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Expressions of Selfhood through Interactions With Vocal Technology

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ABSTRACT

This paper examines how vocal technologies, including microphones, autotune, and vocoders, enable artists to challenge normative gender expectations associated with the human voice. It argues that while these technologies are often designed for utilitarian rather than artistic purposes, their unintended potentials for musical interaction have fostered innovative singing techniques that disrupt traditional categorizations of identity. Focusing specifically on vocal fry, a vocal characteristic often negatively associated with women, this paper explores its transformation into a popular singing technique through technological mediation; this development has allowed artists to redefine its cultural meaning and utilize it for distinct forms of musical expression. This analysis illustrates how exploring vocal technology beyond its prescribed uses opens new avenues for aesthetic exploration and subverts gender-based prejudices. By analyzing the musical evolution of vocal fry and other technologically-mediated singing techniques, this paper demonstrates how artists leverage technology to express selfhood outside of binary norms.

1 Introduction

Voices are inherently tied to recognition, carrying significant implications about an individual's identity and physicality [1]. Social constructs and behaviors often subject voices to perceptions shaped by the expectations of a rigid gender binary [2]. However, vocal technology has provided artists with avenues to explore self-expression that diverge from or directly oppose these normative constructs [3].

Drawing upon Drew Daniel's observation of the inherent ambiguity of sound, this paper acknowledges that the source and meaning of isolated auditory phenomena are often indeterminate [4]. This indeterminacy, Daniel argues, challenges established systems of categorization.

Daniel's ideas are particularly relevant to the human voice and its entanglement with cultural norms. As a complex auditory signal, the voice is frequently subjected to essentializing interpretations based on gender and identity [1]. Consequently, the imposition of rigid categories on vocal characteristics can reinforce normative perceptions and limit the potential for diverse self-expression.

While many vocal technologies originate from utilitarian motivations, their full potential is realized when they are allowed to transform singing practices. These technologically-mediated forms of expression can exist outside of pre-existing gendered standards. The emergence of vocal fry as a signature sound in contemporary pop music, facilitated by the invention of microphone amplification, exemplifies this [5]. Similarly, the development of crooning demonstrated how technological mediation could redefine vocal aesthetics in popular music [6]. The case of vocal fry, a formerly gendered and stigmatized vocal characteristic, exemplifies how technologically-mediated singing techniques can challenge the essentialist gender expectations associated with the voice by reshaping its role in culture.

This paper examines how vocal technology transforms singing practices and expands possibilities for selfexpression beyond normative conceptions of identity. It begins by addressing how societal expectations shape our perception of the voice through a gendered lens, demonstrating how essentialist ideas about gender expression in both speech and singing are perpetuated. Subsequently, it introduces key concepts from posthumanism and glitch feminism, providing a theoretical framework within feminist theory to analyze how women and gender-nonconforming individuals achieve agency in their music through interactions with technology. This analysis then explores the importance of technology in expanding our capabilities for vocal self-expression, culminating in an investigation of contemporary examples that illustrate the potential of technology to achieve agency in self-expression, encompassing both cyborg aesthetics and glitch-based vocal processing.

2 Gendered Standards of the Voice

Daniel reflects on how as humans, we are prone to constantly filtering our perception of sound through learned assumptions and categorizations in order to make sense of its overwhelming ambiguity [4]. He argues that this ambiguity, or 'queerness,' is intrinsic to sound, as it is impossible to definitively know the origin or meaning of a sound in isolation. By attempting to categorize sound and its meaning through language, he argues that this enforces normative thinking by suffocating the fluidity of its interpretation. Instead, he advocates that we embrace the ambiguity of sound in order to move towards a less categorized and more fluid relationship with identity.

Daniel's arguments are particularly relevant to the human voice's perception in music. Voices are imbued with complexities that condition listeners to extrapolate information about the singer's identity and physicality [7]. A disembodied voice can elicit immediate assumptions about the speaker's gender, weight, age, or sexual orientation [1]. To an extent, these assumptions can be attributed to physiological traits; for example, testosterone can produce longer, thicker vocal chords which are more inclined towards lower frequencies, which contributes to men's voices generally being considered lower than women's voices [7]. However, we are also prone to recognizing and imitating sociocultural expectations of gender performance within the voice, and consequently categorizing it within a constricting gender binary [7].

It is important to note that conforming to gendered vocal standards is not always detrimental. For example, trans women may engage in vocal training to align their voices with their gender identity, promoting a sense of safety and comfort [2]. However, ascribing fixed gendered meanings to particular vocal characteristics can result in value judgments based on binary expectations [8]. Ultimately, the gendering of the voice can inhibit expressive freedom and reinforce a normative binary view of gender.

3 Posthumanism and Glitch Feminism

Donna Haraway provides a theoretical framework for examining the liberatory potential at the intersection of human and technology, particularly concerning constructs of gender and identity [9]. Haraway proposes the cyborg as a figure that dismantles deterministic binaries by embodying both human and machine, reflecting a fluid identity as embodied by the cyborg, as a path towards agency [10]. This philosophy will inform the analysis of contemporary instances of vocal technology in music that incorporate mechanization to challenge gendered vocal standards.

Building upon posthumanist ideas, glitch feminism offers another perspective on achieving agency [11]. Russell uses glitches and malfunctions as metaphors for the refusal to conform to normative binary thinking or identities. Russell views multiplicity in identity as a source of agency, and argues for glitch as a way for artists to explore this within themselves. The concept of glitch will be particularly relevant in discussions of the technologically-mediated development of vocal techniques in contemporary pop music and its connection to the queerness of the voice.

4 Vocal Technologies Informing Vocal Techniques

This paper seeks to highlight the interactive relationship between vocal technologies and vocal techniques as a crucial element in artists' ability to exercise agency in the gendering of their voices. Vocal technologies are often constructed as a tool, devised to transform the voice for a utilitarian purpose such as correcting flaws in singing. For instance, the vocoder was developed in 1939 by Homer Dudley as a cryptographic device for secure telecommunications during World War II [12]. Similarly, Autotune, created in 1997, began as a means of correcting pitch inaccuracies before it evolved into a distinct stylistic element in music [12]. However, despite these prescriptive intentions, vocal technologies inevitably shape the way people sing while using them, whether it be to conform to their limitations or to utilize their unique sound to achieve new stylistic effects.

Allowing technology to influence the embodied act of singing opens up the potential to transcend socially constructed gender expectations. In Martin Heidegger's 1954 essay "The Question Concerning Technology," he cautions against the reductive potential of technology, its capacity to transform the world and its inhabitants into mere resources [13]. To view vocal technologies solely from a utilitarian perspective would similarly restrict their transformative potential. Conversely, enabling these technologies to inform and inspire vocal practices fosters new avenues for personal expression that are unconstrained by pre-existing gendered norms. Strict adherence to the intended functions of corrective musical technologies risks homogenizing the landscape of vocal music. Technologies such as microphone amplification have historically inspired various forms of singing which rely on their technological mediation, thereby resisting such homogenization.

5 The Impact of Microphone Amplification on Vocal Aesthetics

Microphone amplification provides a historical example of the interactive relationship between technology and singing technique. As recorded music gained popularity in the twentieth century through radio, microphone amplification catalyzed a new era of singing techniques due to the technology's unique sensitivities and shortcomings [14]. In the 1920s, there existed an observable discrepancy between the quality of recordings in classical and popular music on the radio. Classical singers' vocal techniques were not adequately suited for the medium of recording, as their practice was centered around live performances in large acoustic spaces where projection was necessary to be heard. Furthermore, certain vocal ranges sounded particularly harsh through microphones at the time, particularly sopranos, who as a result were rarely featured on the radio.

In contrast, popular music singers, often lacking classical training, adapted their vocal styles to the microphone's responses, leading to the emergence of the singing style known as crooning [14]. Crooning is characterized by intimate, close-miked singing of sentimental songs, catering to the frequency ranges that microphone recording technology favored at the time—relatively high for men and low for women. Consequently, male crooners were often considered effeminate due to their lack of traditionally masculine vocal characteristics [6]. Vaughn DeLeath, a pioneering crooner, adopted the style to mitigate the harshness of her higher soprano register in recordings, developing a sound that blended both stage and microphone vocal aesthetics [6]. The popularity of these intimate singing styles was further propelled by the Great Depression, during which singers and radio personalities adopted a more conversational vocal delivery [14]. Crooning exemplifies the potential of technology in broadening singing techniques, thereby unlocking new avenues of expression. The impact of these developments is still heard today, as a significant portion of contemporary popular music continues to leverage close-miked singing techniques.

6 The Gendered Perception of Vocal Fry

The influence of intimate singing trends fostered by microphone amplification remains evident in contemporary popular music, particularly in the widespread use of vocal fry. Vocal fry, also known as creaky voice, or the "pulse register," refers to the lowest register of voice [15], usually achieved through constriction of the glottis, and is most commonly heard in American speech at the end of sentences [5]. This vocal phenomenon, like many others, is entangled in a number of gendered associations which play a powerful role in the way those who speak with it are perceived by others. Vocal fry has become strongly associated with women, partially due to its connection to the Valley Girl stereotype which was popularized by Frank Zappa's 1982 song *Valley Girl* [16] Despite men and women both commonly exhibiting vocal fry, it is more often associated with negative attributes in women [17]. Taylor et al. found that women using vocal fry were rated less attractive and intelligent compared to those who did not [18]. Meanwhile, the presence of vocal fry did not affect listers' perceptions of male speakers. While this phenomenon has led to a disproportionate amount of animosity towards women for their speaking habits, contemporary examples of singers in popular music have transformed vocal fry into a meaningful singing technique in their music as well as a source of agency.

7 Reclaiming Vocal Fry as a Tool for Agency

In contemporary pop music, vocal fry has become commonplace for a number of artists such as Iggy Azalea, Billie Eilish, Lady Gaga, and Kesha, who have integrated the technique as a defining characteristic in their singing [19, 20]. Such implementations of vocal fry are nearly non-existent in unamplified singing, supporting that this technique is facilitated through the mediation of recording technology. Due to pop and country music's common use of both close-miked vocals and compression, quieter features of the voice such as fry are able to be made audible, enabling vocalists in these genres employ vocal fry as a singing technique [5]. Through this technologically-mediated development, artists begin to challenge the gendered connotations associated with vocal fry.

Billie Eilish, for example, takes advantage of vocal layering and compression to amplify her soft singing, incorporating vocal fry to create a sense of intimacy [21]. In Eilish's music, vocal fry occurs naturally due to the low volume at which she sings; the recording quality lends a unique sense of depth to her voice as every detail of it is made audible. In contrast, Lady Gaga's music embodies a much louder sound while still incorporating vocal fry. Unlike Billie Eilish, Lady Gaga sometimes leans into the Valley Girl stereotype associated with vocal fry (e.g *Donatella*, *Mary Jane Holland*) through her direct and braggadocious songwriting, but reconfigures it as a source of empowerment.

Rather than vulnerability, Lady Gaga's usage of vocal fry paired with her high-energy dance music conveys confidence and authority. By leveraging recording technology to incorporate a culturally fraught vocal characteristic into a deliberate musical aesthetic,

both Eilish and Gaga challenge stereotypes associated with vocal fry, reclaiming it as an expression of vulnerability or strength.

Artists such as Charli xcx (Charlotte Emma Aitchison) and Black Dresses further expand the relationship between technology and vocal fry by making technological mediation a deliberately audible quality in their vocal performances. While earlier artists utilized technology to mediate their singing, their recordings primarily aimed to present a natural human voice. This is to say, the intention of the recordings is not to draw attention to the technological mediation of the voice, but rather to let it qualities of an otherwise authentic singing voice. In the case of Charli xcx, the singing style she employs not only indulges heavily in vocal fry, but leverages both autotune and vocoder effects to evoke a digital aesthetic. In the outro of her 2020 song *party 4 u*, a sample of Aitchison singing the lyric "party on you" using a vocoder is looped as the instrumental gradually builds to a climax. The mechanical repetition of the lyric evokes a cybernetic aesthetic, complemented by the synthesized harmonic content of the vocoder chords. Notably, the most organic quality of her voice that is still audible despite the effect is Aitchison's vocal fry at the tail end of the line. Through the effect, the vocal fry adopts a uniquely saturated timbre and becomes the most prominent aspect of the voice. This prominence gives the sample a uniquely intimate feeling despite its heavily mechanized sound, and gives the vocal fry an almost percussive role in the context of the instrumental.

Similarly, industrial noise pop duo Black Dresses has similarly pushed the limits of vocal fry through their approach towards vocal processing. In their cover of Tessa Violet's song *Crush*, singer Devi McCallion seemingly exaggerates her vocal fry to force artifacts out of the autotune/vocal synthesizer applied to her voice. By moving in and out of the pulse register, McCallion disrupts the synthesizer's pitch detection algorithm, generating high-pitched glitches. This deliberate embrace of technological failure transforms the synthesizer's artifacts into a mode of expression. McCallion's use of the pulse register to intermittently obscure her voice behind these artifacts creates a novel singing style. While McCallion's vocal qualities exhibit characteristics traditionally associated with femininity, their exaggeration and distortion through the synthesizer resists categorization. The dynamic interaction with the vocal synthesizer evokes a multiplicity of identity, blurring the lines between organic and mechanized voice. This performance echoes Drew Daniel's concept of sound's queerness, as the multiplicity of voice disrupts assumptions about identity and physicality. By creating a musical interaction between vocal technology and the pulse register, McCallion distorts vocal fry beyond conventional gendered standards.

8 Conclusion

Vocal technologies have consistently influenced singing techniques, but contemporary pop aesthetics have empowered artists to further leverage the interplay between voice and technology, thereby liberating personal expression beyond essentializing gender constructs. By exploring interactions based on the unique affordances and failures of technology, artists can evade the prescriptive nature of both technology and gender constructs which obfuscate the fluidity of vocal expression. The historical development of pop singing styles through microphone amplification illustrates the enduring role of technological interaction in shaping vocal aesthetics, including the continued prominence of vocal fry in recorded music.

By incorporating unpredictable digital artifacts and glitches, they blur the distinctions between human and technological performance. The instances discussed throughout this paper align with the ethos of glitch feminism, where performances embrace technological failures to disrupt normative conceptions of gender and vocal performance. Through this process, artists construct alternative vocal identities that subvert fixed categories of identity.

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