writing Component 2: May 10
Submit Draft: June 1
Submit Final: June 20

METHODOLOGY

For the type of literature review methodology I have decided to undertake, I consulted Randolph's 2009 "A Guide to Writing the Dissertation Literature Review", which quotes Cooper's Taxonomy of Literature Reviews. From there, I determined that due to the amount of time and number of sources, I would not be able to carry out a scoping review, but one that is 'representative' and focused on the goal of generalizing information that I have found in a narrative format, analyzing the texts one by one. I will be categorizing the sources by type of intervention, or more specifically, the vocal structures of the techniques examined within the source. A narrative review is the best approach for my goals, as I aim to learn about extreme vocal effects and vocal health, but do not anticipate being able to form a comprehensive understanding of the subject. I am also aware of my potential biases in search criteria, as I am interested generally in the negative impacts of stigma in regards to certain vocal effects or the larger social and cultural perceptions of heavy metal music. As I am interested in a qualitative synthesis of literature, a narrative review is the best option for cohesively reviewing the selected material within the narrow time window I have to undertake this project.

The search methodology I will undertake utilizes keyword searching for specific words and phrases, within a particular time period of publication and mostly from peer reviewed journals. However, due to the nature of this subject, I do anticipate utilizing some other sources as well.

Using the University of Wales Trinity St. David online library, my search criteria began with the keywords "voice" and "vocal" AND "metal or rock", in the fields of drama, medicine, and music, within the last ten years. It led to 194 results, however, most did not have to do with metal singing, but heavy metals found in the body. I expanded my search to include the keywords "extreme vocals", "extreme singing", and "vocal effects", which led to articles more appropriate to the research question. From there, I chained back and forth between the referenced sources to find more material. I found nineteen peer reviewed articles related to rock and popular vocal technique, and through those articles, more sources on injury prevention in general for vocalists, and environmental factors for performers of non-classical music. Of those related specifically to

metal singing and extreme vocal effects, there were eleven primarily focused between 2005 and 2025, and often, written by the same groups of researchers continuing their through lines of examination into these vocal effects.

However, despite finding these eleven articles about vocal techniques in metal singing, I worried they would not be completely fruitful to my research question in regards to lifestyle factors specific to metal singers that may be influential on the way they prevent injury. I used a keyword searching for a variety of words and phrases related to these pre-show rituals, or overall lifestyle concerns, including “pre-show” with metal and rock, as well as looking for material related to the stigma of vocal injury specifically in the metal and rock scenes, and was unable to locate any peer reviewed articles related to these issues in the last twenty years. Therefore, I decided to branch into the world of grey literature and examine newspaper and magazine articles and YouTube interviews where vocal teachers discuss extreme vocal effects, featuring particularly the two most mentioned and “well known” extreme vocal teachers, Elizabeth Zharoff and Melissa Cross.

My justification for including such sources comes from Bozeman and Ragan’s writings on Evidence Based Voice Pedagogy. As they wrote in 2021 in Journal of Singing, “Practitioner empiricism involves evidence gained by experience, observation, and informed trial and error exploration…voice teachers gradually develop their ears, eyes, and somatic sense for functionally efficient singing appropriate to the genres being studied” (Bozeman and Ragan, 2021). Additionally, as Winter quoted, the Adams framework suggests the questions: what is the potential impact of each artifact and how does the grey literature support the peer-reviewed material? (Winter, 2022). This question is one I will return to before considering the inclusion of any grey literature - how does it support the peer reviewed sources I have found? I will also write about this literature in a separate section from my peer reviewed sources and potentially, will need to consider implicit biases I may have in regards to it.

This lack of examination into metal vocal techniques may exist for many reasons, including a dearth of interest from researchers, but also due to the “rock and roll” lifestyle that these singers up until recently found vital to their images as performers (Coghlan, 2015). A death metal star talking about vocal care and voice training may take away from the image they hope to portray on stage, and many metal singers first learn how to engage with their voices through listening to and imitating other metal singers (Norton, 2023). Therefore, I believe it is necessary to engage

with the existing information in all forms, from peer reviewed to interview, in order to have a more complete view of this research question.

PART TWO: CRITICAL EVALUATION & REFLECTION

METAL, THEATRE, & THE VOICE TEACHER

Metal music is a genre of rock that began in earnest in the 1970s with the rise of bands such as Led Zeppelin, Deep Purple, and Black Sabbath, with the latter often being cited as the "creator" of metal (Walser, 2018). The genre was unique from its predecessors in its use of heavy riffs, distortion, and vocal styles that would eventually come to epitomize the style (Walser, 2018). Metal music continued to evolve into the 1980s and 90s, with subgenres splintering into their own categories and styles, each with their own unique vocal sounds. From the high riffs and reinforced falsetto of power metal, to the nearly unintelligible rasps of Norwegian black metal and all styles in between (Tarre, 2023), the perception of these vocal effects is often that they are "harmful and detrimental to the voice" (Guzman et al., 2019). Additionally, compounding the vocal effects themselves, the themes and material of heavy metal music often conjure images of the devil and "evil", with many believing the music to be "satanic", and many vocalists leaning into these connections when performing extreme vocals (Paulissen, 2021).

This paper aims to provide an overview of the ways heavy metal singers avoid injury while performing extreme vocal effects. Through the analysis of eleven peer reviewed papers, and two grey literature reviews with extreme vocal effect teachers discussing their voice techniques for popular metal and alternative publications, the differences and similarities in these approaches to the different vocal effects is reviewed. This critical analysis will span studies that examine the aerodynamic and laryngeal functions found in both trained and untrained singers undergoing these "rough" vocal effects, the prevalence of vocal injuries and dysphonia in rock and metal performers, as well as vocal hygiene and habits undertaken to avoid vocal injury.

As a researcher interested in the intersection of vocal hygiene, technique, and dysphonia in theatre performers, the purpose of this literature review is to edify my own practice regarding extreme vocal effects to be able to better support those who find the need to perform these "rough" sounds without causing harm, either in the form of physical injury or mental stresses. As more and more theatre productions use popular music to advance the genre of musical theatre, the rise of traditional metal in the theatrical world is expanding with the inclusion of metal music in shows such as *Rock of Ages*, *Bat Out of Hell,* and *We Will Rock You*. Even musicals now considered "classics" such as *The Who's Tommy* and *Jesus Christ Superstar* utilize vocal techniques common in metal singing such as reinforced falsetto and "growl". Carl Anderson's

performance of “Damned For All Time” in *Jesus Christ Superstar* features both techniques and a recently televised performance of the musical featured legendary shock rock performer Alice Cooper as King Herod (Loudwire, 2018; MovieClips, 2021). Additionally, as the mainstream crossover of metal bands such as Ghost, who incorporate theatrical conventions such as narrative storytelling and character creation, continues to rise in popularity, the expertise of vocal teachers with experience in the techniques of both theatre and metal would be considered valuable, and therefore an important area for which my research can continue to grow (Kelly, 2015; Caulfield, 2025). Furthermore, as my searching and sources reveal, examination into metal vocals specifically separate from the world of contemporary non-classical music is a new and emerging field of exploration, and further work into the intersection of these techniques and lifestyle would be of major interest for my own future work (Ribaldini, 2019).

DEFINITION OF EXTREME VOCAL EFFECTS

Before going into analysis of the texts on the basis of vocal technique and hygiene, it was important for me to review the different words used to describe vocal techniques. As Paolo Ribaldini writes in his paper “Terminology issues with the poietic aspect of vocals in heavy metal: A suggestion for a multidisciplinary approach”, the terminology of sounds and vocals in heavy metal music “seems more to indicate what is the voice’s impression on the listener rather than what mechanisms of voice production are used by singers” (Ribaldini, 2019). He also rightfully points out that, despite being a major lynchpin in defining the style of metal comparative to other genres of rock, vocal sounds are not examined for technique as thoroughly as instrumental in previous academic explorations of metal music.

I include this criticism of a lack of unified language for different vocal effects as I will be using this terminology quite frequently while analyzing the different papers, and would like to state at the start that it is impossible to know with one hundred percent certainty that researchers were using the same word to describe the same sound as one another. As Ribaldini writes, one researcher’s “growl” is another’s “grunt”. To further illustrate this lack of clear terminology, in “Analysis and Categorization of Various Types of Vocal Distortion in Rock, Metal, Pop Styles, and Throat Singing Observed by High-Speed Digital Imaging” by Lee et al., 2025, they write:

> “...in recent years, especially in metal and death metal, more diverse, specific, and strongly distorted voices have been used than in other styles. Some are called ‘death growl’, ‘unclean vocals’, ‘death screams’, ‘death voice’, ‘grunt’ or ‘rattle’, while others are called ‘fly scream’ or simply ‘scream’ or ‘shout’.” (Lee et al., 2025)

This section underlines Ribaldini's point that one sound or category of sound could be described so diversely.

ROUGH VOCALS: THE LARYNX, & SUPRAGLOTTIC STRUCTURES

The earliest source I included in this analysis is dated back in 2009, which fell out of my Boolen search limitations at first, but I found it cited so often in many later writings it felt vital to include. This study was initially excluded due to the date - I originally tried to focus on research only within the last ten to fifteen years. However, the discovery of this source while chaining back and forth led me to expand my search criteria slightly, as this is a topic with limited research in the lifespan of the subject, and limiting strictly by date of research was excluding valuable, peer reviewed literature. "Voice production in death metal singers" is a conference paper from the International Conference on Acoustics from 2009 by Eckers et al., 2009 that, through the use of both endoscopy and laryngoscopy on seven death metal singers asked to sustain various growled and un-growled vowel sounds, found that the production of "growling" was created by two separate physical movements - one using ventricular folds and one using aryepiglottic folds. In addition, through the use of Electroglottographic Signal waveforms, they found vocal fold fundamental frequency taking place in the vocal folds, at a slower rate on the growled vocals than when the participants sustained an ungrowled vowel. But what was of most interest to the current research is the use of the Vocal Handicap Index. Of the seven death metal vocalists interviewed and examined for this study, only one showed any symptoms of being on the lower bound of a voice disorder. While the others described "pressure in the larynx and/or chest" when producing growling vocals, the only noted vocal complaints after overloading on the growling, and found that their voices regenerated overnight. What this might suggest is that the safety and vocal health perceptions of a technique cannot be determined by the ear alone, or how pleasant or unpleasant the sound is perceived to be.

What this suggests is that, despite the perception that "growl" is a vocally damaging sound, the creation of this sound for the seven participants of this study does not affect the true vocal cords as much as the ventricular folds. Ventricular folds have been noted for their usage in glottal stops and throat singing but their use in vocal production has previously been considered minimal outside of these specific instances (Moon and Alipour, 2013). The small sample size of this study should be noted, however, and it raises the question of potential bias in that the singers who may have volunteered for such a study may already have enough vocal technique

or concern about vocal health as to skew the results in a way that favors the argument presented above. It also raises the question for me in my own teaching of how this technique may be taught to theatre actors, many of whom have a fear of vocal injury and may also hold on to the perception that vocally extreme sounds are inherently unhealthy.

In Guzman et al, 2013, twenty-one rock singers and a control group of eighteen traditional pop singers were assessed for differences in laryngeal function to discover “if growl voice and reinforced falsetto lead to the presence of major vocal fold disorders”. The study did not find any major vocal fold disorders among the rock singers, despite the hypothesis that growl voice and reinforced falsetto are produced by hyperfunctional vocal activity, a potentially harmful technique. Through acoustic, perceptual, laryngoscopic, and functional assessment, the study found that “The rough and raspy perceptual quality of growl voice production is likely produced by the vibration of the supraglottic structures involved in the observed laryngeal compression” (Guzman et al., 2013). While the study notes that the supraglottic laryngeal activity could be considered a risk factor for developing a voice disorder due to hyperfunctional behavior, they “do not seem to contribute to laryngeal disorders in the assessed group of rock singers” (Guzman et al., 2013). The participants also reported on the Vocal Health Index that they “almost never” have issues with effort when singing, or controlling their voice. The study did note, however, that the development of vocal issues may occur if this hyper-functionality is utilized over long periods of time, as that was not studied among the present group. Additionally, this study is also a small sample size, and focused on “rock” singers, not necessarily metal performers. While all metal singers are considered rock singers, all rock singers are not necessarily metal singers nor engaged with extreme vocal effects.

While the Guzman et al., 2013 study was an examination of a group of rock singers with no professional voice training, In 2020, Aaen, McGalshan and Sadolin engaged with 20 professional singers all of whom had varying levels of experience with the Complete Vocal Technique (written hereafter as CVT). CVT is a methodology created by Catherine Sadolin who identified and then defined vocal effects often used in metal music - distortion, growl, grunt, creak, scream, vocal breaks, and more - and taught how to produce these specialized vocal effects. The second half of the study focused on vocal clinicians with limited experience with CVT, and investigated their ability to identify these extreme vocal effects in supraglottic structures. Overall, the study found that the effects could be “performed, identified, and recognized” (Aaen, McGalshan and Sadolin, 2020) and that CVT may be a fruitful methodology

for further investigation into the defining - and teaching - of these vocal effects to singers, and could create a unified language for the effects, as demonstrated by the clinicians being able to identify the vibrational patterns and vocal effects with high accuracy.

Both of these studies focusing on laryngoscopic examination of the vocal structures conclude what was outlined in Eckers et al.'s study on death metal vocals - that the primary vocal load in producing sustained, growled vocals was not on the true vocal cords, but the supraglottic folds, and in the limited scope of their studies, did not appear to cause vocal damage. This suggests that multiple researchers are finding the same conclusions about the false vocal cords and how they engage during the creation of extreme growled effects. The application of this finding into vocal teaching could begin with learning how to isolate the vibration of the supraglottic folds, then transitioning that isolation into voiced sustained sound to create the desired effect in a healthy way, preventing vocal load on the true vocal cords.

In "Analysis and Categorization of Various Types of Vocal Distortion in Rock, Metal, Pop Styles, and Throat Singing Observed by High-Speed Digital Imaging" by Lee et al., 2025, researchers found that vocal distortion could be categorized into "periodic" and "aperiodic" groups, with periodic distorted vocalizations containing overtones by the combination of vocal fold vibrations and supraglottic vibrations, similar to those noted above. In the aperiodic group, the distortion was generated by "chaotic oscillations of the vocal folds". The study concludes that in order to produce vocal fry or "death screams", the vibration of the subglottic structures is not enough, but the aperiodicity of vocal fold vibration is also utilized in creating many of these extreme vocal effects. This discovery leads them to suggest that further research should also observe the vocal tract, as certain varieties of screams require the narrowing of the tract and the influence of this is currently unknown. Additionally, they note that the aperiodic vocal distortions are created by inhalation or exhalation and can be intentionally controlled by the singer, deepening the understanding of the laryngeal function of these effects. This recent study does challenge the sources above in some ways - discovering that in their sample, the vocal cords were engaged and vibrating, not completely overtaken by the false vocal cords as described above. This leads to further questions and areas for future research - are the sounds and effects created by this type of vibration and technique different than the ones produced only by subglottic folds? This also goes back to the questions around technological terms for the sounds of "growl" and "scream" and more clarity and unified terminology being needed for vocal teachers and researchers.

AERODYNAMICS & AIRFLOW IN METAL VOCALS

In 2019, Guzman et al. continued their research into metal singing effects, building upon the work described above in 2013 regarding laryngoscopic exploration of supraglottic folds, and examining the aerodynamic characteristics of growl voice and reinforced falsetto. The study included twenty three metal singers - sixteen who performed growl voice, seven who performed reinforced falsetto. The participants had at least one year of singing experience with these vocal effects, no current or past vocal problems, perceptually “normal” voices, no structural or function vocal fold disorders, normal hearing, and technically sound voice technique for metal vocals. The purpose of the study was to go beyond the previous studies in the underlying physiology of vocal effects and into the aerodynamic behaviors of these vocal functions. They found that glottal airflow and Psub, or subglottal pressure, were higher during growl than during ungrowled singing. Subglottal pressure is defined as pressure of air that is greater than atmospheric pressure in the space below the glottis. As the study states, “Because glottal airflow is defined as the ratio between Psub and and glottal resistance, it seems natural to think that higher airflow found in the present study during growl voice production was caused by decreased vocal folds adduction and also a high Psub.” They also speculate that the high Psub is an aerodynamic strategy to produce the previously studied vibrations of the supraglottic structures. In the examination of reinforced falsetto, the study indicates high values of Psub and glottal resistance - which could have indicated more potential trauma to the vocal structure than “pure” falsetto, but the previous study in 2013 suggested that metal singers who performed this technique had no major vocal fold disorders. The study continues by suggesting that resonance strategies in growled voices could be the techniques preventing vocal injury in these effects - effects that they note could be classically described as vocal abuse.

ACOUSTIC CONSIDERATIONS OF ROUGH VOCAL EFFECTS

Building on the above and on their previous studies in laryngostroboscopic studies of rough vocal effects, Aaen et al. 2021 explored the acoustic measurements of these effects across phonation types to discover the difference between the notes with and without effects added. The study participants were, like their previous study, experienced in CVT and singing teachers with an average of twenty two years of experience (ten years average of CVT). They found that “overall, an increase of acoustic energy was observed in the spectral analyses in specific regions for four of the effects”, the four being distortion, grunt, growl, and rattle. Additionally, the spectral impacts for female singers was less clear than for males. They concluded that

controlling the phonation, then adding vocal effects on top by then involving the supraglottic sound without altering the vocal folds' vibrational pattern helped maintain vocal health. The added “vocal fry” was shown in spectral analyses of the vocalizations. They did note, however, that of all the vocal effects outlined by CVT and studied within, “creaking” was the only one to show a decrease in acoustic output when added and led to the conclusion that at lower frequencies, the “vocal fry” may be produced differently than at higher frequencies.

The conclusion this study creates when considering teaching these effects to theatre actors is that there may be importance in including increased focus on breath control and deep breathing in order to control these aerodynamic effects without them overpowering the vocal structures or creating unsustainable vocal conditions. Additionally, the “layering” technique described above would further support the idea of teaching how to isolate certain sounds or vibrations in structures, before incorporating sustained sounds or singing with the effects to prevent overloading. The gender gap in the studies’ results is also an area for further research, as little has been examined in all the current sources of the differences between the vocal structures or techniques based on gender, though it seems to be present in the results, suggesting that different techniques or teaching strategies may be needed.

EXTREME VOCALS & VOCAL HEALTH

> “...scare research documents vocal effects, and does not specifically focus on the health of the singing strategies recruiting supraglottic vibrations as a noisy sound source. This paucity in research is unfortunate since the health of these sounds is often debate in voice pedagogy, which is understandable since vocal effects may sound straining or harming to an unfamiliar ear in comparison to ‘purer’ sounding western operative voice use. Accordingly, rougher sounding voicing has classically been labelled as vocal abuse…which is problematic for two main reasons: first, it is a claim at best not supported by, and at worst in conflict with, extant literature and secondly, it restricts the development of and widespread access for singers to good clinical and pedagogical advice in training and performing these sounds” (Aaen et al., 2022).

Continuing in the work outlined in previous sections, Aaen et al. in 2022 focus on the vocal health of extreme vocal effects with the thesis statement quoted above. They studied a group of twenty professional singers and voice teachers trained in CVT and experienced in teaching these effects across a wide variety of musical styles, including Rock and Progressive Rock.

The first discovery was that “supraglottic narrowing in the larynx…and raising the larynx to allow the supraglottic structures to vibrate is not damaging to vocal health” (Aaen et al., 2022) and actually is a necessary physical movement to allow for these vibrations to create the rough vocal effects added atop healthy phonation - as also noted in their acoustic study in 2021. Secondly they discovered that while this physical gesture is also found in those who present with muscle tension hyperfunctional dysphonia, supraglottic narrowing can also be found in healthy vocal production. Additionally, the study demonstrated that rough vocal effects, despite how they sound to an outside observer, can be performed in a healthy way with proper technique, the same way other more classical vocal techniques can be performed, and they go on to highlight, like Ribaldini 2019, that a “unified terminology in vocal pedagogy” would support this expanding field of research in order to avoid confusion about supraglottic vibrations in other capacities, such as belting studies. Of particular interest as well is that the participants in the study were able to repeat the sounds and consistently produce the effects, with the shared terminology of CVT and healthy vocal technique related to subglottic structural vibration. Lastly, they found that there was no increase in SVHI assessment, with all participants falling within below-mean averages for singers.

DYSPHONIA & VOCAL EDUCATION IN METAL SINGERS

Moving away from the physical structures that create extreme vocal effects and into the area of vocal injury, Unterhofer et al. 2023 writes, “Most of the metal singers learn the technique of metal singing autodidactically. They listen to metal artists and try to imitate those to detect the right technique from the wrong.” Their study aimed to determine if singing lessons or education had an affect on the rates of vocal problems in metal singers. Utilizing the Singing Vocal Handicap Index alongside the Vocal Handicap Index, the researchers interviewed seventy-four participants - 45 of whom had no education in singing or metal singing at all. Their hypothesis that metal singers without training would be more likely to exhibit vocal problems was disproven - only 12.2%, or 9 out 74, participants showed an increased score on the Singing Vocal Handicap Index or the Vocal Handicap Index. In fact, the number of singers with dysphonia were so low, the researchers had a difficult time analyzing the results. They determined that an explanation for the low numbers of vocal problems could be that metal singing requires high technique, whether learned through singing lessons or autodidactically:

> “To achieve the right sound, the singers need to learn special singing techniques autodidactically or with singing lessons to protect their voice while using them. Without the adequate technique for example you cannot do ‘growling’ for longer time without stressing the vocal folds” (Unterhofer et al., 2023)

The researchers do note, however, that their research pool might be biased towards singers who do not already possess vocal issues, noting that they were not able to reach former metal singers and it may be that only singers who present with healthy vocals would be interested in engaging with a survey of this style. In the study, of the participants who had taken voice lessons or singing classes, the prevalence of dysphonia was slightly lower than those who learned autodidactically, with nine total presenting with dysphonia, six who learned autodidactically, three who took lessons. They conclude that metal singers with “good” vocal technique, regardless of how they learned it, can have healthy voices and that the discussion of what creates a healthy metal technique is an area for future study.

Additionally, it should be noted that this lack of training may not be coming from a place of ignorance on behalf of metal performers, as a study into Australian death metal vocalists found that a desire for vocal instruction was a key theme in their interviews (Blackwood, 2024). Blackwood writes of her interviewees:

> “Many felt that they would have appreciated greater willingness on the part of their teachers to engage with the technique, rather than caution against it as those interviewed felt that they were going to practice the technique either way and could have used the insight. Others noted that those who did engage were often under-educated about the technique” (Blackwood, 2024).

This suggests that metal performers are going to sing extreme and rough vocals, regardless of whether or not they find a vocal teacher willing to assist them and a bias against “rough” sounding vocal effects will not engender a metal performer to want to engage with vocal education (Blackwood, 2024).

LIFESTYLE CONSIDERATIONS

A consideration underreported in current research is the effect of vocal hygiene on the voices of metal singers. The venues for metal shows varies vastly from the venues of most classical music or theatrical spaces, with large acts like Ghost, Pantera, and The Misfits performing in arenas such as Madison Square Garden and smaller acts playing shows in bars or pubs, such as St Vitus in Greenpoint, Brooklyn (Stousy, 2013). Alcohol, cigarette and marijuana smoking,

stage effects such as pyro and smoke are more likely to occur at a metal show than a theatrical production (Rubin and Codino, 2019). One study found that the venues for these non-classical musical performances are often louder environments with sub-optimal acoustics, and often have a lower awareness of vocal hygiene practices (Morawska, Niebudek-Bogusz and Pietruszewska, 2022).

Smoking in particular has been found to decrease fundamental frequencies of the voice, creating “roughness and fluid phonation, characterized by a lower degree of glottal coaptation, favoring the decreased amount of harmonics and increase presence of noise” (Gomes, Crespo and Mourão, 2014). The combination of smoking while consuming alcohol is also of vital importance, with this combination causing changes in the epithelium of the vocal cords.

Relatedly, an underreported factor in many considerations of the vocal technique and care of metal performers is the use of stage smoke and pyrotechnics that can affect the voice. In Sataloff’s *Vocal Health and Pedagogy: Science, Assessment, and Treatment*, Monona Rossol writes of three main groups of substances used to create modern smoke effects: Glycols and glycerins, mineral oil, and cryogenic gases - none of which have a net zero effect on vocal health. Glycols and glycerins absorb water, which can dry the air, irritating the skin but also cause acute laryngitis, while mineral oil repels water and can lead to lipoid pneumonia (Rossol, 2017). However, cryogenic gasses, most commonly carbon dioxide as dry ice and liquid nitrogen are the most commonly used modern smoke effects - both of which can cause death in large doses. Rossol also compared workplace health studies from Actors Equity and Local 802 Unions which found performers and musicians working in artificial fog were more likely to be diagnosed and treated for respiratory problems. While these studies focused on musical theatre stage shows, the use of pyrotechnic and fog effects in metal concerts can be logically assumed to cause similar respiratory concerns.

In addition to environmental hazards in performance venues, the tour schedule of a metal performer is often demanding and causes a lack of consistent sleep - which can have massive vocal implications with sleep loss being linked to dysphonia (Rubin and Codino, 2019). Tied to this, metal performers who are unable to solely perform for a living may have vocally demanding day jobs to make ends meet and these jobs can actually cause more damage to their vocal functioning than singing might cause (Bartlett and Wilson, 2017; Rubin and Codino, 2019)

EXTREME VOCAL COACHES, VOCAL HYGIENE, AND YOUTUBE

As Blackwood, 2024 found in her study of Australian heavy metal singers, many metal vocalists want to engage with vocal education, and there are voice teachers who work with metal performers, such as Melissa Cross, David Benites, and Christopher Mars (Hagerty, 2018). Elizabeth Zharoff has found YouTube fame with her channel, The Charismatic Voice, which aims to challenge views in the vocal education world of rough vocals (Bellino, 2024). In an article with *Decibel*, Zharoff echoes Blackwood and Aaen et al., 2022 in claiming that stigma around extreme vocals comes from the assumption that it created the rough sounds causes injury - but Zharoff further hypothesizes that singing teachers “had experiences where they tried to make a rough sound in the wrong way and that made clean singing difficult. They spread the word of warning to others, and eventually rumors were created”. Discussions of vocal health and hygiene also appear in resources about extreme vocal effects online. Melissa Cross, a former rock singer who created “The Zen of Screaming”, a popular video series about extreme vocal effects, notes in an interview that vocal injuries do not only occur from lack of training, but when the singer is not physically well or singing through vocal injury (AltPress, 2017).

However, discussions around vocal health and extreme vocal effects online should be noted as not being a part of a peer reviewed, pedagogical assessment of vocal technique. As more and more aspiring singers turn to the internet as the first source of information on how to learn to sing, not only extreme effects but all vocalization, more investigation must be done on who is making this content. Zharoff, while a trained singer herself with a Masters Degree in Opera and a popular YouTube channel, is not a fellowship-trained laryngologist or speech language pathologist. Neither is Melissa Cross. While much of their guidance aligns with current research on vocal health and extreme vocal effects, it should be considered that researchers are concerned with the rise of vocal health information online and on social media that was not created by laryngologists (Rosario et al., 2022; Alter et al., 2024). One study acknowledged the barriers to health information, particularly in the United States where there is no universal healthcare system, but found that the majority of vocal health related content on TikTok is of “poor quality and reliability and only moderate accuracy” (Alter et al., 2024). This is compounded by the fact that vocal performers often do not feel comfortable seeking treatment for vocal injuries or concerns due to stigma and fear of losing work opportunities, creating a cycle where they may seek alternative resources before going to a voice professional (Murphy Estes et al., 2024).

CRITICAL REFLECTION: GIBBS' REFLECTIVE CYCLE

DESCRIPTION

During the preparation for this module, I took a risk in deciding to research metal vocals - a subject that fascinated me personally for my own voice work, but did not necessarily align with my previous research modules. When discussing this concern with my previous course tutor and engaging with the lectures from the Voice Study Centre, I discovered that using a literature review as a way to learn about a new subject was not only acceptable, but encouraged.

The research process began with identifying exactly what metal vocals intrigued me, and discovering it was how they performed extreme sounds, and my curiosity about how to avoid injury while doing so. I utilized the University of Wales Trinity St. David library resources to perform keyword and Booleon searches, then chained backwards and forwards within the content I was able to find in order to further flesh out the sources to examine. I found cohesion in these sources - a throughline of research for the past twenty years - but also gaps, that I then decided to fill with grey literature in the form of interviews with extreme vocal teachers in articles and YouTube interviews.

FEELINGS

While working through the search process for peer reviewed materials on extreme vocals, I was discouraged by how few unique resources there seemed to be - while it was helpful in creating a narrative around extreme vocal techniques and injury, there were definitely not as many peer reviewed sources as I had hoped and this made me quite anxious for how to proceed. Additionally, in reviewing grey literature, I wanted to make sure that if I had to engage with non peer reviewed sources, they would at least be from verified experts in extreme vocals. However, in doing more research into vocal teachers of these metal techniques, I found that there was little information about qualifications - or even who the teachers may be themselves. Whether this is due to rock stars not wanting their secrets to get out (it may be perceived as decidedly not "rock n' roll" to have a voice coach) or due to a lack of teachers being available, I was not entirely able to discern. This also made me question my own stigma around teachers who teach "popular" music, vs theatre or classical teachers, a stigma that was pervasive in the literature as well.

EVALUATION

I was able to make several conclusions about extreme vocal effects through this research process. The first, that there are physical structures at play that make the line between healthy

vocal technique and not, such as the usage of false vocal cords. Second, that the lack of investigation into these effects may be tied to their rough nature and the stigma around the sound being judged as “unhealthy”. Third, there is a desire among metal vocalists for pedagogy and training that does not increase that stigma, or discourage them from performing extreme vocal effects. Fourth, there are many compounding factors when it comes to metal singers and vocal injuries, that include vocal training, but also include lifestyle and performance venue factors. And finally, that most of the actual technique material of how to perform these extreme vocals lives in the world of grey literature and not of peer reviewed sources.

Something else to note is that several of the sources I found were the same researchers, coming back to and building upon previous research. Aaen et al.,2022 builds upon Aaen et al. 2020 and 2021, and Guzman et al., explores metal singing and rock vocals in studies in 2013 and 2019. This seems to illustrate that while the field of rough vocals is not overly plentiful with researchers, there are those with continued interest in the topic.

ANALYSIS

Evaluating the materials I was able to find about extreme vocals, I was surprised to find that most of it was not about how to perform the techniques of these effects and therefore, overall not incredibly helpful for someone who has not attempted them before. For example, most of the articles about how these vocal effects manifest in the larynx concluded that the false vocal cords were engaged and vibrating at a greater rate than the true cords, but none explained how or why this was happening. This is where I wished I had engaged with further grey literature, to examine if it provided answers on not only how these effects are performed from a physical standpoint, but a pedagogical one.

However, with that noted, having the knowledge presented in the literature review of the different anatomical ways that these vocal effects may be created has birthed more areas of future research and ideas for exercises building upon these studies to incorporate into voice work with theatre actors. The isolation of various parts of the vocal apparatus, as well as the increased aerodynamic function are all areas for increased focus in warmups for actors or singers who may be engaging with these techniques.

Additionally, I would be interested in further reviewing the psychological impacts of these vocal effects - both on performer and audience. I briefly touched upon the vocal effects of metal

singers that are designed to sound “bad” or “satanic”, but I’m interested in the why of this - why do some people feel drawn to these techniques and sounds, and some are thoroughly repelled?

CONCLUSION

Overall, I am glad I decided to undertake this literature review outside of my normal scope of study because it illuminated many things in my own vocal pedagogy practice. My previous research into lifestyle for actors - sleep deprivation and stigma in particular - finds a throughline in the concerns of contemporary music performers as well, including metal singers. I am very interested in research surrounding various stigmas in the performing arts, from mental health to vocal injuries, and now I can include stigma around performance of extreme vocal effects as well. This literature review also briefly engaged with a subject I have great interest in researching further, which is the dissemination of information about vocal health across the internet, particularly social media and YouTube. Because of the lack of pedagogical texts and peer reviewed information on the “how to” of performing extreme vocal effects, much information lives in the internet - where things are not cited, sourced, or ensured to exist within a solid pedagogical framework. This has led me to potential future research topics of vocal health information on social media, particularly, “voice teachers” on Instagram and TikTok.

On a personal note, the information I have learned by researching extreme vocal effects will further my own teaching and coaching practice, as much of my fear around avoiding these vocal effects in the past were my own assumptions that they cause vocal damage and therefore, I did not want to engage with them even though from an aesthetic point of view, I enjoy them and enjoy the performers who employ them.

ACTION PLAN

My next steps for my vocal practice will be to find further resources, most likely through the grey literature I identified, on how to safely perform these vocal techniques myself. From there, I will begin incorporating these techniques into coachings with students who have shown an interest in furthering their singing abilities for classical plays, or those who already perform popular music vocals in theatre but want to branch into wider genres. Additionally, I would like to create a “vocal hygiene for metal performers” resource for my colleagues who do currently play in these types of groups - a beginners guide to vocal health and how to best treat their instrument.

In my research, I am interested in further exploring the intersection of stigma, extreme vocals, and mental health - which I was not able to touch upon in this module but did in previous. I would be interested in an interview participant study to explore these themes among singers who do not work in theatre, as well, to see if there is overlap between previous research into actors and mental health/stigma concerns and metal/rock singers.

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