

Module 4 – Independent Study

A study into the relationship between the voice and identity for adolescent singing students transitioning from female to male.

Part One – Portfolio 3561 words

Introduction and Rationale

In my previous research, I have found that the voice can be connected to a person's sense of self, especially when experiencing voice change through adolescence (Monks, 2003) and can be emotionally connected to their sense of identity (Bonshor, 2017). In my practice as a singing teacher, I have recently gained some adolescent students from different settings that were born female but are now identifying as male or non-binary and I feel it is my responsibility as their teacher to better understand their changing voice and how best to help them during their transition. Studies of transgender men and women have found higher levels of anxiety and avoidance than the general population, and difficulty with vocal quality (Bukhari, Butt et al., 2022), with several sources finding the voice – as well as physical appearance - closely connected to the identity of trans people (Van Borsel, Pot et al., 2007; Krell, 2014; Roy, 2015) which can be an obstacle in social consolidation and positive mental health (Stewart, Oates et al., 2018). It is my aim to specifically research adolescent female-to-males (FTM) in order to equip myself with the tools needed to guide their changing voices and mitigate some of the barriers to singing that are presented by gender dysphoria.

I am a freelance singing teacher of students aged from 5-18 in one-to-one and group settings. As I continue to build my practice, skills and confidence, I wish to ground my knowledge to help and encourage all my students' individual needs and not rely on a one-size-fits-all approach (Palkki, 2020). Singers may also be reluctant to change their approach to singing, having built particular habits, and teachers of FTM students may need to encourage these students to try and forget what they knew about their voice until it has fully transitioned, presenting a challenge for voice teachers as this can lead to insecurity (Constans and Foteinou, 2017).

Previously I have been interested in self-efficacy and how physical methods can aid adolescent singing students' connection to their voice and sense of identity. While this study moves away from embodied cognition, it continues to explore the voice in connection with sense of identity and is still concerned with the adolescent population. This age group particularly interests me,

not only because they make up the majority of the students that I teach, but also because it is my observation that it is this population that seems to lose the most interest and confidence in singing. While this is just my personal impression, I have found that peer pressure (Lucas, 2011), insensitive remarks from their teacher and embarrassment caused by pubertal voice changes (Killian, 1997) negatively impact this group in particular. I am interested to discover how trans adolescents can benefit from tailored voice training.

While there are a growing number of studies on voice and trans people, many of these focus on male-to-female transitions (MTF) and there is much less to be found on female-to-male (FTM) voice. It is clear from my early research that this is a complex phenomenon, not only involving scientific research relating to hormonal changes to the voice but also the personal and emotional feelings of the individuals themselves. There is also some disparity over the correct language to use, and the differences between sex, gender, expression and identity will have to be clearly defined. Where possible, I aim to use the most up to date research in this field to inform my practice as this is a constantly evolving research topic.

Planned Programme of Study

The aims of this project are:

- To widen my understanding of voice change in particular regard to female-to-male (FTM) trans students
- To improve my knowledge of FTM trans adolescents and gender dysphoria to create a more inclusive teaching practice
- To find voice teaching methods for practical application within the voice studio to help these students through voice changes and to aid their self-confidence

The objectives of this project are:

- To research across the relevant literature to find the most substantiated and up-to-date studies relating to FTM adolescent voices
- To critically analyse the existing and most recent and relevant literature, identifying gaps in the current research for avenues of further study
- To consider not only the scientific nature of voice change, but the complex and nuanced nature of emotional development and mental health, carefully considering the correct language to use throughout

Literature Review Methodology

This desktop study will use a narrative literature review, and the planning of this will employ Cooper's (1988) taxonomy of literature reviews framework: focus, goals, perspective, coverage, organization and audience. The literature review is crucial to research as "a researcher cannot perform significant research without first understanding the literature in the field" (Boote and Beile, 2005, p. 3). The purpose of having a structure to follow while undertaking research is to improve the quality and substantiality of the work (Cooper, 1988). This study will aim to synthesise the literature, broadly understood to mean "a process for accumulating knowledge relevant to a given topic, question, or issue and for showing interrelationships among the pieces of knowledge and the question or issue" (Ward and Reed, 1983, p.11).

Focus

This concerns "the material that is of central interest to the reviewer" (Cooper, 1988, p.108). Through early preliminary research, pre-existing research concerning FTM trans voice and identity can be found not only in papers specific to voice but also across sociology, psychology and scientific papers concerning physical changes. With such a wide array of literature, I will keep my focus narrow to FTM adolescents, although where research becomes sparser there may need to be a broader study into adults who identify as male and those who have undergone physical alterations. This review has aims to find gaps in the current research, therefore having a research outcome focus (Randolph, 2009). As this is a work-based learning study, it will also be focused on application to practice (Randolph, 2009).

Goals

This element concerns the accomplishment aim for the study and how the review will integrate and synthesize the existing literature (Cooper, 1988). The goals of this review will include critical analysis of the existing literature, aiming to resolve "the conflict between contradictory ideas or statements of fact by proposing a new conception that accounts for the inconsistency" (Cooper, 1988, p.108). It is also a goal of this review to identify the issues central to the topic, identifying gaps in research and questions for further research (Cooper, 1988). Through this process, synthesis and integration will "present the reader with the big picture" (Randolph, 2009, p.3).

Perspective

I will avoid the "espousal of literature" (Cooper, 1988, p.110) perspective and instead attempt a "neutral perspective" (Cooper, 1988, p.110); while it may be impossible to remain completely

neutral (Cooper, 1988), it is imperative to this review to consider many different perspectives as it is largely based on people's personal experiences. By amassing a wide array of perspectives and sources of literature, it is still possible to present a solid argument even when not presenting evidence from a pre-existing perspective (Cooper, 1988). However, as this review will be largely qualitative with the intended purpose of improving my practice and is in part based on my personal interest in these students it is logical to consider any biases I might have before investigating the literature (Randolph, 2009). Revealing my biases may also further contribute to the development of practice by challenging misconceptions that I may have had. This could help to deepen my knowledge and synthesize the literature.

Coverage

As this is a broad and nuanced topic, careful consideration must be given to how wide the coverage in my literature review should be (Randolph, 2009). An exhaustive review (Cooper, 1988) would mean finding all sources and information available on the topic, which raises the issue of considering less reputable sources as well as the issue of the time constraint for this project (Randolph, 2009). Representative or purposive sampling (Cooper, 1988) (making deductions from a smaller sample of information) wouldn't consider the nuance of the individual experiences of the population being studied and would risk making too many assumptions (Randolph, 2009). Therefore, this study will employ an "exhaustive review with selective citation" (Cooper, 1988, p.109); this serves this study well as it still considers a wide range of reputable sources, while providing a rationale for excluding outdated or misinformed sources due to the evolving and fast changing nature of this study topic.

Organisation

This concerns the methodological format of the review (Randolph, 2009). The historical format (Cooper, 1988) doesn't lend itself to this review as there is no clear chronology. The best fit for this study topic would be a conceptual format (Cooper, 1988), whereby the literature is arranged via similar theories or ideas (Randolph, 2009).

Audience

This review will be written for an academic audience, avoiding being too general (Randolph, 2009). As such, I will employ a writing style appropriate for this audience that is detailed and including the appropriate scientific terminology (Cooper, 1988). This will ensure that my

literature review has the appropriate voice and rigor and is a narrative literature review and not a commentary (Winter, 2022).

Cooper (1984) also suggested five research stages for conducting a comprehensive literature review: problem formation, data collection, data evaluation, analysis and interpretation and public presentation.

Problem Formation

This asks the question: “what evidence should be included in the review?” (Cooper, 1984). This process involves determining the research questions that the literature review aims to answer (Randolph, 2009). As this review aims to critically analyse the literature (Randolph, 2009), the following research questions were determined:

What research methods have previously been implemented to investigate FTM trans adolescents in voice training and what was determined?

What flaws can be identified in these previous methods and how can this be rectified in future studies of this population?

How can the themes and theories of previous research on this population be applied to practice to improve voice training for FTM adolescents?

Problem formation also involves determining inclusion/exclusion criteria as I begin the search for literature on this phenomenon (Randolph, 2009). There is the option in beginning this search to either conduct one ‘lump’ search to find subtopics or to undertake smaller ‘split’ searches (Noyes, Booth et al., 2019); as this research topic is so broad and consistently changing with time, conducting smaller searches will make the research more specific and less overwhelming. Similarly, I will use single searches and then sift through and identify qualitative and quantitative data as opposed to searching separately for specifically quantitative or qualitative studies as this will save time and allow a wider range of data to be examined (Noyes, Booth et al., 2019).

To assure that the data collected has rigour and remains appropriately academic, I will begin my search through the UWTSD online library and Google Scholar. The search terms that I will use will include “FTM adolescents”, “voice” and “transition” as a jumping off point. I will then employ the berry-picking strategy “backward chaining” (Bates, 1989) which involves following the footnotes and citations in data of interest to collect data. The search terms will include both

“transgender” and “transsexual” as although transgender is now the preferred term, using both will allow me to collect more data.

Data Collection

What procedures should be used to find relevant evidence?

Randolph (2009) suggests that the data collection process should be well documented with records kept of searches made across internet databases as well as dates, what database was searched and what keywords were used. As this is a remote, desktop study I will use the UWTSD online library, Google Scholar and Google Books as starting points for my search for data; I will then explore the relevant references of these articles, “backward chaining” until saturation has been reached (Bates, 1989; Randolph, 2009). The other source of relevant data will come from articles sent to me by my tutor. While documenting this process, I will then sort the literature into relevant and irrelevant data for this review until I have determined which articles will be used in the review (Randolph, 2009).

Data Evaluation

What retrieved evidence should be included in the review?

Using the focus of research outcomes and the goal of critical analysis, I will then extract research outcomes from the relevant literature to critically analyse in the review (Randolph, 2009). This will involve coding data into common themes; this will be a spreadsheet noted in my appendix to include types of data, the extraction process and the actual data (Randolph, 2009).

To improve the organisation and detail of my data, I will also employ the use of thematic analysis which is described as “a method for identifying, analysing, and reporting patterns (themes) within data” (Braun and Clarke, 2006, p.6). This process involves immersion in the data through reading the entire collected data set and searching for meanings (Braun and Clarke, 2006). Firstly I will identify common codes before searching for patterns and meanings, refining the codes and defining what part of the data each theme encompasses (Braun and Clarke, 2006).

I will also attempt to identify the quality of the literature throughout, justifying the use of lower quality data and comparing this data to higher quality literature in my critical analysis (Randolph,

2009). With focus also on application to practice and integration, I will identify a common metric while undertaking this process so that literature can be more easily compared (Randolph, 2009).

Analysis and Interpretation

What procedures should be used to make inferences about the literature as a whole?

This will be a mixed methods literature review as it is focused both on people's lived experience and statistical evidence. Data with focus on people's personal experiences will be phenomenological, and as such will include my experience in teaching FTM adolescents ethnographically (Randolph, 2009). In analysis of this data, I will identify "meaningful statements" (Randolph, 2009, p.11); this can happen in my coding process and will be followed by giving meaning to these statements by coding common themes together (Randolph, 2009). Finally, description will be given to these themes and statements by attempting to look at the data through the eyes of the primary researchers who conducted the used studies (Randolph, 2009). Any quantitative data, as in a narrative review, can be collected and organised into significant and non-significant data before being compared and interpreted (Gall, Borg and Gall, 1996; Randolph, 2009).

Public Presentation

What information should be included in the review report?

Following this process, relevant data will be included in the literature review with other data omitted (Randolph, 2009). As the organisational focus is conceptual, the review will be structured through similar theories or ideas identified in the coding process and the audience focus will remain to be scholarly (Randolph, 2009).

Finally, when the literature review has been written I will employ the use of Boote and Beile's (2005, appendix 1) scoring rubric to ensure that my work has effectively covered and synthesised the literature, including appropriate research methods and methodologies from the literature and has been well structured. In using this rubric, my work should remain focused on each of Cooper's (1988) aims and classifications for a literature review of quality.

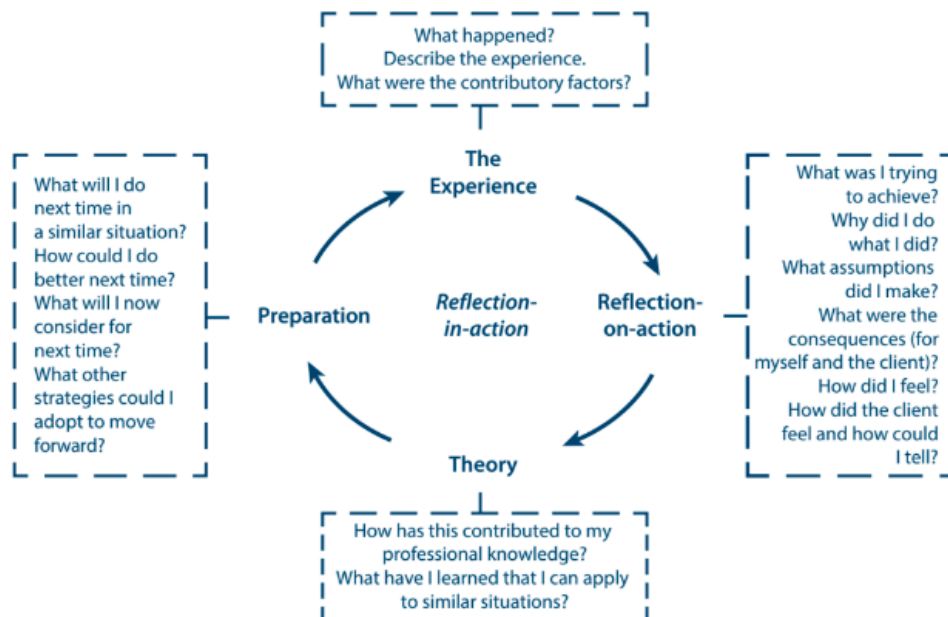
Critical Reflection – The Learning Process

In order to critically reflect on the learning process, I will consider my position in terms of reflexivity; this is the idea that the learner consider both their personal circumstances and their influences as well as the wider context (Finlay, 2008). Reflective practice involves experience – reflection – action (ERA) and is cyclical in that action taken from the first cycle of reflection

informs future experiences meaning that they are interpreted in a new way each time a reflective cycle begins (b, 2003). To reflect on my learning experience, I will use Schon's (1983) reflection-in-action and reflection-on-action model. This seems the most appropriate choice, as it is practice focused whereby I can "describe, analyse and evaluate... past practice with a view to gaining insight to improve future practice" (Finlay, 2008 p.3).

Reflection-on-action occurs after embarking on the research and works to improve reflection-in-action (Bolton and Delderfield, 2018). To develop this, I have used Bassot's (2024) Integrated Reflective Cycle as prompts for my reflection.

Figure 1: Integrated Reflective Cycle (Bassot, 2024, p.94)



The Experience

Initially when beginning this study, I was overwhelmed by the possible avenues of research. The constantly evolving and current cultural interest in trans issues simultaneously made this research exciting and daunting. Research concerning voice change and the effects of taking hormones was particularly vast and took the most time to read, understand and synthesise. I also felt it was important to understand the trans experience, drawing on case studies and statistics from young LGBT people in schools to consider their perspectives. Gaps were identified in Female-to-Male (FTM) research, as many studies concern Male-to-Female (MTF) voices, and the adolescent population is also less researched than adults in transition. This

presented a challenge to find and use relevant literature to the specific demographic of interest. The use of my inclusion/exclusion criteria and backward chaining helped to keep the research relevant, although it wasn't always easy to keep these searches narrow as the research topic is broad.

Reflection-On-Action

Throughout the research, I attempted to remain focused on what I wanted to achieve which was to better understand and help my FTM adolescent singing students. I tried to consider them in my research and what information would be helpful in my practice. I also tried to consider my pre-existing assumptions, such as observations about male retention in singing and previous research where I have looked into the voice and identity. This helped to contextualise my study and keep it related to practice. Much of what I have discovered through this process is yet to be applied within my practice, but I feel better equipped to understand changes that they may be going through and to use appropriate language to engage in a discourse with these students so that they can better express their own feelings about their voice and what they wish to work towards in lessons.

Theory

Through Reflection-On-Action, "the artistry of practice is when our knowledge, skill and theory base becomes:

- large and diverse appropriate to our practice
- more and more available when needed" (Bolton and Delderfield, 2018, p.9).

Completing this research has contributed enormously to my practice, as I now have not only a better understanding of the complexities of the trans adolescent experience but also of vocal pedagogy surrounding pubertal voice change, voice problems that can occur from taking hormones and some solutions to these issues. It has consolidated my belief that the best voice training is tailored to individuals as everyone has unique needs in the voice studio, and discussions about the voice in connection to self can be beneficial to singing training.

Preparation

In future research, I will follow the methods outlined in the preparation for the literature review more closely to make identifying literature easier. At times, as I explored other related avenues of interest it was difficult to keep the sections relevant and cohesive. I could have also been

more selective with the types of literature I collected, so exploring other coding and data collection methods could also be beneficial to discover what works best for me in future research.

Gaps in the research for FTM adolescent voice has presented potential avenues for further research and as my previous research was concerned with adolescents and self-efficacy, the combination of these topics could prove lucrative to improve my practice further. It has also led me to consider other demographics within my teaching and what I could investigate next to create a toolkit for a wider range of students and needs.

Literature Review Scoring Rubric

To conclude my reflection, I looked back on Boote and Beile's (2005, Appendix 1) literature review scoring rubric to assess the quality of my review. The elements for inclusion and exclusion were considered before the review, with my understanding of the current language being used for trans people developing throughout. This led me to replace the terms "biological male/female" with "assigned male/female at birth". This is also relevant to synthesis of the literature and enhancing vocabulary.

Addressing and identifying gaps in the literature also helped to synthesise the research and I found that there was little to be found on this specific demographic; many of the available studies researched adult FTM people, MTF trans people or weren't researching the voice specifically. This I believe has meant that my research offers a new perspective. I acknowledged the fast-changing nature of this topic and statistics of recent history where attitudes towards trans people have changed and the lowering ages of trans people beginning treatment. Case studies concerning personal experiences and opinions were considered and acknowledged as well as the multifaceted relevant phenomena, including scientific research.

The review acknowledged methods used in previous research, including social constructivist ideas of gender; I could have developed this further by comparing the limitations of existing research. I attempted to relate the research back to practice to signify its relevance and how this could be applied to my own students. The structure of this review proved difficult as many of the topics overlapped and took time to organise data coherently; employing a more rigorous coding process could have made identifying structural topics easier. Identifying the limitations of my review can mean that beginning further research will develop my research skills further.

Part Two – Literature Review 4463 words

Introduction

In this literature review, I will explore the pre-existing literature on trans voices with a particular focus on Female to Male (FTM) adolescents. My intention is to fill gaps in my knowledge to better assist students that have singing lessons and are also transitioning or exploring their gender identity. This review will explore both the changes that can occur from taking hormones and enacting physical alterations to the voice and trans voice in connection to identity, music and mental health; this will be explored within my role as a teacher, in school settings and in group and one-to-one sessions to help to understand a range of students with varying identities and needs. It will also aim to identify gaps in the literature, as FTM voices remain largely unresearched in comparison to MTF voices (Dunkerson and Weiler, 2023), and avenues for further research and study.

This review will use the terms AMAB (Assigned Male at Birth) and AFAB (Assigned Female at Birth) as these are now the commonly accepted terms, as opposed to the medical term biological male/female which doesn't acknowledge incongruence between sex and gender (Hearns and Kremer, 2018; Spencer-Hall and Gutt, 2021).

Voice and Identity

It is clear from beginning to examine the literature that the voice is crucial in presenting social cues to others regarding a person's identity (Watt, Tskhay and Rule, 2018). Consansis and Foteinou (2017, p.154) summarise this in music education: "whereas adept music instrument playing is an extension of the musician's persona, a human voice is always personal", an ethos that I have previously adopted in my teaching. Studies into FTM voices have found that it is a priority for male identifying persons to seek voice alteration to match their gender identity, and that this can positively impact wellbeing (Watt, Tskhay and Rule, 2018). This idea of gender congruence or feeling able to pass as your self-identified gender is highly influential on the mental health of the individual (Watt, Tskhay and Rule, 2018; Kaltiala, Heino et al., 2019). For FTM adolescents, this may be even more crucial as they have been found to have worse mental health and lower self-esteem than MTF adolescents (McKay and Watson, 2020).

Hearns and Kremer (2018) define the terms gender identity ("one's own internal, personal, sense of being a man, woman, both, neither, or other nonbinary identity") (p.6), gender expression ("the external presentation of someone's gender identity") (p.6) and gender

perception (“how society and the world perceives, observes, or reacts to another’s gender expression and/or identity”) (p.6). For the majority of people, their sex and gender are congruent and are fixed from childhood, with social behaviours such as chosen toys, play style and play mates affecting how children identify themselves and others (Steensma, Kreukels et al., 2013; Diamond and Butterworth, 2008). The social constructivist idea of gender is that it is performed in social interactions with others, rather than being fixed or biological (Dunkerson and Weiler, 2023). For many trans people, it is a challenge to align themselves with the socially accepted behaviours and cues that allow others to see them as their self-identified gender (Dunkerson and Weiler, 2023).

The pubertal period between the ages of 10 and 13 are crucial in increased gender discomfort for people with gender dysphoria, thought to be because of physical changes, changing school environments and the discovery of sexuality occurring in this period (Steensma, Kreukels et al., 2013). It is unclear across studies what may influence gender incongruence, however it is suggested that the development of gender identity is shaped by “complex interplay between biological, environmental and psychological factors” (Steensma, Kreukels et al., 2013, p.295).

Historically, more Male to Female (MTF) trans people were reported than FTM at a ratio of 2:1 (Zucker, 2017; Leinung, Urizar et al., 2013). However, in recent years this has plateaued and studies are finding almost equal numbers of FTM people compared to MTF people seeking treatment (Leinung and Joseph, 2020). This may be because seeking help for gender dysphoria is more common than before and because societally, females who have more typically masculine behaviours are more socially accepted than males who have typically female behaviours, resulting in FTM people not aligning themselves with having gender dysphoria (Leinung and Joseph, 2020; Aitken, Steensma et al., 2015). A 2020 study found that trans people are receiving sex hormone therapy at younger ages than ever before and the number of children with gender dysphoria continues to increase (Leinung and Joseph, 2020). Being aware of this as an educator could be crucial to making students feel included and understood.

Adolescents with Gender Dysphoria

Despite the lowering ages of young people seeking gender-affirming care, treatment for gender dysphoria (GD) is often withheld until an individual begins to present the first physical changes of puberty, as these symptoms being incongruent with the individual’s gender identity makes GD easier to diagnose (Tack, Craen et al., 2016). Before cross-sex hormones are offered,

adolescents may begin to take puberty blockers to suppress these changes; the use of this medication is controversial, with some arguing the positive benefits of improving mental health and wellbeing, and others arguing concerns over how this may affect future health of the individual and whether or not a child has capacity to make this decision at a young age (Vrouenraets et al., 2015). The administration of testosterone has historically been withheld as a medical treatment due to fears that gender dysphoria was not an official medical diagnosis and due to safety concerns for FTM people (Consansis and Foteinou, 2017). Regardless of the controversies, the voice teacher should be aware of the needs of a student and whether they are taking medication or not so that they can be aware of physical changes they may be experiencing.

Those adolescents experiencing gender dysphoria that are not taking any medication but are still presenting as and wanting to be perceived as male make up all of those that I am currently teaching singing to. This may be because a high percentage of trans people have been found to be unable to access Gender Affirming Hormones (GAH); adolescents who have accessed GAH, however, have been found to have better mental health outcomes in adulthood including decreased risk of suicide (Turban et al., 2022). One reason for this may be that for young trans people, there often has to be a negotiation between them and their parents to allow them to begin taking hormones which can cause tensions (Fahs, 2021). This furthers my belief that it is of the utmost importance for me to better understand these young people and to create a safe space for them in voice lessons; trans adolescents have been found to have higher rates of depression and anxiety than the general population (Turban and Ehrensaft, 2018).

The FTM students that I teach have lessons in their school environment, where it has been found that many trans youths have been victimised, diminishing their sense of belonging and increasing anxiety and other mental health issues (Hatchel, 2019). In the US, a study found that 80% of transgender students surveyed felt unsafe at school and 57% regularly heard negative comments regarding gender expression from school staff (Kosciw, Greytak et al., 2012). Trans people are also at higher risk of violence (Dunkerson and Weiler, 2023); this is reflected in schools where bullying based on gender has been reported as the most common form (Palkki and Caldwell, 2018). Many schools also lack a specific bullying policy addressing homophobic and gender-based bullying (Palkki and Caldwell, 2018; Wright and Smith, 2013).

This may explain why although the majority of teachers in one sample had positive attitudes towards trans people, it is often reported that teachers do not intervene in cases of harassment towards these students (Silveira and Goff, 2016; Kosciw, Greytak et al., 2012). This could be due to lack of training or institutional support, or that the music classroom provides a safer space in school from these kinds of incidents (Silveira and Goff, 2016). With the number of openly transgender students in schools growing, 68% of leaders in one study reported having at least one student that identified as trans in their choir and found that these educators felt most confident in adapting language to become more inclusive and least confident in understanding medical interventions these students may undertake and their impact on the voice (Cates, 2022). It is apparent that there is a disconnect between the changing landscape of gender in music education and the training and understanding for educators to best benefit trans students.

Some FTM students may choose to use a chest binder to create the appearance of a flatter and more masculine chest, and while this shouldn't prevent normal functional breathing, this may be a consideration for teachers as it may inhibit these students' breathing technique whilst singing (Lessley, 2017). Post-18, some may also elect to have gender reassignment surgery which can affect breathing and posture during recovery (Lessley, 2017). There are many available journeys for trans people which teachers can make themselves aware of.

Voice Change

As this gap in education regarding the understanding of voice changes for trans students is clear, it is important to understand the natural changes to the voice that happen during puberty. The voice can be described as a secondary sex characteristic (Hearns and Kremer, 2018) and the larynx as a secondary sexual organ modified by hormones (Zamponi, Mazzilli et al., 2021). In typical puberty, both men and women's vocal tracts, folds and larynxes enlarge and elongate with males' vocal tracts and folds elongating more than females (Zamponi, Mazzilli et al., 2021). Those AMAB however experience a secondary descent of the larynx that AFAB people do not, resulting in these more dramatic changes (Zamponi, Mazzilli et al., 2021). It is a common misconception that only male voices lower during puberty, with evidence showing that while male voices typically drop in pitch by an octave, female voices also drop by 3-4 semitones on average (Zamponi, Mazzilli et al., 2021).

Figure 2: A table showing voice changes during puberty for males and females (Zamponi, Mazzilli et al., 2021 p.692).

- Pre-mutation period: voice quality becomes flat and occasionally hoarse and breathy.
- Proper mutational period: uncertain intonation, sudden alterations in pitch, and falsetto-shifts.
- Post-mutational period: gradual maturation of the voice quality, reaching the typical adult voice timbre and range.

Table 1 Voice modifications during puberty

	Mean vocal fold lengths	Mean vocal tract length	Mean voice deepening
Females	1.0 cm	14.1 cm	3–4 semitones
Males	1.6 cm	16.9 cm	1 octave

People AFAB also experience voice modifications during menstruation and pregnancy, accounted for by the reduced estrogen rates in pre-menstruation and hormonal changes causing vocal fatigue in the late stages of pregnancy (Zamponi, Mazzilli et al., 2021). An understanding of voice changes that can affect any person who takes up voice lessons is fundamental to good practice.

Some FTM individuals will seek to alter their voice to improve their feeling of gender congruence. Following the use of puberty blockers (to pause physical changes), cross-sex hormones may be offered, which can contain testosterone and can irreversibly deepen the voice (NHS, 2020). Trans FTM people undergoing testosterone hormone replacement therapy (HRT) experience thickening and increased mass of the vocal folds, essentially replicating the changes that occur in a male puberty (Buckley, Dahl et al., 2020).

Most studies concerning trans voices studied MTF (male to female) individuals, highlighting a gap in the research which is suggested to be a contributing factor in FTM people not seeking medical help for voice problems (Deuster, Matalat et al., 2016). One study of FTM voice change found that the use of testosterone lowered the voice significantly within the first year with more gradual change thereafter; this study however did not measure feelings of the individuals as to whether they were more satisfied with their voice after treatment, or whether it led to others viewing them as more masculine (Deuster, Matalat et al., 2016).

Additionally, it is often assumed that FTM people who lower their voice using testosterone will be fully satisfied, when studies suggest that taking testosterone can cause issues such as difficulty projecting, instability and hoarseness (Azul, Hancock and Nygren, 2021). Although it is suggested that the transition to a male voice with testosterone is often smoother than a MTF

vocal transition, the genetically smaller thorax in many FTM people in comparison to some AMAB can mean that the voice has less strength (Constansis, 2008). For many there is still a voice and gender incongruence following treatment, with many not being content with the pitch of their voices (Azul, Arnold et al., 2018; Nygren, Nordenskjold et al., 2016).

Despite these considerations, transitioning trans men's voices, once treated with testosterone, can sound identical to the voices of those AMAB (Bultynk, Pas, Defreyne et al., 2017). A 2000 study also found that the majority of FTM people taking androgens reported that their voice had lowered to sound the same as a biological male's, however some still found that they were misgendered in public, suggesting that it is not only the pitch of the voice but vocabulary and communication styles that can indicate gender to others (Van Borsel, de Cuypere et al., 2000). Taking HRT has been found to lower and reduce vowel formants as well as lowering fundamental frequency of the voice which can mean an individual is perceived as more masculine (Buckley, Dahl et al., 2020).

Mean fundamental frequency, the length of the vocal tract and glottal pulse rate can serve as gender indicators, as those AFAB have a higher fundamental frequency by approximately an octave on average; however, the wide range in fundamental frequency between males and females means values often overlap (Nagels, Gaudrain et al., 2020). Studies suggest that suprasegmental features (stress and intonation) are some of the most prominent vocal gender identifiers (Leung, Oates and Chan, 2018). Even for those that undergo vocal surgery, intonation can still suggest gender even if voice frequency has been altered (Neumann and Welzel, 2004). For trans people in transition, fundamental frequency of the voice plays a part in perceived femininity or masculinity, with some undertaking vocal therapy to increase from the average male frequency of 110Hz to upwards of 155Hz (Hancock and Helenius, 2012).

Some may also seek laryngeal manual therapy (LMT) which involves lowering the larynx and lengthening the vocal tract through rotation of the cricoid cartilage (Honda, Hirai et al., 1999). Other forms of vocal therapy aim to guide trans individuals towards gender congruent speech patterns; this, however, relies on certain gender stereotypes that may differ from reality (Leung, Oates and Chan, 2018). As communication styles between men and women have become more similar over time, studies have found that female voices are becoming deeper and more aligned with men's (Krahé and Papakonstantinou, 2020). As within those AFAB and AMAB, there is also a wide range of linguistic styles amongst trans men (Podesva and Callier, 2015; Zimman, 2012)

suggesting that what is perceived as a feminine or masculine voice is as much about social cues and stereotypes as frequency and phonation.

It is suggested then that vocal gender is not only understood through producing certain pitches or vocal qualities, but through listening practices that identify and interpret these vocal cues (Azul, Arnold et al., 2018). This is corroborated by Azul (2013), finding that while the speaker can in many ways control and alter the way that they produce sound, ultimately it is the listener that interprets the voice that they hear based on their understanding of gender. Physical differences in the vocal tracts between people AFAB and AMAB create differences in pitch and phonation and when listeners hear vowel sounds and connected speech even when sped up or played backwards, they have been found to be able to accurately identify if a voice is from a AMAB or AFAB person (Podesva and Callier, 2015).

In a study where recordings of female voices were lowered in pitch, listeners rated the lower voices as more masculine and as presenting less positive female characteristics (Krahé and Papakonstantinou, 2020). Females altering their voice to be lower are perceived as less anxious and self-doubting and are more associated with positive masculine traits but are also perceived as less likeable (Krahé and Papakonstantinou, 2020). This could suggest a further problem for FTM people seeking non-surgical voice alteration, as they choose between improved gender congruence and decreased likeability in an already marginalised identity.

Generally, and potentially due to differences in the larynx, women produce breathier phonation and in one case study of a trans female, therapy to produce more of this vocal quality resulted in being acoustically identified as more feminine (Podesva and Callier, 2015; Hancock and Helenius, 2012). However, this idea that a voice can only be strictly male or female extends from the notion of gender binary that is deep rooted in society and is how people tend to be socialised (Azul, 2013). In reality, listeners cannot hear masculinity or femininity in a voice, only different voice qualities which are then categorised by the listener into the binary of male or female (Azul, 2013). With understandings and attitudes of gender binaries continually changing and being discussed, the voice teacher is in a unique position to add to this discourse through understanding the individual needs of each of their students.

Singing Voice and Training

In addition to the speaking voice being an important feature in identity, the singing voice has been described as “salient in the actual construction, maintenance and performance of self at

various stages of personal, musical and psychological development” (Faulkner and Davidson, 2004, p.232). The singing teacher can play an important role where they “dismantle and rebuild relationships between gender and voice in healthy and empowering ways” (Hearns and Kemer, 2018, p.4), challenging beliefs they have had about the binaries of gender and creating a more inclusive space for all students regardless of their gender identity (Hearns and Kemer, 2018). Bonshor (2017) argues that students in a one-to-one setting will invariably open up about their life experiences as the voice is so connected to their sense of self. A study found that more trans youths disclosed their identities to teachers than parents or grandparents (Grossman and D’Augelli, 2006) and it is suggested that music teachers often create more meaningful relationships with students than in other subjects (Bergonzi, 2009). This highlights the responsibility of music educators to students with non-conforming gender identities.

Before Constansis’ (2008) dissertation on FTM transition and vocality, little research existed on singing for FTM people and Constansis’ personal experience of transitioning and singing technique meant this research was well respected (Kozan and Hammond, 2018). Through his research, Constansis (2013) suggests that the sudden administration of hormones to create a quicker transition, the lack of appropriate medical care for trans people post-transition and misinformed and overly simplistic expectations of what would happen to the voice during transition are all reasons why transitioning FTM people may struggle to maintain their singing voices. Van Borsel (2000) also reported that following testosterone treatment, some individuals felt they could not sing as well as before. Despite this however, there is evidence to suggest that for some voice problems, people who have had previous voice training were more able to troubleshoot solutions, learn new muscular patterns and rehabilitate their voices (Dastolfo-Hromack, Thomas et al., 2016). This could suggest that singing could be beneficial to FTM singers who are experiencing issues with their voices as a result of changes caused by hormone therapy.

Research on FTM singing voices is still lacking (Graham, 2022). As with many aspects of the trans experience, much of the research that does exist into trans singing voice is rooted in personal experience and although this offers expert insight it also means that there is no accepted consensus or universal training method (Graham, 2022). Despite this, it seems evident that listening to FTM adolescents’ feelings towards their voice is paramount to tailoring their singing training.

Male Identity and Participation in Performing Arts

It is my observation from teaching adolescent singing students that the number of females largely outweighs the number of males who participate. This is not a new phenomenon and researchers across the years have agreed that it is a particular challenge to maintain male engagement in choirs and music education (Faulkner, 2012; Lucas, 2011; Phillips, 1992). As a group, adolescent males tend to be more influenced by their peers and less influenced by adults, however adolescent males are most influenced to sing if they have either a choir leader who is seen as a positive male role model, family participation in music at home or an intrinsic enjoyment of singing (Lucas, 2011; Demorest, 2000; George, 1993; Svengalis, 1978).

Embarrassment caused by their changing voices can cause demotivation to participate in singing within this demographic (Kennedy, 2002). There is also evidence to suggest that pitch matching may become more difficult for adolescent through puberty as their aural system physically changes (Demorest and Clements, 2007).

For those that are experiencing pubertal voice change, the considered instruction of their voice teacher at the time can be the difference between singing connecting with embarrassing adolescent memories (Killian, 1997) and wanting to continue singing into adulthood (Fisher, 2014). Choral settings can also be rooted in gender binaries using language, dress codes and music that may alienate non-cisgender (those identifying as the sex they were assigned at birth) attendees (Palkki, 2020). It is possible for males to fit within a higher voice part and vice versa, therefore it is recommended that choir leaders maintain an open dialogue with students firstly as to how much they feel their voice is connected to self and with vocal health in mind; if a student wishes to sing a higher or lower part but this is not safe for their voice, the choir leader should gently encourage them away from this (Palkki, 2017).

Similarly, teachers shouldn't assume that a trans student is more comfortable in a certain vocal part and should instead be open to an ongoing dialogue with these students (Palkki, 2020). This is corroborated by Hearn and Kremer (2018) who express the importance of the voice teacher not presuming that students wish to achieve a certain vocal range or quality, as trans students may or may not be seeking voice lessons to improve their gender affirmation and may have pre-existing anxieties about their voice due to "vocal dysphoria" (p.7).

For those students who are FTM but not taking hormones, some may still forcefully try and make their voice sound deeper to pass as male, which over time can cause vocal health problems resulting in damage of the vocal folds (Palkki, 2020). Tailored voice practice is not just unique to trans students, and an increased knowledge of the needs of all students and their needs can help to improve practice.

Teachers can also be aware that there is a stereotype contributing to lack of male adolescent participation in singing particularly in schools, and that is that singing is viewed as feminine (Faulkner, 2012). Faulkner (2012) suggests that this raises a further issue in school settings, whereby singing is not only considered to be lesser as it is connected to femininity, but that a male participant may be considered not heteronormative if they enjoy this activity and therefore fear being bullied.

Adler (2000, n.p) stated that as “singing does not construct or defend masculinity it therefore embodies gender incongruence”. For those students also experiencing gender incongruence, this may go some way to explain why they may be drawn to singing as a pastime. It doesn’t however explain why more FTM than AMAB young people continue to participate in school in a stereotypical feminine activity. In a 2012 study, attending choir was the most popular extracurricular activity for LGBT (Lesbian, Gay, Bisexual or Trans) students, with 60% of those interviewed taking part (Palkki and Caldwell, 2018). It may be that these students already feel removed from the gender binary and therefore are not concerned with whether or not singing is viewed as feminine, or that choir is a place where they feel they can more freely express their gender identity.

In the recruitment of adolescent boys to choir, some suggest that leaders should aim to demote femininity and promote a more traditional idea of masculinity (McBride, 2016). While this may encourage more AMAB participants, choir leaders almost must choose between nurturing non-conformist students where choir may be their safest space in school or creating a more traditional and binary choir where more AMAB members attend. This connection between the social constructs of sex and gender and what they mean in society highlights an issue that goes beyond understanding just trans youths, presenting an avenue for further study where singing in relation to personal development of gender identity is explored.

Conclusion

The aim of this study was to widen my understanding of voice change in FTM adolescents, improve my knowledge in order to create a more inclusive teaching practice and to find methods for the voice studio to help students through voice changes and to aid their self-confidence.

While my previous research had already led me to discover that voice change embarrassment can be a barrier for adolescents who want to sing (Killian, 1997), researching pubertal voice change through the lens of trans students helped me to better understand the pedagogical process that occurs for all adolescent students regardless of sex. Although the research helped me to understand what effects taking hormones can have on the FTM voice, the biggest takeaway from researching trans voice change is the idea that even when the fundamental frequency of the voice changes, the other vocal elements and perception from the listener of the voice can have the largest effect on vocal gendering (Neumann and Welzel, 2004). This has led me to consider a dialogue with students whereby this can be discussed whether they are taking any medication for gender dysphoria or not.

Research of choirs, particularly in school settings, revealed a contradiction in that music can simultaneously represent a safe space for trans students (Palkki and Caldwell, 2018) while also being representative of traditional and potentially alienating gender binaries (Palkki, 2020). The review of this literature has led me to consider the language that I am using particularly in group settings and to open a dialogue with students as to what vocal part they want to sing in and whether or not this is a safe and realistic possibility (Palkki, 2017). This also may change if the student begins to medically transition.

With the research also revealing striking statistics of mental health issues and bullying within school settings for these students (Palkki and Caldwell, 2018), my responsibility in not only helping them to understand their voice but also to understand the difficulties they may be facing at school is highlighted. The voice teacher can also improve students' feeling of gender congruence and that they are passing as their self-identified gender (Watt, Tskhay and Rule, 2018; Kaltiala, Heino et al., 2019). Employing my previous research on self-confidence and self-efficacy methods may also prove beneficial to the mental health of trans singing students and as trans issues are currently hotly contested, I will continue to follow the evolving research in order to continue understanding these students' challenges and needs.

Appendix 1 (Boote and Beile, 2005)

Table 1
Literature Review Scoring Rubric

Category	Criterion	1	2	3	4
1. Coverage	A. Justified criteria for inclusion and exclusion from review.	Did not discuss the criteria inclusion or exclusion	Discussed the literature included and excluded	Justified inclusion and exclusion of literature	
2. Synthesis	B. Distinguished what has been done in the field from what needs to be done.	Did not distinguish what has and has not been done	Discussed what has and has not been done	Critically examined the state of the field	
	C. Placed the topic or problem in the broader scholarly literature	Topic not placed in broader scholarly literature	Some discussion of broader scholarly literature	Topic clearly situated in broader scholarly literature	
	D. Placed the research in the historical context of the field.	History of topic not discussed	Some mention of history of topic	Critically examined history of topic	
	E. Acquired and enhanced the subject vocabulary.	Key vocabulary not discussed	Key vocabulary defined	Discussed and resolved ambiguities in definitions	
	F. Articulated important variables and phenomena relevant to the topic.	Key variables and phenomena not discussed	Reviewed relationships among key variables and phenomena	Noted ambiguities in literature and proposed new relationships	
	G. Synthesized and gained a new perspective on the literature.	Accepted literature at face value	Some critique of literature	Offered new perspective	
	H. Identified the main methodologies and research techniques that have been used in the field, and their advantages and disadvantages.	Research methods not discussed	Some discussion of research methods used to produce claims	Critiqued research methods	Introduced new methods to address problems with predominant methods
3. Methodology	I. Related ideas and theories in the field to research methodologies.	Research methods not discussed	Some discussion of appropriateness of research methods to warrant claims	Critiqued appropriateness of research methods to warrant claims	
4. Significance	J. Rationalized the practical significance of the research problem.	Practical significance of research not discussed	Practical significance discussed	Critiqued practical significance of research	
	K. Rationalized the scholarly significance of the research problem.	Scholarly significance of research not discussed	Scholarly significance discussed	Critiqued scholarly significance of research	
5. Rhetoric	L. Was written with a coherent, clear structure that supported the review.	Poorly conceptualized, haphazard	Some coherent structure	Well developed, coherent	

Note: The column-head numbers represent scores for rating dissertation literature reviews on 3-point and 4-point scales (endnote 4 explains our choice of the two types of scales). Adapted from *Doing a Literature Review: Releasing the Social Science Research Imagination* (p. 27), by Christopher Hart, 1999, London, SAGE Publications. Copyright 1999 by SAGE Publications. Adapted with permission.

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