

Appendix 1: Timeline

	Step 1 Receive ethics form approval and write project proposal	Step 2 Tutorial	Step 3 Submit project proposal	Step 4 Reworking project proposal	Step 5 Tutorial	Step 6 Conduct recordings and interview research	Step 7 Analysis and write-up of findings	Step 8 Write methods section	Step 9 Tutorial	Step 10 Source and read literature for area of study and organise relevant data	Step 11 Write literature review	Step 12 Write conclusion and introduction	Step 13 Tutorial	Step 14 Develop artefact	Step 15 Create presentation	Step 16 Submit draft	Step 17 Tutorial	Step 18 Amendments	Step 19 Final submission incl. presentation	Step 20 Presentation
Week commencing																				
15-Jan-24																				
22-Jan-24																				
29-Jan-24																				
05-Feb-24																				
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02-Sep-24																				
09-Sep-24																				

APPLICATION FOR ETHICAL APPROVAL

In order for research to result in benefit and minimise risk of harm, it must be conducted ethically. A researcher may not be covered by the University's insurance if ethical approval has not been obtained prior to commencement.

The University follows the OECD Frascati manual definition of **research activity**: "creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications". As such this covers activities undertaken by members of staff, postgraduate research students, and both taught postgraduate and undergraduate students working on dissertations/projects.

The individual undertaking the research activity is known as the "principal researcher".

Ethical approval is not required for routine audits, performance reviews, quality assurance studies, testing within normal educational requirements, and literary or artistic criticism.

Please read the notes for guidance before completing ALL sections of the form.

This form must be completed and approved prior to undertaking any research activity. Please see Checklist for details of process for different categories of application.

Delete the Guidance Notes at the end of the form BEFORE submitting your application

SECTION A: About You (Principal Researcher)

1	Full Name:	Emma Lindsey			
2	Tick all boxes which apply:	Member of staff:	☐	Honorary research fellow:	☐
3	Undergraduate Student	☐	Taught Postgraduate Student	☒	Postgraduate Research Student
4	Institute/Academic Discipline/Centre:	WAPPAR			
5	Campus:	Carmarthen			
6	E-mail address:	emma_lindsey@outlook.com			
7	Contact Telephone Number:	07769 706714			
For students:					
8	Student Number:	2016639			
9	Programme of Study:	MA in Professional Practice (Voice Pedagogy)			
10	Director of Studies/Supervisor:	Debbie Winter/ Julie Crossman			

SECTION B: Approval for Research Activity

1	Has the research activity received approval in principle? (please check the Guidance Notes as to the appropriate approval process for different levels of research by different categories of individual)	YES	☒	NO	☐
					Date
2	If Yes, please indicate source of approval (and date where known): Approval in principle must be obtained from the relevant source prior to seeking ethical approval	Research Degrees Committee	☐		
3		Institute Research Committee	☐		
4		Other (write in) WAPPAR Ethics Board Representative	☒		

SECTION C: Internal and External Ethical Guidance Materials

	Please list the core ethical guidance documents that have been referred to during the completion of this form (including any discipline-specific codes of research ethics, and also any specific ethical guidance relating to the proposed methodology). Please tick to confirm that your research proposal adheres to these codes and guidelines.	
1	UWTSD Research Ethics & Integrity Code of Practice	☒
2	UWTSD Research Data Management Policy	☒
3		☐

SECTION D: External Collaborative Research Activity

1	Does the research activity involve collaborators outside of the University?	YES	☐	NO	☒	
2	If Yes, please provide the name of the external organisation and name and contact details for the main contact person and confirmation this person has consented to their personal data being shared as part of this collaboration.					
3	Institution					
4	Contact person name					
5	Contact person e-mail address					
6	Has this individual consented to sharing their details on this form?	YES	☐	NO	☐	
7	Are you in receipt of a KESS scholarship?	YES	☐	NO	☐	
8	Is your research externally funded	YES	☐	NO	☐	
9	Are you specifically employed to undertake this research in either a paid or voluntary capacity?	Voluntary	YES	☐	NO	☐
10		Employed	YES	☐	NO	☐
11	Is the research being undertaken within an existing UWTSD Athrofa Professional Learning Partnership (APLP)	If YES then the permission question below does not need to be answered.	YES	☐	NO	☐
12	Permission to undertake the research has been provided by the partner organisation	(If YES attach copy) If NO the application cannot continue	YES	☐	NO	☐

Where research activity is carried out in collaboration with an external organisation

13	Does this organisation have its own ethics approval system?	YES	☐	NO	☐
14	If Yes, please attach a copy of any final approval (or interim approval) from the organisation				

SECTION E: Details of Research Activity

1	Indicative title:	An investigation into the influence of vowels on the perception of choral intonation.		
2	Proposed start date:	16 January 2024	Proposed end date:	2 September 2024
3	Introduction to the Research (maximum 300 words) Ensure that you write for a Non-Specialist Audience when outlining your response to the three points below: • Purpose of Research Activity • Proposed Research Question • Aims of Research Activity • Objectives of Research Activity Demonstrate, briefly, how Existing Research has informed the proposed activity and explain • What the research activity will add to the body of knowledge • How it addresses an area of importance.			
4	Purpose of Research Activity Singing in tune is an important aspect of choir rehearsals and performances. Vowels could play a role in enhancing the perception of intonation. The purpose of this research is to further understand this concept following my Module 5 project on the potential use of formant tuning within choirs to improve intonation. This project concluded that while there was no conclusive evidence, it did seem meaningful and warranted further investigation. (this box should expand as you type)			
5	Research Question What impact do vowels have on the perception of choral intonation? (this box should expand as you type)			
6	Aims of Research Activity To better understand if there is value in asking choir members to target or adjust specific vowel sounds to improve intonation. (this box should expand as you type)			
7	Objectives of Research Activity 1. Review the existing data on the impact of vowels on intonation. 2. Understand if vowel unification or formant tuning is used by choral directors in the UK and if they do, why do they use it and what strategies do they have for achieving it. 3. Compare the formant energies of singers singing at different pitches on different vowels on Voce Vista. 4. Explore the reaction of professional musicians to audio data of different vowels on a range of pitches for their perception of unification and intonation. 5. Design a strategy for working on vowels with choir members, building on the artefact of Module 5. (this box should expand as you type)			

8	Proposed methods (maximum 600 words) Provide a brief summary of all the methods that may be used in the research activity, making it clear what specific techniques may be used. If methods other than those listed in this section are deemed appropriate later, additional ethical approval for those methods will be needed.
9	A mixed methods approach as follows: 1. Semi-structured interviews with choral directors that will be recorded and transcribed and sent to the participants for validation. 2. Audio and video recordings of choral singers singing different vowels at different pitches within their range for spectral analysis on Voce Vista. 3. Online questionnaire containing above audio data to be emailed to professional musicians (including non-singers) for their perceptions of unification and intonation. 4. Narrative literature to explore existing data on this topic. (this box should expand as you type)

10	Location of research activity Identify all locations where research activity will take place.
11	The recordings will take place in-person in my teaching studio, interviews will take place over Zoom and the surveys will be completed online. <i>(this box should expand as you type)</i>
12	Research activity outside of the UK If research activity will take place overseas, you are responsible for ensuring that local ethical considerations are complied with and that the relevant permissions are sought. Specify any local guidelines (e.g. from local professional associations/learned societies/universities) that exist and whether these involve any ethical stipulations beyond those usual in the UK (provide details of any licenses or permissions required). Also specify whether there are any specific ethical issues raised by the local context in which the research activity is taking place, for example, particular cultural and/or legal sensitivities or vulnerabilities of participants.
13	N/A <i>(this box should expand as you type)</i>

14	Use of documentation not in the public domain: Are any documents NOT publicly available?	NO	☒
		YES	☐
15	If Yes, please provide details here of how you will gain access to specific documentation that is not in the public domain and that this is in accordance with prevailing data protection law of the country in question and England and Wales. <i>(this box should expand as you type)</i>		

SECTION F: Scope of Research Activity

1	Will the research activity include:	YES	NO
2	Use of a questionnaire or similar research instrument?	☒	☐
3	Use of interviews?	☒	☐
4	Use of diaries?	☐	☒
5	Participant observation with their knowledge?	☒	☐
6	Participant observation without their knowledge?	☐	☒
7	Use of video or audio recording?	☒	☐
8	Access to personal or confidential information without the participants' specific consent?	☐	☒
9	Administration of any questions, test stimuli, presentation that may be experienced as physically, mentally or emotionally harmful / offensive?	☐	☒
10	Performance of any acts which may cause embarrassment or affect self-esteem?	☐	☒
11	Investigation of participants involved in illegal activities?	☐	☒
12	Use of procedures that involve deception?	☐	☒
13	Administration of any substance, agent or placebo?	☐	☒
14	Working with live vertebrate animals?	☐	☒

15	Other primary data collection methods, please explain in this box For example, 'focus groups'. Please indicate the type of data collection method(s) in this box and tick the accompany box.	☐	☒
16	Details of any other primary data collection method: (this box should expand as you type)		

If NO to every question, then the research activity is (ethically) low risk and **may** be exempt from **some** of the following sections (please refer to Guidance Notes).

If YES to any question, then no research activity should be undertaken until full ethical approval has been obtained.

SECTION G: Intended Participants

1	Who are the intended participants:	YES	NO
2	Students or staff at the University?	☐	☒
3	Adults (over the age of 18 and competent to give consent)?	☒	☐
4	Vulnerable adults?	☐	☒
5	Children and Young People under the age of 18? (Consent from Parent, Carer or Guardian will be required)	☐	☒
6	Prisoners?	☐	☒
7	Young offenders?	☐	☒
8	Those who could be considered to have a particularly dependent relationship with the investigator or a gatekeeper?	☐	☒
9	People engaged in illegal activities?	☐	☒
10	Others (please identify specifically any group who may be unable to give consent) please indicate here and tick the appropriate box.	☐	☒
11	Other – please indicate here: (this box should expand as you type)		

12	Participant numbers and source Provide an estimate of the expected number of participants. How will you identify participants and how will they be recruited?	
13	How many participants are expected?	24 participants in total: I would expect to record 8 singers and send the recordings together with a questionnaires to 8 professional musicians. I would then look to interview 8 choral directors. <i>(this box should expand as you type)</i>
14	Who will the participants be?	Choral directors for the interviews, choral singers for the recording and professional musicians for questionnaire responses. All participants will be 18 and over. <i>(this box should expand as you type)</i>
15	How will you identify the participants?	I will use my network of contacts and social media to initially recruit participants. I will then use snowball sampling to recruit further participants. <i>(this box should expand as you type)</i>

16	Information for participants:	YES	NO	N/A
17	Will you describe the main research procedures to participants in advance, so that they are informed about what to expect?	☒	☐	☐
18	Will you tell participants that their participation is voluntary?	☒	☐	☐
19	Will you obtain written consent for participation?	☒	☐	☐
20	Will you explain to participants that refusal to participate in the research will not affect their treatment or education (if relevant)?	☒	☐	☐
21	If the research is observational, will you ask participants for their consent to being observed?	☒	☐	☐
22	Will you tell participants that they may withdraw from the research at any time and for any reason?	☒	☐	☐
23	With questionnaires, will you give participants the option of omitting questions they do not want to answer?	☒	☐	☐
24	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
25	Will you debrief participants at the end of their participation, in a way appropriate to the type of research undertaken?	☒	☐	☐
26	If NO to any of above questions, please give an explanation			
27	(this box should expand as you type)			

28	Information for participants:	YES	NO	N/A
29	Will participants be paid?	☐	☒	☐
30	Is specialist electrical or other equipment to be used with participants?	☒	☐	☐
31	Are there any financial or other interests to the investigator or University arising from this study?	☐	☒	☐
32	Will the research activity involve deliberately misleading participants in any way, or the partial or full concealment of the specific study aims?	☐	☒	☐
33	If YES to any question, please provide full details			
34	I will be recording the Zoom interviews using my Mac and the software Otter.ai. I will be recording audio and video footage of the singers using microphones, my iPhone, my Mac and Garageband. I will analyse the audio recordings using Voce Vista. (this box should expand as you type)			

SECTION H: Anticipated Risks

1	Outline any anticipated risks that may adversely affect any of the participants, the researchers and/or the University, and the steps that will be taken to address them. If you have completed a full risk assessment (for example as required by a laboratory, or external research collaborator) you may append that to this form.		
2	Full risk assessment completed and appended?	Yes	☐
		No	☒
3	Risks to participants For example: emotional distress, financial disclosure, physical harm, transfer of personal data, sensitive organisational information		
4	Risk to Participant:	<i>How will you mitigate the Risk to Participant</i>	

	Reputational risk or damage to the choral directors or singers if anonymity was not maintained in the disclosure of information in a research report or if the security of the held personal data was compromised. <i>(this box should expand as you type)</i>	To ensure confidentiality, each participant will be assigned a unique identifier. The list of identifiers will be securely stored in a file protected by a password. Additionally, all collected data will be safeguarded in cloud storage, also password protected. In the information provided to participants in advance of obtaining consent, they will be made aware that participation is voluntary and that they are able to withdraw their participation and data from the project at any time. <i>(this box should expand as you type)</i>		
5	If research activity may include sensitive, embarrassing or upsetting topics (e.g. sexual activity, drug use) or issues likely to disclose information requiring further action (e.g. criminal activity), give details of the procedures to deal with these issues, including any support/advice (e.g. helpline numbers) to be offered to participants. Note that where applicable, consent procedures should make it clear that if something potentially or actually illegal is discovered in the course of a project, it may need to be disclosed to the proper authorities			
	N/A <i>(this box should expand as you type)</i>			
6	Risks to investigator For example: personal safety, physical harm, emotional distress, risk of accusation of harm/impropriety, conflict of interest			
	Risk to Investigator: Risk of being accused of damaging a participant's reputation. <i>(this box should expand as you type)</i>	How will you mitigate the Risk to Investigator: I can mitigate the risk by not naming participants or the choirs to which they are affiliated. <i>(this box should expand as you type)</i>		
7	University/institutional risks For example: adverse publicity, financial loss, data protection			
	Risk to University: Data breach Reputational risk <i>(this box should expand as you type)</i>	How will you mitigate the Risk to University: All participants will be given a unique identifier to ensure confidentiality and this list will be kept securely in a password-protected file. All data will be kept in password-protected cloud storage. I will carry out the research with integrity and in a professional manner. I will comply with the University's Research Integrity and Ethics Code of Practice. <i>(this box should expand as you type)</i>		
8	Disclosure and Barring Service			
9	If the research activity involves children or vulnerable adults, a Disclosure and Barring Service (DBS) certificate must be obtained before any contact with such participants.	YES	NO	N/A
10	Does your research require you to hold a current DBS Certificate?	☐	☒	☐

SECTION I: Feedback, Consent and Confidentiality

1	Feedback What de-briefing and feedback will be provided to participants, how will this be done and when?
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	I will give every participant my email address for communication and to request feedback and results should they wish it. Additionally, those participants who are interviewed will receive a copy of their interview transcription for verification purposes. <i>(this box should expand as you type)</i>
2	Informed consent Describe the arrangements to inform potential participants, before providing consent, of what is involved in participating. Describe the arrangements for participants to provide full consent before data collection begins. If gaining consent in this way is inappropriate, explain how consent will be obtained and recorded in accordance with prevailing data protection legislation. Before the recordings and interviews, I will email the participants detailed information about the research. This will include the type of information I intend to collect, their expected role, the time commitment involved and how the collected information will be used. This will be done before obtaining their signed consent forms. For the those taking part in the questionnaire, I will present this same information in an introduction section at the start of the questionnaire. I will clarify that by clicking the 'Next' button, they are giving their consent to participate. <i>(this box should expand as you type)</i>
3	Confidentiality / Anonymity Set out how anonymity of participants and confidentiality will be ensured in any outputs. If anonymity is not being offered, explain why this is the case. All participants will be given a unique identifier to ensure confidentiality. I will not name participants or the choirs to which they are affiliated in my research report. <i>(this box should expand as you type)</i>

SECTION J: Data Protection and Storage

In completing this section refer to the University's Research Data Management Policy and the extensive resources on the University's Research Data Management web pages (<http://uwtsd.ac.uk/library/research-data-management/>).

1	Does the research activity involve personal data (as defined by the General Data Protection Regulation 2016 "GDPR" and the Data Protection Act 2018 "DPA")?	YES	NO
	"Personal data" means any information relating to an identified or identifiable natural person ('data subject'). An identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.	X	☐
2	If YES, provide a description of the data and explain why this data needs to be collected:		
	I will be collecting participant names, email addresses, signed consent forms, audio and video recordings, transcriptions of the interviews as well as the answers from the questionnaires. <i>(this box should expand as you type)</i>		
3	Does it involve special category data (as defined by the GDPR)?	YES	NO
	"Special category data" means sensitive personal data consisting of information as to the data subjects' – (a) racial or ethnic origin, (b) political opinions, (c) religious beliefs or other beliefs of a similar nature,	☐	X

	(d) membership of a trade union (within the meaning of the Trade Union and Labour Relations (Consolidation) Act 1992), (e) physical or mental health or condition, (f) sexual life, (g) genetics, (h) biometric data (as used for ID purposes),		
4	If YES, provide a description of the special category data and explain why this data needs to be collected:		
	N/A (this box should expand as you type)		

5	Will the research activity involve storing personal data and/or special category data on one of the following:	YES	NO
6	Manual files (i.e. in paper form)?	☐	☒
7	University computers?	☐	☒
8	Private company computers?	☐	☒
9	Home or other personal computers?	☒	☐
10	Laptop computers/ CDs/ Portable disk-drives/ memory sticks?	☒	☐
11	"Cloud" storage or websites?	☒	☐
12	Other – specify:	☐	☒
13	For all stored data, explain the measures in place to ensure the security of the data collected, data confidentiality, including details of password protection, encryption, anonymisation and pseudonymisation:		
	All data will be kept in password-protected company Google cloud storage which will not be shared. Audio/visual data will be transcribed will be shown to participants to check accuracy of reporting. All participants will be given a unique identifier to ensure confidentiality and this list will be kept securely in a password-protected file. (this box should expand as you type)		
14	All Data Storage		
15	Will the research activity involve any of the following activities:	YES	NO
16	Electronic transfer of data in any form?	☒	☐
17	Sharing of data with others at the University?	☒	☐
18	Sharing of data with other organisations?	☐	☒
19	Export of data outside the European Union or importing of data from outside the UK?	☐	☒
20	Use of personal addresses, postcodes, faxes, emails or telephone numbers?	☒	☐
21	Publication of data that might allow identification of individuals?	☐	☒
22	Use of data management system?	☐	☒
23	Data archiving?	☐	☒
24	If YES to any question, please provide full details, explaining how this will be conducted in accordance with the GDPR and DPA (and/or any international equivalent):		

	All data will be kept in password-protected company Google cloud storage which will not be shared. All data transfers will be encrypted and password protected. All participants will be given a unique identifier to ensure confidentiality and this list will be kept securely in a password-protected file. The data will be stored until the completion of the project and then deleted. In accordance with the DPA2018, participants will have the right to ask to see what data is held relating to them, and this data will be deleted immediately if the participant requests this, in which case the data will not be used in the project. <i>(this box should expand as you type)</i>		
25	List all who will have access to the data generated by the research activity: Emma Lindsey (researcher) and Kerrie Obert (tutor) <i>(this box should expand as you type)</i>		
26	List who will have control of, and act as custodian(s) for, data generated by the research activity: Emma Lindsey (researcher) <i>(this box should expand as you type)</i>		
27	Give details of data storage arrangements, including security measures in place to protect the data, where data will be stored, how long for, and in what form. Will data be archived – if so how and if not why not. All data will be encrypted and kept in password-protected company Google cloud storage which will not be shared. The data will be stored until the completion of the project and then deleted. <i>(this box should expand as you type)</i>		
28	Please indicate if your data will be stored in the UWTSD Research Data Repository (see https://researchdata.uwtsd.ac.uk/). If so please explain. <i>(Most relevant to academic staff)</i> N/A <i>(this box should expand as you type)</i>		
29	Confirm that you have read the UWTSD guidance on data management (see https://www.uwtsd.ac.uk/library/research-data-management/)	YES	☒
		NO	☐
30	Confirm that you are aware that you need to keep all data until after your research has completed or the end of your funding	YES	☒
		NO	☐

SECTION K: Declaration

31	The information which I have provided is correct and complete to the best of my knowledge. I have attempted to identify any risks and issues related to the research activity and acknowledge my obligations and the rights of the participants. In submitting this application I hereby confirm that I undertake to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice which is published on the website: https://www.uwtsd.ac.uk/research/research-ethics/		
	Signature of applicant:	<i>Lindsey</i>	Date: 13 Nov 23

For STUDENT Submissions:

32	Director of Studies/Supervisor:	<u>Laura James</u>	Date: 15.1.24
33	Signature:	<u>Laura James</u>	

For STAFF Submissions:

34	Academic Director/ Assistant Dean:		Date:
35	Signature:		

Checklist: Please complete the checklist below to ensure that you have completed the form according to the guidelines and attached any required documentation:

☒	I have read the guidance notes supplied before completing the form.
☒	I have completed ALL RELEVANT sections of the form in full.
☒	I confirm that the research activity has received approval in principle
☐	I have attached a copy of final/interim approval from external organisation (where appropriate)
☐	I have attached a full risk assessment (and have NOT completed Section H of this form) (where appropriate) ONLY TICK IF YOU HAVE ATTACHED A FULL RISK ASSESSMENT
☒	I understand that it is my responsibility to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice.
☒	I understand that before commencing data collection all documents aimed at respondents (including information sheets, consent forms, questionnaires, interview schedules etc.) must be confirmed by the DoS/Supervisor, module tutor or Academic Director.
☒	I have deleted the guidance notes before submitting the PG2 for consideration

RESEARCH STUDENTS AND STAFF ONLY

All communications relating to this application during its processing must be in writing and emailed to pgresearch@uwtsd.ac.uk, with the title 'Ethical Approval' followed by your name. You will be informed of the outcome of your claim by email; therefore it is important that you check your University and personal email accounts regularly.

STUDENTS ON UNDERGRADUATE OR TAUGHT MASTERS PROGRAMMES should submit this form (and receive the outcome) via systems explained to you by the supervisor/module leader.

Appendix 3: Letters of approval



University of Wales Trinity St David

13th November 2023

To whom it may concern,

WORK-BASED LEARNING RESEARCH PROJECT

I am writing to confirm approval of the research by Emma Lindsey into the unification of vowels in a choral setting.

Yours faithfully,

A handwritten signature in blue ink that reads "e. lindsey".

Emma Lindsey



University of Wales Trinity St David

7th March 2024

To whom it may concern,

WORK-BASED LEARNING RESEARCH PROJECT

I am writing to confirm approval of the research by Emma Lindsey into the use of vowels to improve intonation in a choral setting.

This follows my original letter dated 13th November 2023 from Vocal Spark Limited. Please note that Vocal Spark Limited changed its name to Emma Lindsey Voice Limited on 7th March 2024.

Yours faithfully,

A handwritten signature in blue ink that reads 'Emma Lindsey'.

Emma Lindsey

Appendix 4: Consent Forms

Saturday, May 11, 2024

Participant Information and Consent Form

S1 Form A

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in an in-person session at the researcher's teaching studio, where you will be asked to sing vowel sounds at a comfortable pitch in your vocal range. This will be audio-recorded. You will undergo two recording sessions separated by approximately one hour, with each session lasting 10 minutes.

Voluntary Participation: Your involvement is entirely voluntary, and you have the right to withdraw at any time without explanation and without facing any negative consequences. Please note that there is no financial compensation or direct benefit associated with participating in this research.

Potential Risks: There is a potential risk to your privacy if personal data is accessed or if anonymity is compromised. However, to address this concern, strict measures are in place. Your data will be managed as outlined below and your identity will be anonymised in the research report.

Management and Use of Your Information: Your data will be securely stored in password-protected cloud storage accessible only to the researcher. Your information will be pseudonymised, meaning it will be associated with a unique identifier rather than your real identity. Only the researcher will have access to a password-protected document linking your unique identifier to your actual identity. The data will be analysed and will contribute towards a report, which will be submitted to the University of Wales Trinity St David and the Voice Study Centre in September 2024.

Your data will be retained until the project's completion, after which it will be deleted. As per the Data Protection Act 2018, participants retain the right to request access to their held data. Upon such request, participants can also opt for immediate deletion of their data ensuring non-inclusion within the project.

Ethical Approval: This research project has been granted ethical approval by the Research Ethics Committee of the University of Wales Trinity St David.

Contact Details for Further Information: If you have any concerns or wish to seek further information, you are encouraged to contact the researcher (emma_lindsey@outlook.com) in the first instance. If you do not feel comfortable doing so, then you can contact the Director of Studies at the Voice Study Centre (info@voicestudycentre.com).

Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being audio recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that signed consent forms and audio recordings will be retained as described above.

I understand that under the Data Protection Act 2018, I am entitled to access the information I have provided at any time while it is in storage as specified above.

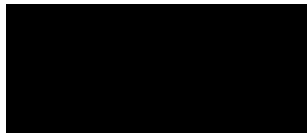
Are you an amateur choral singer?

Yes

Please confirm your choral experience in years

12

Participant's Signature



Date Signed

Saturday, May 11, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

A handwritten signature in blue ink that reads "E. Lindsey".

Date Signed

Saturday, May 11, 2024

Tuesday, July 9, 2024

Participant Information and Consent Form

S1 Form B

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in a Zoom interview, which will last no longer than an hour. It will be recorded and a transcription will be sent to you for verification to ensure its accuracy.

Voluntary Participation: Your involvement is entirely voluntary, and you have the right to withdraw at any time without explanation and without facing any negative consequences. Please note that there is no financial compensation or direct benefit associated with participating in this research.

Potential Risks: There is a potential risk to your privacy if personal data is accessed or if anonymity is compromised. However, to address this concern, strict measures are in place. Your data will be managed as outlined below and your identity will be anonymised in the research report.

Management and Use of Your Information: Your data will be securely stored in password-protected cloud storage accessible only to the researcher. Your information will be pseudonymised, meaning it will be associated with a unique identifier rather than your real identity. Only the researcher will have access to a password-protected document linking your unique identifier to your actual identity. Your data will be analysed and will contribute towards a report, which will be submitted to the University of Wales Trinity St David and the Voice Study Centre in September 2024.

Your data will be retained until the project's completion, after which it will be deleted. As per the Data Protection Act 2018, participants retain the right to request access to their held data. Upon such request, participants can also opt for immediate deletion of their data ensuring non-inclusion within the project.

Ethical Approval: This research project has been granted ethical approval by the Research Ethics Committee of the University of Wales Trinity St David.

Contact Details for Further Information: If you have any concerns or wish to seek further information, you are encouraged to contact the researcher (emma_lindsey@outlook.com) in the first instance. If you do not feel comfortable doing so, then you can contact the Director of Studies at the Voice Study Centre (info@voicestudycentre.com).

Participant Information

Participant's Name

[REDACTED]

Email

[REDACTED]

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no



negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being video recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that signed consent forms and video recordings will be retained as described above.

I understand that under the Data Protection Act 2018, I am entitled to access the information I have provided at any time while it is in storage as specified above.

Participant's Signature

Date Signed

Monday, July 1, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

Date Signed

Wednesday, July 10, 2024

Saturday, May 11, 2024

Participant Information and Consent Form

S2 Form A

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in an in-person session at the researcher's teaching studio, where you will be asked to sing vowel sounds at a comfortable pitch in your vocal range. This will be audio-recorded. You will undergo two recording sessions separated by approximately one hour, with each session lasting 10 minutes.

Voluntary Participation: Your involvement is entirely voluntary, and you have the right to withdraw at any time without explanation and without facing any negative consequences. Please note that there is no financial compensation or direct benefit associated with participating in this research.

Potential Risks: There is a potential risk to your privacy if personal data is accessed or if anonymity is compromised. However, to address this concern, strict measures are in place. Your data will be managed as outlined below and your identity will be anonymised in the research report.

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Your data will be retained until the project's completion, after which it will be deleted. As per the Data Protection Act 2018, participants retain the right to request access to their held data. Upon such request, participants can also opt for immediate deletion of their data ensuring non-inclusion within the project.

Ethical Approval: This research project has been granted ethical approval by the Research Ethics Committee of the University of Wales Trinity St David.

Contact Details for Further Information: If you have any concerns or wish to seek further information, you are encouraged to contact the researcher (emma_lindsey@outlook.com) in the first instance. If you do not feel comfortable doing so, then you can contact the Director of Studies at the Voice Study Centre (info@voicestudycentre.com).

Participant Information

Participant's Name

XXXXXXXXXXXXXXXXXXXX

Email

XXXXXXXXXXXXXXXXXXXX

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being audio recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that signed consent forms and audio recordings will be retained as described above.

I understand that under the Data Protection Act 2018, I am entitled to access the information I have provided at any time while it is in storage as specified above.

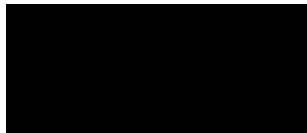
Are you an amateur choral singer?

Yes

Please confirm your choral experience in years

3

Participant's Signature



Date Signed

Saturday, May 11, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

A handwritten signature in blue ink that reads "E. Lindsey".

Date Signed

Saturday, May 11, 2024

Wednesday, July 3, 2024

Participant Information and Consent Form

S2 Form B

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in a Zoom interview, which will last no longer than an hour. It will be recorded and a transcription will be sent to you for verification to ensure its accuracy.

Voluntary Participation: Your involvement is entirely voluntary, and you have the right to withdraw at any time without explanation and without facing any negative consequences. Please note that there is no financial compensation or direct benefit associated with participating in this research.

Potential Risks: There is a potential risk to your privacy if personal data is accessed or if anonymity is compromised. However, to address this concern, strict measures are in place. Your data will be managed as outlined below and your identity will be anonymised in the research report.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXX

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no



negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being video recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that signed consent forms and video recordings will be retained as described above.

I understand that under the Data Protection Act 2018, I am entitled to access the information I have provided at any time while it is in storage as specified above.

Participant's Signature

Date Signed

Monday, June 3, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

Date Signed

Wednesday, July 3, 2024

Saturday, May 11, 2024

Participant Information and Consent Form

S3 Form A

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in an in-person session at the researcher's teaching studio, where you will be asked to sing vowel sounds at a comfortable pitch in your vocal range. This will be audio-recorded. You will undergo two recording sessions separated by approximately one hour, with each session lasting 10 minutes.

Voluntary Participation: Your involvement is entirely voluntary, and you have the right to withdraw at any time without explanation and without facing any negative consequences. Please note that there is no financial compensation or direct benefit associated with participating in this research.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXX

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I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being audio recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

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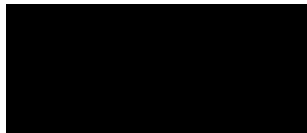
Are you an amateur choral singer?

Yes

Please confirm your choral experience in years

4 years

Participant's Signature



Date Signed

Saturday, May 11, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

A handwritten signature in blue ink that reads "E. Lindsey".

Date Signed

Saturday, May 11, 2024

Tuesday, June 18, 2024

Participant Information and Consent Form

S3 Form B

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in a Zoom interview, which will last no longer than an hour. It will be recorded and a transcription will be sent to you for verification to ensure its accuracy.

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Participant Information

Participant's Name

[REDACTED]

Email

[REDACTED]

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no



negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being video recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that signed consent forms and video recordings will be retained as described above.

I understand that under the Data Protection Act 2018, I am entitled to access the information I have provided at any time while it is in storage as specified above.

Participant's Signature

Date Signed

Tuesday, June 18, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

Date Signed

Tuesday, June 18, 2024

Saturday, May 11, 2024

Participant Information and Consent Form

S4 Form A

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in an in-person session at the researcher's teaching studio, where you will be asked to sing vowel sounds at a comfortable pitch in your vocal range. This will be audio-recorded. You will undergo two recording sessions separated by approximately one hour, with each session lasting 10 minutes.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being audio recorded.

I understand that all information I provide for this study will be treated confidentially.

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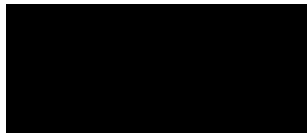
Are you an amateur choral singer?

Yes

Please confirm your choral experience in years

13 Years

Participant's Signature



Date Signed

Saturday, May 11, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

A handwritten signature in blue ink that reads "E. Lindsey".

Date Signed

Saturday, May 11, 2024

Monday, June 17, 2024

Participant Information and Consent Form

S4 Form B

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in a Zoom interview, which will last no longer than an hour. It will be recorded and a transcription will be sent to you for verification to ensure its accuracy.

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Participant Information

Participant's Name



Email



I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no



negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being video recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that signed consent forms and video recordings will be retained as described above.

I understand that under the Data Protection Act 2018, I am entitled to access the information I have provided at any time while it is in storage as specified above.

Participant's Signature

Date Signed

Monday, June 17, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

Date Signed

Tuesday, June 18, 2024

Saturday, May 11, 2024

Participant Information and Consent Form

S5 Form A

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in an in-person session at the researcher's teaching studio, where you will be asked to sing vowel sounds at a comfortable pitch in your vocal range. This will be audio-recorded. You will undergo two recording sessions separated by approximately one hour, with each session lasting 10 minutes.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXX

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being audio recorded.

I understand that all information I provide for this study will be treated confidentially.

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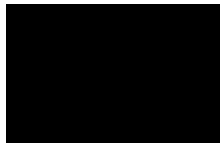
Are you an amateur choral singer?

Yes

Please confirm your choral experience in years

25 years

Participant's Signature



Date Signed

Saturday, May 11, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

A handwritten signature in blue ink that reads "E. Lindsey".

Date Signed

Saturday, May 11, 2024

Monday, June 17, 2024

Participant Information and Consent Form

S5 Form B

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in a Zoom interview, which will last no longer than an hour. It will be recorded and a transcription will be sent to you for verification to ensure its accuracy.

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Contact Details for Further Information: If you have any concerns or wish to seek further information, you are encouraged to contact the researcher (emma_lindsey@outlook.com) in the first instance. If you do not feel comfortable doing so, then you can contact the Director of Studies at the Voice Study Centre (info@voicestudycentre.com).

Participant Information

Participant's Name

[REDACTED]

Email

[REDACTED]

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no



negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being video recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that signed consent forms and video recordings will be retained as described above.

I understand that under the Data Protection Act 2018, I am entitled to access the information I have provided at any time while it is in storage as specified above.

Participant's Signature

Date Signed

Monday, June 17, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

Date Signed

Saturday, June 22, 2024

Saturday, May 11, 2024

Participant Information and Consent Form

S6 Form A

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in an in-person session at the researcher's teaching studio, where you will be asked to sing vowel sounds at a comfortable pitch in your vocal range. This will be audio-recorded. You will undergo two recording sessions separated by approximately one hour, with each session lasting 10 minutes.

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Ethical Approval: This research project has been granted ethical approval by the Research Ethics Committee of the University of Wales Trinity St David.

Contact Details for Further Information: If you have any concerns or wish to seek further information, you are encouraged to contact the researcher (emma_lindsey@outlook.com) in the first instance. If you do not feel comfortable doing so, then you can contact the Director of Studies at the Voice Study Centre (info@voicestudycentre.com).

Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being audio recorded.

I understand that all information I provide for this study will be treated confidentially.

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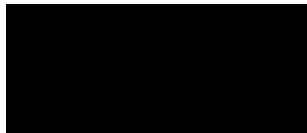
Are you an amateur choral singer?

Yes

Please confirm your choral experience in years

4

Participant's Signature



Date Signed

Saturday, May 11, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

A handwritten signature in blue ink that reads "E. Lindsey".

Date Signed

Saturday, May 11, 2024

Saturday, June 29, 2024

Participant Information and Consent Form

S6 Form B

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in a Zoom interview, which will last no longer than an hour. It will be recorded and a transcription will be sent to you for verification to ensure its accuracy.

Voluntary Participation: Your involvement is entirely voluntary, and you have the right to withdraw at any time without explanation and without facing any negative consequences. Please note that there is no financial compensation or direct benefit associated with participating in this research.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

I confirm that I have read and understood the above participant information and have had the opportunity to ask questions which have been fully answered.

I agree to take part in the above study.

I understand that my participation is voluntary, and I am free to withdraw without giving any reason and with no



negative consequences.

I understand that I will not benefit directly from participating in this research.

I agree to being video recorded.

I understand that all information I provide for this study will be treated confidentially.

I understand that in any report on the results of this research my identity will remain anonymous.

I understand that signed consent forms and video recordings will be retained as described above.

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Participant's Signature

Date Signed

Saturday, June 29, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

Date Signed

Saturday, June 29, 2024

Saturday, May 11, 2024

Participant Information and Consent Form

S7 Form A

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in an in-person session at the researcher's teaching studio, where you will be asked to sing vowel sounds at a comfortable pitch in your vocal range. This will be audio-recorded. You will undergo two recording sessions separated by approximately one hour, with each session lasting 10 minutes.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

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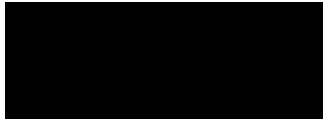
Are you an amateur choral singer?

Yes

Please confirm your choral experience in years

1.5years

Participant's Signature



Date Signed

Saturday, May 11, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

A handwritten signature in blue ink that reads "E. Lindsey".

Date Signed

Saturday, May 11, 2024

Monday, June 17, 2024

Participant Information and Consent Form

S7 Form B

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

Your Involvement: You are invited to participate in a Zoom interview, which will last no longer than an hour. It will be recorded and a transcription will be sent to you for verification to ensure its accuracy.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXX

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Participant's Signature

Date Signed

Monday, June 17, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

Date Signed

Friday, June 21, 2024

Saturday, May 11, 2024

Participant Information and Consent Form

S8 Form A

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

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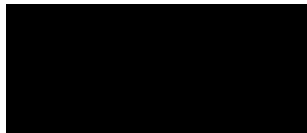
Are you an amateur choral singer?

Yes

Please confirm your choral experience in years

20

Participant's Signature



Date Signed

Saturday, May 11, 2024

Researcher Information

Researcher's Name

Emma Lindsey

I believe the participant is giving informed consent to participate in this study.

Researcher's Signature

A handwritten signature in blue ink that reads "E. Lindsey".

Date Signed

Saturday, May 11, 2024

Wednesday, June 26, 2024

Participant Information and Consent Form

S8 Form B

Research Overview: This project will focus on leveraging vowel-based techniques to enhance choral intonation. It aims to investigate their application within amateur choirs, identify necessary training needs and develop a pedagogical approach for their effective utilisation.

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Participant Information

Participant's Name

XXXXXXXXXX

Email

XXXXXXXXXX

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I agree to take part in the above study.

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Participant's Signature

Date Signed

Wednesday, June 26, 2024

Researcher Information

Researcher's Name

Emma Lindsey

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Researcher's Signature

Date Signed

Wednesday, June 26, 2024

Appendix 5: Vowel Pair Testing (Full Results)

Participant	ja					uo					ua				
	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes
S1	232.35	233.05	0.70	0.30%		239.66	234.72	-4.94	-2.06%		239.66	234.72	-4.94	-2.06%	
S2	190.34	191.09	0.75	0.39%		181.83	181.62	-0.21	-0.12%		179.37	179.85	0.48	0.27%	
S3	379.14	379.76	0.62	0.16%		383.20	380.72	-2.48	-0.65%		383.39	378.32	-5.07	-1.32%	
S4	365.35	365.45	0.10	0.03%	3rd attempt	359.57	357.54	-2.03	-0.56%	2nd attempt	364.61	361.81	-2.80	-0.77%	
S5	377.53	373.64	-3.89	-1.03%		372.96	379.17	6.21	1.67%	2nd attempt	374.25	376.80	2.55	0.68%	
S6	263.04	264.82	1.78	0.68%	Transition 0.3s	259.87	259.14	-0.73	-0.28%		259.57	252.87	-6.70	-2.58%	Transition 0.32s
S7	218.39	216.78	-1.61	-0.74%		252.48	250.61	-1.87	-0.74%		248.50	248.89	0.39	0.16%	
S8	266.29	263.63	-2.66	-1.00%	2nd attempt	285.05	275.2	-9.85	-3.46%	Transition 0.2s	285.82	278.11	-7.71	-2.70%	
Spoken	91.36	91.05	-0.31	-0.34%		91.29	91.36	0.07	0.08%		91.29	91.05	-0.24	-0.26%	
Other attempts															
S4 - 1st	371.41	369.04	-2.37	-0.64%	Gap between vowels										
S4 - 2nd	366.24	359.57	-6.67	-1.82%	Vibrato on V2 (+/- 46ct)										
S8 - 1st	262.91	248.71	-14.20	-5.40%	Gap between vowels										
S4 - 1st						364.53	361.48	-3.05	-0.84%	Gap between vowels					
S5 - 1st						264.17	258.11	-6.06	-2.29%	Gap between vowels					

Appendix 5: Vowel Pair Testing (Full Results)

Participant	ie					ea					ai				
	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes
S1	241.38	237.77	-3.61	-1.50%		238.25	236.56	-1.69	-0.71%		237.61	237.34	-0.27	-0.11%	
S2	179.89	181.7	1.81	1.01%		181.56	182.81	1.25	0.69%		180.96	182.53	1.57	0.87%	
S3	377.04	376.85	-0.19	-0.05%		375.02	374.76	-0.26	-0.07%		377.44	379.75	2.31	0.61%	
S4	362.51	358.19	-4.32	-1.19%		361.58	360.67	-0.91	-0.25%		361.89	361.20	-0.69	-0.19%	2nd attempt
S5	375.20	369.94	-5.26	-1.40%		362.20	364.74	2.54	0.70%	Gap between vowels but no further attempt	367.43	372.52	5.09	1.39%	
S6	263.30	261.42	-1.88	-0.71%	2nd attempt	261.90	261.27	-0.63	-0.24%	2nd attempt	263.11	260.02	-3.09	-1.17%	
S7	280.15	278.71	-1.44	-0.51%		275.18	277.51	2.33	0.85%		245.90	249.94	4.04	1.64%	
S8	279.35	270.00	-9.35	-3.35%		275.33	273.32	-2.01	-0.73%	Transition 0.2s	264.59	275.53	10.94	4.13%	
Spoken	91.54	90.22	-1.32	-1.44%		90.22	91.05	0.83	0.92%		91.05	91.54	0.49	0.54%	
Other attempts															
S6 - 1st	263.61	259.37	-4.24	-1.61%	Gap between vowels (transition 0.35s)										
S6 - 1st						254.77	257.76	2.99	1.17%	Gap between vowels					
S4 - 1st											363.74	364.64	0.90	0.25%	Gap between vowels

Appendix 5: Vowel Pair Testing (Full Results)

	ie					ɔɪ					aʊ				
Participant	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes
S1	238.26	236.15	-2.11	-0.89%		181.33	205.59	24.26	13.38%	2nd attempt	180.95	205.65	24.70	13.65%	4th attempt
S2	184.51	182.75	-1.76	-0.95%		183.19	183.26	0.07	0.04%		178.53	179.85	1.32	0.74%	
S3	375.60	372.77	-2.83	-0.75%		373.19	413.78	40.59	10.88%	1st attempt	373.38	418.95	45.57	12.20%	recognised that she has changed pitch
S4	369.27	366.44	-2.83	-0.77%		360.05	362.18	2.13	0.59%	2nd attempt	360.44	357.12	-3.32	-0.92%	2nd attempt
S5	374.94	372.95	-1.99	-0.53%		373.96	375.26	1.30	0.35%		199.02	201.90	2.88	1.45%	5th attempt transition 0.3 gap and 0.48s measured on 2nd vowel
S6	253.86	258.44	4.58	1.80%	Transition 0.3s	258.25	258.88	0.63	0.24%	Transition 0.35s	258.45	259.99	1.54	0.60%	3rd attempt - 1st vowel 0.44s and transition 0.38s
S7	248.36	247.70	-0.66	-0.27%		245.54	247.55	2.01	0.82%		243.69	245.83	2.14	0.88%	
S8	279.79	279.45	-0.34	-0.12%		269.14	275.75	6.61	2.46%	Transition 0.2s	184.31	208.32	24.01	13.03%	5th attempt
Spoken	91.54	92.83	1.29	1.41%		91.36	104.43	13.07	14.31%		91.05	99.97	8.92	9.80%	
Other attempts															
S1 - 1st						180.65	206.43	25.78	14.27%	Gap between vowels					
S3 - 2nd						375.33	417.92	42.59	11.35%	Pitch difference of a tone & introduction of consonant					
S3 - 3rd						373.38	413.32	39.94	10.70%	Transition 0.3s and 2nd vowel 0.32s (aborted attempt)					
S3 - 4th						278.68	307.16	28.48	10.22%	Vowel closer to /e/ - change of pitch but recognised that					
S3 - 5th						279.52	277.61	-1.91	-0.68%	Vowel closer to /i/					
S3 - 6th						270.97	273.13	2.16	0.80%	Vowel closer to /i/					
S4 - 1st						360.79	357.94	-2.85	-0.79%	Gap between vowels					
S1 - 1st											184.26	208.46	24.20	13.13%	Gap between vowels
S1 - 2nd											180.52	207.09	26.57	14.72%	Gap between vowels
S1 - 3rd											179.51	207.06	27.55	15.35%	Gap between vowels
S3 - 2nd											172.71	173.48	0.77	0.45%	
S4 - 1st											359.67	357.80	-1.87	-0.52%	Gap between vowels
S5 - 1st											370.72	372.31	1.59	0.43%	/u/
S5 - 2nd											200.07	206.34	6.27	3.13%	Gap between vowels /u/
S5 - 3rd											193.92	198.66	4.74	2.44%	Gap between vowels
S5 - 4th															Aborted
S6 - 1st											252.83	250.10	-2.73	-1.08%	Gap between vowels - 1st vowel 0.4s and transition 0.35s
S6 - 2nd											255.10	255.45	0.35	0.14%	Gap between vowels - 1st vowel 0.4s and gap 0.3s
S8 - 1st											276.12	300.05	23.93	8.67%	Gap between vowels and transition of 0.2s - Sounds like /au/
S8 - 2nd											252.45	298.63	46.18	18.29%	Sounds like /au/ - 1st vowel was never stable - it was continually rising from approx 233-283
S8 - 3rd											266.16	292.85	26.69	10.03%	Sounds like /au/ - gap is 0.2s and 2nd vowel 0.4s - large diff in pitch
S8 - 4th											268.65	297.09	28.44	10.59%	Sounds like /au/ - large diff in pitch

Appendix 5: Vowel Pair Testing (Full Results)

aɔ						ɔu						au					
Participant	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes		
S1	190.87	190.81	-0.06	-0.03%		188.78	187.25	-1.53	-0.81%		247.63	248.11	0.48	0.19%			
S2	179.79	179.23	-0.56	-0.31%	2nd attempt	183.82	182.09	-1.73	-0.94%		181.20	182.11	0.91	0.50%			
S3	366.77	367.04	0.27	0.07%	2nd attempt	372.49	375.60	3.11	0.83%		377.88	379.77	1.89	0.50%			
S4	364.32	366.04	1.72	0.47%	2nd attempt	368.74	364.78	-3.96	-1.07%		364.41	364.39	-0.02	-0.01%	2nd attempt		
S5	371.77	367.05	-4.72	-1.27%		373.24	375.21	1.97	0.53%		360.81	365.53	4.72	1.31%	2nd attempt		
S6	184.33	184.74	0.41	0.22%	2nd attempt - transition 0.2s	181.78	188.78	7.00	3.85%	4th attempt - pitch difference of semitone	221.78	224.46	2.68	1.21%			
S7	244.16	245.43	1.27	0.52%		245.87	247.31	1.44	0.59%		244.77	247.44	2.67	1.09%			
S8	282.85	282.72	-0.13	-0.05%	1st and 2 vowels 0.4s and transition 0.2s	283.78	287.96	4.18	1.47%	1st and 2nd vowels 0.4s and transition 0.2s	280.84	286.61	5.77	2.05%	1st and 2 vowels 0.4s and transition 0.32s		
Spoken	91.05	91.36	0.31	0.34%		91.36	91.29	-0.07	-0.08%		91.05	91.29	0.24	0.26%			
Other attempts																	
S2 - 1st	176.83	178.37	1.54	0.87%	Gap between vowels												
S3 - 1st	373.36	372.67	-0.69	-0.18%	2nd vowel sound is not accurate												
S4 - 1st	365.17	367.00	1.83	0.50%	Vibrato on 2nd vowel (+/- 50ct)												
S6 - 1st	188.22	183.47	-4.75	-2.52%	Gap between vowels												
S6 - 1st						183.83	184.37	0.54	0.29%	Gap between vowels							
S6 - 2nd						192.28	185.9	-6.38	-3.32%	Gap between vowels - transition 0.3s							
S6 - 3rd						190.06	189.72	-0.34	-0.18%	Gap between vowels - transition 0.34s							
S6 - 5th						256.99	260.61	3.62	1.41%	Pitch difference of semitone							
S4 - 1st											362.55	363.04	0.49	0.14%	Vib on 2nd vowel (+/- 42ct)		
S5 - 1st											360.74	364.70	3.96	1.10%	Vib on 1st vowel (+/- 35ct)		

Appendix 5: Vowel Pair Testing (Full Results)

	ɛi					aɛ					ia				
Participant	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes
S1	244.43	244.67	0.24	0.10%		243.26	246.41	3.15	1.29%		244.05	243.28	-0.77	-0.32%	
S2	182.64	183.10	0.46	0.25%		177.64	180.22	2.58	1.45%		179.36	180.28	0.92	0.51%	
S3	251.77	253.16	1.39	0.55%		379.22	380.40	1.18	0.31%		280.39	277.79	-2.60	-0.93%	2nd attempt
S4	371.26	371.58	0.32	0.09%		365.23	364.04	-1.19	-0.33%		364.72	364.54	-0.18	-0.05%	
S5	374.02	374.82	0.80	0.21%		370.89	371.79	0.90	0.24%		370.23	369.65	-0.58	-0.16%	
S6	224.77	224.67	-0.10	-0.04%		222.88	221.45	-1.43	-0.64%		223.90	221.40	-2.50	-1.12%	
S7	243.48	248.51	5.03	2.07%		271.84	275.77	3.93	1.45%		284.78	276.79	-7.99	-2.81%	
S8	274.11	280.41	6.30	2.30%		271.55	276.28	4.73	1.74%		278.76	278.11	-0.65	-0.23%	
Spoken	90.22	91.54	1.32	1.46%		91.05	90.22	-0.83	-0.91%		91.54	91.05	-0.49	-0.54%	
Other attempts															
S3 - 1st											280.92	275.72	-5.20	-1.85%	Frog on 2nd vowel

Appendix 5: Vowel Pair Testing (Full Results)

Participant	ei					io					ua				
	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes	V1 (Hz)	V2 (Hz)	Diff (Hz)	Diff (%)	Notes
S1	241.39	241.78	0.39	0.16%		244.85	244.62	-0.23	-0.09%	Sounds more like /i/	202.73	181.75	-20.98	-10.35%	2nd attempt - recognised pitch diff
S2	182.01	184.97	2.96	1.63%		198.62	196.26	-2.36	-1.19%		196.62	195.56	-1.06	-0.54%	
S3	371.15	374.79	3.64	0.98%		434.41	388.92	-45.49	-10.47%	2nd attempt	370.73	322.18	-48.55	-13.10%	2nd attempt - recognised pitch diff
S4	364.28	365.15	0.87	0.24%		365.09	364.66	-0.43	-0.12%	2nd attempt	362.65	363.32	0.67	0.18%	
S5	373.82	374.02	0.20	0.05%		205.79	204.13	-1.66	-0.81%	2nd attempt	204.74	201.28	-3.46	-1.69%	2nd attempt
S6	219.50	221.77	2.27	1.03%		238.96	208.69	-30.27	-12.67%		249.65	245.76	-3.89	-1.56%	1st vowel 0.4s and transition 0.2s
S7	275.13	277.27	2.14	0.78%		274.81	275.14	0.33	0.12%	2nd attempt	272.9	272.71	-0.19	-0.07%	2nd attempt
S8	270.1	276.03	5.93	2.20%	1st and 2nd vowels 0.45s	285.72	246.33	-39.39	-13.79%	2nd attempt	208.47	203.91	-4.56	-2.19%	1st and 2nd vowel 0.4s and transition 0.16s
Spoken	92.83	91.54	-1.29	-1.39%		104.43	91.36	-13.07	-12.52%		99.97	91.05	-8.92	-8.92%	
Other attempts															
S3 - 1st						434.39	385.78	-48.61	-11.19%	Gap between vowels					
S3 - 3rd						387.35	387.07	-0.28	-0.07%						
S4 - 1st						368.96	365.22	-3.74	-1.01%	Vib on 2nd vowel (+/-26ct)					
S5 - 1st										Aborted					
S6 - 2nd						252.24	248.24	-4.00	-1.59%						
S7 - 1st						277.15	275.43	-1.72	-0.62%	Sounds closer to /i/					
S8 - 1st						302.22	285.75	-16.47	-5.45%	Sounds closer to /i/					
S8 - 3rd						242.37	244.41	2.04	0.84%	Transition 0.2s					
S1 - 1st											205.74	182.47	-23.27	-11.31%	Gap between vowels
S1 - 3rd											205.85	205.96	0.11	0.05%	
S3 - 1st											371.18	322.93	-48.25	-13.00%	Gap between vowels
S3 - 3rd											374.44	333.29	-41.15	-10.99%	"that one's hard"
S3 - 4th											310.86	307.69	-3.17	-1.02%	vowels are woolly
S5 - 1st															Aborted
S7 - 1st											275.12	272.54	-2.58	-0.94%	Sounds like /u/

Appendix 6: Interview transcripts (with codes)

S1 Interview

RESEARCHER

Well thank you so much for giving up your time to take part in this study. I'm going to start with some general questions on your background. Can you tell me about your background in singing and in music in general?

S1

Well, I was in the school choir from the age of about 12. And then once I left school, I didn't do really much singing apart from a couple of karaoke performances up in the City. And then a few years ago, somebody came into [name of church] and said they wanted to do a concert there and that they had opened a new choir. So I said, "Oh, I fancy doing that", so I joined [name of choir] and subsequently [name of another choir]. That's a potted history.

Singing experience: school choir

Singing experience: sung in choirs as an adult

RESEARCHER

And have you ever had any formal training in singing?

S1

No.

Singing experience: no formal singing training

RESEARCHER

And do you play any instruments?

S1

I used to play the piano - I got to grade three or four, but that was when I was much younger, and I haven't really gone back to it. Something else on my list of things to do. Yeah, and the recorder, of course. I think I could probably still bang out "London's Burning", but that's about it.

Instrumental experience: piano - beginner level

Instrumental experience: woodwind - beginner level

RESEARCHER

Do you or have you ever practised ear training such as recognising intervals, chords and rhythms?

S1

Have I practised that? No, any training I've done is only what we've done through the choir.

RESEARCHER

Did you have to do anything in your piano exams?

S1

Oh, yes, there must have been, but that was about 300 years ago, so I can't really remember. So yeah, there would have been. I did some theory alongside my piano as well, but again, I only did up to grade three or four. Once I got to the age of 16, and went to the sixth form, I had other things to concentrate on, so I didn't really do anything after that. But yeah, we must have done some sort of thing with the exam. I'm afraid my memory is not that great to know what exactly it was.

Aural experience: "I can't really remember"

Aural experience: as part of exams

Other music experience: grade 3/4 music theory

RESEARCHER

Is there anything related to your health that you feel impacts your singing voice? If so, would you mind sharing how you manage it? Feel free to only share what you're comfortable with.

S1

No, I'm fairly healthy, so there's not really anything that is an issue.

Physical health: no health concerns

RESEARCHER

And have you ever noticed any changes in your singing voice that you think might be related to hormonal changes?

S1

Interesting. No, I don't think so. No, I mean, I went into early menopause sort of 15 years ago. I don't really, you know, apart from that change, I don't have a monthly hormonal change.

Hormonal: postmenopausal

RESEARCHER

The menopause was before you joined [name of choir]?

S1

Yeah, just before, so I wasn't singing on a regular basis then, so I wouldn't have noticed the change.

RESEARCHER

If you're comfortable sharing does neurodiversity such as autism, ADHD, dyslexia, etc. play a role in your life and your singing experience? If so, would you mind describing that experience?

S1

No.

Neurodiversity: neurotypical

RESEARCHER

Moving now to some questions that are more specific to my study. What comes to mind when you hear the word "vowel"?

S1

Vowel, ooh, um. Gosh, no, not really thought about it. It's just, yeah, obviously we hear musical directors speak about them, watching the vowels. I just sometimes, you know, obviously, when we're singing, we just sort of, you know, you mention the vowels, but apart from that it's not really something that I take too much notice of.

Musical development: "it's not really something that I take too much notice of"

RESEARCHER

In written English, there are five vowel letters (a, e, i, o, u), sometimes seven if we include w and y. How does this compare with the number of vowel sounds when we speak or sing? And what implications might that have for choral singing?

S1

Yeah, I don't really know what to say to that.

Vowel sounds: No apparent knowledge of vowel sounds

RESEARCHER

So do you notice any differences between how you sing a vowel and how you speak it?

S1

Yes, it depends on the song, obviously, and the word. Sometimes you have to use your mouth differently to make sure that we don't, well also so that we don't sound like we're from Essex, so it's a slightly different way of singing.

Sung vs spoken vowels: avoidance of Essex accent when singing

RESEARCHER

Reflecting on the testing that we did together, do you have any overriding memories or impressions from that experience?

S1

Yeah, that was interesting. It was, sometimes I just, I found some of them much easier than others and I don't know why. But to hear and then re-sing so, um, I think there were one or two that I ended up completely missing, but then most of the others were okay, so it's, it was just interesting to note for myself that, you know, "Why didn't I get that right?" I'm just, you know, because I'm doing exactly the same thing for all of what you were doing, but some of them I just didn't get right. So yeah, that was just interesting, too.

Reflecting on testing: "interesting"

Reflecting on testing: level of difficulty varied

RESEARCHER

Can you describe any physical changes you notice when making different vowel sounds?

S1

The shape of my mouth, basically. I remember, when [name of choir member] was doing her song and couldn't get, was it an E [E5] or something, and she was doing a letterbox that should have been longer. So depending what you're singing, you'd have to use your mouth differently in order to get the sound that you want. So it's yeah, it's makes quite a difference. You think that just when you're there, you know, singing along, but when you're actually involved in choral singing and trying to do things properly, when you tell us, you know, you need a longer mouth as opposed to a letterbox depending on, and you wouldn't automatically think that if you were just singing along yourself, so it's just interesting.

Physical changes: shape of mouth

RESEARCHER

So do you mean just the lips or...

S1

Sometimes, obviously, depending on what you're singing. Breathing is always something that I need to work on because I find myself running out of breath. So I have to make sure that I'm breathing in the right place and sort of you know, using my diaphragm properly. It depends on what song you're singing, but yeah, I just find that, that I run out of breath before I should probably and unless you breathe in the right place or breathe in deep enough or whatever, say. There's always something to work on.

RESEARCHER

Are there any vowel sounds that you find particularly easy or more difficult to sing?

S1

No, to be honest, I've not taken too much notice of it. So I don't think that there's anything I find particularly difficult. But yeah, I don't suddenly think "Oh, I can't do that sound". No, I don't think so.

Musical development: "it's not really something that I take too much notice of"

RESEARCHER

Do you ever notice how other choir members shape their vowels and does it influence your own singing?

S1

No. Very self-absorbed. No, I don't. I don't really, I mean, I'm more tuning into making sure that I'm on the right note with the rest of my section, as opposed to the sound unless we are all sounding very Essex. So I think that I will be more in tune with hitting the right note rather than how the vowels sound.

Current approach to unifying vowels: "more in tune with hitting the right note rather than how the vowels s..."

RESEARCHER

What do you think the potential advantages and/or disadvantages might be of choir members unifying vowels?

S1

Obviously, it just sounds a lot better if everyone's singing the same thing and the harmony is nice and, um, yeah, the sound would just be much clearer and better than if everybody was doing something different. Yeah, basically.

Advantages: "sounds a lot better if everyone's singing the same thing"

RESEARCHER

What strategies do you think could help ensure more unified vowels within each section?

S1

Well, practice I guess, and perhaps some sort of additional training, maybe a workshop or something, so that we know what we should be doing. Of course, you know, sometimes, you know, what you should be doing, but in the moment you don't.

Improving tuning: training

RESEARCHER

Do you have any experience with interpreting or using the symbols from the International Phonetic Alphabet?

S1

No.

IPA: no knowledge

RESEARCHER

Have you ever tried changing how you sing vowels to improve your sound? If so, what have you tried?

S1

I think it's just making sure, you know, that we all sound the same and it's usually you pick up on it and tell us that's not, instead of going "ee" [i:] or "ah" [ɑ:] or whatever, so I think it's just under direction really. Obviously, we're in a rehearsal, somebody will say, remember what you said, in order to make it a nicer sound.

Advantages: "sounds a lot better if everyone's singing the same thing"

Vowel modification: under direction

S1

What does singing in tune mean to you? And do you think there are differences in staying in tune when singing solo versus as part of a choir?

S1

I suppose you've got a bit more freedom when you're singing solo, so you can do your own thing a bit more and it wouldn't necessarily sound out of tune. However, obviously when you're in a choir, you need to make sure that you're singing the same as other people, so that the overall sound is nice as opposed to you know, everyone just singing along, you know. It's more disciplined when you're within the choir, I think.

Definition of in tune: singing the same as each other

Definition of in tune: tuning is "more disciplined when you're within the choir"

RESEARCHER

How do you make sure you're singing in tune?

S1

Um basically, I make sure I'm listening to others within my section. And, again, it's practice I think. I would I tend to practise and learn things a lot by ear anyway, so I know when I've hit a bum note. Yeah, I think it's, within the choir, it's listening to the others surrounding you to make sure that you're all singing in tune.

How to sing in tune: can hear when it is in tune/out of tune

How to sing in tune: learning by repetition

How to sing in tune: listening to others

RESEARCHER

And this is my final question: if you notice or are told that some notes are a bit flat or sharp, what is your process for fixing them?

S1

Basically, I would go over it, over and over again. And also see how my breathing or, you know, things can change to support the note. I know that in the past you said you have to sort of aim, sometimes if you are singing something high, you have to aim over what you're singing, so that you make sure that you actually hit the note that you need. So I think it's under direction of what we're doing.

Improving tuning: "go over it, over and over again"

Improving tuning: flat - aim above the note

Improving tuning: under direction

Improving tuning: use of breath

RESEARCHER

Well, thank you so much for taking part. Before we finish is there anything else that you'd like to add or share?

S1

Um, I don't think so. I'm glad I went back into choral singing - it has really been, you know, really enjoyable. And it was something that was just for me at a time when, you know, sometimes I needed to get out the house for a bit. But no, I have really, really enjoyed it because sometimes when you're in the school choir, and you have to do this, you have to do that, you're sort of under duress about singing. I mean, I always enjoyed it, to be honest, but some people always tried to get out of going to choir. But, so yeah actually, just thank you for the choirs. I really, really enjoyed it. I really enjoyed the concert last night as well. So yeah, really glad to have got back into singing with everyone again.

Created with the Delve Qualitative Analysis Tool (<http://www.delvetool.com>)

S2 Interview

RESEARCHER

Thank you so much for giving up your time to take part in this study. I'm going to start with some general questions on your background. Can you tell me about your background in singing and in music in general?

S2

Okay, so, my background in music, I started playing the recorder when I was in primary school, and the guitar and yeah carried on with recorder for quite a long time. I think, I kind of started with woodwind instruments. And when I was in junior school, I managed to snag parts, lead parts, in the school plays. So in secondary school, I started going to, I was already in like small, little orchestras, so I started going to an orchestra that was actually outside of the school, run by the local council, I suppose. I'm from [name of town] so in that orchestra, I played recorder, but also whatever instrument I could kind of pick up and bluff my way through. I didn't really start singing in a choir until I was in secondary school. I went to a Catholic school so they did a lot of kind of hymn-related stuff and a big, big carol concert - it was quite famous for the carol concert, my school, so that, yeah. Always just part of the choir, nothing more than that. But at the same time, in secondary school, I started playing violin as well, picked up guitar and started piano lessons in earnest. My stepdad was very musical and completely paid for everything, pushed all of that, so really it was like a kid in a candy store and I could do anything: tried flute, tried oboe, didn't get on with that. So I had a pick of everything, but I stuck with piano and stuck with recorder right through to playing for the [county] quartet. Mostly like Baroque and chamber music, kind of things. The singing, I only really sang as part of a group, and I wasn't very confident in singing either. I was a bit scared of my voice, that kind of thing. It was more after school, when I started having more friends and that kind of crowd, like musical friends, that I started to find, as you do like in your 20s, you find yourself and sang a little bit in a couple of bands and in a casual way. And mostly did like kind of noise experimentey things. Yeah, definitely less on the

formal, I didn't have any formal training really. I had like minimal input from the choir leaders when I was at school, so yeah, anything that I could find, just picked up from people I was listening to, I suppose. But I've just always tried to carry on making a little bit of music here and there, even when it was just on my laptop for a bit. Yeah, I got a piano a few years back and messed around on that and like, sang along to it. But yeah, that's, I think that's it. That is a whistle-stop tour.

Instrumental experience: piano - level unknown

Instrumental experience: woodwind - intermediate level

Instrumental experience: woodwind ensemble

Instrumental experience: youth orchestra

Musical development: I've just always tried to carry on making a little bit of music

Musical development: opportunity to learn variety of instruments

Other music experience: musical family

Singing experience: band

Singing experience: group singing

Singing experience: no formal singing training

Singing experience: school choir

RESEARCHER

Do you or have you ever practised ear training such as recognising intervals, chords and rhythms?
And if so, can you tell me more about that experience?

S2

Yes, I would have done that as part of my music theory for recorder and piano. And I actually did music theory up to grade eight when I was practising, just because I loved that side of it so much. So yeah, that was just part of my music tuition for those instruments.

Aural experience: grade 8 aural

Aural experience: received training

RESEARCHER

So which grades did you do for piano and violin?

S2

I had a little go, I didn't do any grades for violin.

RESEARCHER

Piano and recorder then.

S2

Yeah, I did my grade four on recorder. And I only actually did grade one on piano, but because I did stop lessons eventually and I carried on playing. Yeah, I was always more interested in the theory side of it, to be honest, when like you're studying.

Instrumental experience: piano - level unknown

Instrumental experience: woodwind - intermediate level

RESEARCHER

Did you do theory lessons or did you teach yourself?

S2

The theory lessons were part of my music, so like my piano lessons had like a theory component. And when I was with the recorder quartet, the leader was also my recorder teacher, so I had like private lessons, and did that too. And yeah, that was the majority of it. She was like a proper music head, played in like, orchestras and bits and pieces. It was, it was her life, so it was yeah, just to see how far I could go with it really. And one thing that was challenging for me was that you'd have to use your voice when you were practising those bits. So I was very, like, unsure about that. And she said, "Don't worry, you are getting it right", but it wasn't so much about quality of voice it was yeah.

Musical development: "how far I could go"

Musical development: reluctance to sing

RESEARCHER

So you found the ear tests quite straightforward, would you say?

S2

Yeah, I did.

Aural experience: found ear tests easy

RESEARCHER

And was it the sort of case that three weeks before the exam she'd bring out an aural book or did she do aural throughout your recorder and piano lessons?

S2

It was throughout and also I had, you know, she recommended books to buy, so I had like the AB theory books and things like that. Also, I just, I just, I was quite immersed in it because my stepdad was playing in lots of orchestras, I was playing in like a local orchestra in [name of town] and one in [name of another town], when we were like, in between moving house. And I'd go, like we went to church at the time, so I'd be in the church band. I was just constantly kind of surrounded by people that wanted to approach music in an academic way. So there's a lot of like sponging.

Aural experience: consistent training

Instrumental experience: church band

Musical development: "immersed" in music

RESEARCHER

I am interested to hear more about your experience because I have always found ear training very difficult, despite feeling that I was immersed in music growing up.

S2

I think once I had like, the lexicon for it, once I knew the terminology. It kind of clicked with what I'd already thought about. I did linguistics at uni for a while. I've always been quite interested in just the patterns. And yeah, so those kinds of things were things that I'd just sit there, when I was zoning out, thinking about. It was putting a name to things and to be honest, I'd struggle to do those kinds of things right now. But I suppose that's kind of where I started, rather than having that musical education and then including that too in a weird way.

Aural experience "struggle to do those kinds of things right now"

Musical development: interested in pattern matching

RESEARCHER

How did you find the quartet?

S2

I absolutely, I loved it. I absolutely loved it. I quite liked the music at the time. I was playing tenor recorder. And yeah, I just, I really, I really enjoyed it. It was very like, it felt very familiar and cozy. Yeah, I just, I just liked going into the room and liked the smell of like the wood and it's very like a sensory memory for me. And we did performances as well and that was fine too. I mean we never performed to a very big crowd, but yeah, it was nice.

RESEARCHER

Is there anything related to your health that you feel impacts your singing voice? If so, would you mind sharing how you manage it? Feel free to only share what you're comfortable with?

S2

Don't think from a physiological standpoint, there would be anything. I don't, not that I'm aware of, I have some back problems, but I don't think that affects my singing per se. Probably more from my mental health I'd say because that's probably one of the reasons that I was reluctant in the first place to start singing. I find that my confidence goes up and down and you can feel like you're physically restrained even when you're not. That's probably, yeah, I don't think it massively impacts me right now, but I do think probably in the past that might have been a factor.

Mental health: confidence varies

Musical development: reluctance to sing

RESEARCHER

Have you ever noticed any changes in your singing voice that you think might be related to hormonal changes?

S2

That's interesting. Yeah, I'm not too sure. I'm not too sure about that. Yeah, maybe around time of the month because I'm usually shouting more. Potentially. No I wouldn't say, not obviously. I think if I read into it, maybe there is a subtle difference, but I don't think I've paid close enough attention to know necessarily.

Hormonal: not aware of hormonal influences on voice

RESEARCHER

If you're comfortable sharing does neurodiversity such as autism, ADHD, dyslexia, etc. play a role in your life and your singing experience?

S2

Well, I'm currently in the assessment process for yeah, ASD. Yeah, I'm currently in the assessment process - it's probably going to take years. Yeah, I think it probably has, I think it probably has.

Neurodiversity: being assessed for ASD

RESEARCHER

You think it affects your singing?

S2

I think, I think it affects my singing a bit. So for example, with noise, like with noises when there's like different layers of noises going on, say if someone's talking and there's music in the background, I find it very difficult to kind of like, focus on one or the other and it's very frustrating. So I've found that it's easier, and this is not great, I think it's easier for me to ignore what's going on around me soundwise. Probably sounds ridiculous if you're singing in a choir. Definitely at the beginning I just couldn't pay attention to anybody else. And now I'm starting to feel a bit more comfortable when I can be more conscious about blending in properly. And yeah, it's hard. I'm glad that the acoustics when we stand like in a line like that, I can't hear everybody.

Musical development: struggles to focus

RESEARCHER

Right, that's really interesting. Does it make a difference whether you're at a sectional rehearsal or a full choir rehearsal with multiple parts?

S2

I don't think it makes too much of a difference. Because to be really honest, when I'm in a smaller group, that's more like anxiety-inducing just because often I'm having to stand in front of people, and they might be looking at me so that's, that just throws me off a little bit. So when we're in a line, we're kind of like all just looking at you and that's like, that's different. So I think there are just challenges.

Mental health: "anxiety-inducing"

RESEARCHER

How did you find the singing quartet?

S2

I found that really difficult because, um, because we decided we were going to look at each other while we were singing. So that did, it was like I was having to do, yeah, like segment my mind into doing different things. Even though it was really enjoyable. It's like, you just, I just can't like suppress that bit. It puts me on tenterhooks when I'm, when I was doing that. So it was really nice practising and I really enjoyed it. But I think especially when I was performing in front of the crowd, although I didn't feel nervous, I think performing to the crowd, performing to the people around me and doing the singing as well was difficult.

Mental health: "It puts me on tenterhooks"

Musical development: "segment my mind into doing different things"

RESEARCHER

And now moving to some questions that are more specific to my study: what comes to mind when you hear the word vowel?

S2

Vowel, so a, e, i, o, u. They are mouth shapes really, aren't they? I think that's probably what comes to mind.

Definition of vowel: a, e, i, o, u

RESEARCHER

By mouth, can you define what you mean? Do you mean lips or like the inside of the mouth or something else?

S2

I think it is shapes on the inside of your mouth, so like using your tongue, but unlike consonants, you're not making any kind of like percussive, there's no start and end to it. It's a movement and you breathe out the air. I think it's more the inside shape of your mouth.

Definition of vowel: "shapes on the inside of your mouth"

Definition of vowel: "there's no start and end to it"

Definition of vowel: "you breathe out the air"

Definition of vowel: use of tongue

RESEARCHER

In written English, there are five vowel letters (a, e, i, o, u), sometimes seven if we include w and y. How does this compare with the number of vowel sounds when we speak or sing and what implications might that have for choral singing?

S2

That's a really interesting question as well, because all of language and all systems of language like alphabets and those kinds of nomenclatures like vowels and things like that are a way of kind of reducing down something that's really, really complex. And the amount of vowel shapes and sounds in theory are infinite, like every single shape that you could do. If you look at all the different accents, I'd imagine probably, every single like possible movement of the mouth is covered. So it's a generalisation and I think just from the fact that in our practices, you have to give us guidance on how to, the way you see it written in the symbols, translating that to the actual sound of a vowel. They're two different things as well. The symbol of the vowel is different to the sound of the vowel. It must be such a wide spectrum. I can't imagine how you would like quantify all of them.

Vowel sounds: alphabets are a way of "reducing down something that's really, really complex"

Vowel sounds: infinite number of vowel sounds theoretically

Vowel sounds: requires guidance

Vowel sounds: written vowels are a "generalisation"

RESEARCHER

Do you notice any differences between how you sing a vowel and how you speak it?

S2

Personally, um, yeah, I think I probably do because when I'm singing a song, I'm not usually singing it in the voice of [name of S2] from [name of home town]. I'm usually singing the song or trying to in the voice of that I'd think, is like the voice it should be. So I guess, and also, it's just because you're holding sustaining things much longer a lot of the time. Yeah, probably is quite different.

Sung vs spoken vowels: sung vowels are sustained

RESEARCHER

And reflecting on the testing we did together, do you have any overriding memories or impressions from that experience?

S2

Memorable things, um, there's nothing like massively that sticks out, but it was, it was enjoyable. It's like an unusual thing to do. And I liked focusing on something that I normally just take for granted. So it was interesting when you said you need to go back and redo that bit, because I didn't always realise I hadn't quite done it right. Yeah, there was some bits that were more difficult than others, like some of the vowels, which I hadn't realised. Yeah, those things I wasn't conscious of before.

Musical development: enjoyed learning

Reflecting on testing: "take for granted"

Reflecting on testing: level of difficulty varied

RESEARCHER

We sort of talked about this already, but can you describe any physical changes you notice when making different vowel sounds?

S2

Yeah, I think, not just with like the inside shape of my mouth. I feel like my face muscles like the outside, I think, like I'm thinking about doing like an "e" [i:/]. If you want to do it really well, then I suppose you have to kind of exaggerate it a bit. So that's one thing I'm conscious of. I always remember my old music teacher saying "Smile when you sing" and like, "Open your mouth" and all this kind of stuff "because more sound can come out" and I think, yeah, with vowels probably I am overexaggerating sometimes with my facial muscles, what's going on inside the mouth.

Definition of vowel: "open your mouth"

Physical changes: "overexaggerating"

Physical changes: face

RESEARCHER

Are there any vowel sounds that you find particularly easy or more difficult to sing?

S2

That is a hard one. Well, I guess, I think, with like, just coming back to like "how", and all the different ways of pronouncing "how" I think in English, like in German you have things like umlauts and things that give you a little push in the direction you want to go in. Lots of European languages have those little accents and we don't, it's just, you just have to, you just know the right way to do it. But I think yes, I suppose that "o", and I think also with like double "o"s as well, like, look and book, when you have to, like sustain that, it's really difficult, you want to go like "ooh" [u:/], because it feels like the right thing to do. But yeah, I think that's maybe one. What other? Yeah, when you're saying "ooh" [u:/], and you're trying to smile at the same time, I've not figured that one out yet.

Vowel sounds: singers can interpret vowels in different ways

RESEARCHER

Do you ever notice how other choir members shape their vowels and does it influence your own singing?

S2

I don't think I've noticed it too much. I keep trying to listen out for the Essex twang, because I think, I just think it'd be really funny to hear that with some of the music we sing, but I think I miss it, I don't think I've really heard it so much. When we were singing in the quartet, the sopranos have a more operatic way of singing sometimes. And I think that the shape, the sound of the vowels is a bit different when they sing like that because I personally don't sing like that. And I don't know if all of the altos do either. That seems a bit different, but no I don't notice it too much from where I'm standing.

Current approach to unifying vowels: "don't notice how they sing the vowels particularly"

Current approach to unifying vowels: higher voices approach vowels differently to lower voices

Singing experience: quartet

RESEARCHER

What do you think the potential advantages and/or disadvantages might be of choir members unifying their vowels?

S2

Um, I'd say depends on the kind of sound you're going for. Because if you wanted a really clean, unified sound, and yeah, it's great if everyone's singing the same thing, but I think maybe there's a bit of a richness and kind of rougher timbre that may come from people making those different sounds and you end up with like this kind of general sound. That's like all the vowels at once is, is the vowel maybe, I don't know. But if you're going for a particular thing, like "You'll Never Walk Alone" that's, I can see the benefits of that being sung in a unified way. Probably both, like there's benefits both ways depending on the sound you're going for.

Advantages and disadvantages: affects the sound

RESEARCHER

What strategies do you think could help ensure more unified vowels within each section?

S2

I do think it's helpful when you point it out as we're singing, so we can make that connection straight away. Maybe like diction lessons. It's one thing that we don't, we do touch on it when we're doing our sectional rehearsals. We'll say "Oh, that's, that's one to watch out for because we've got it marked". But it's impossible for anyone, for you to go through every single thing, how it's meant to be pronounced so I think with like "Hushabye" you gave us some, there was like some good general tips you gave, you said like when it's this, like when it's like "ye" or whatever, it's this and you can almost like list and try and memorise it, but it's quite challenging, I guess. Because everyone's got their own personal challenge to get things right or wrong. So I think probably most people don't realise how they actually sound.

Disadvantages: difficult to give comprehensive guidance

Improving the unification of vowels: under direction

RESEARCHER

Do you have any experience with interpreting or using the symbols from the International Phonetic Alphabet?

S2

Yes, I do from my brush with linguistics. So yeah, I do. I can't really remember exactly. So when we were looking at accents and things like that, that is one thing that we'd look at so you wouldn't, if you're trying to like understand the differences between different accents, you just write things down

phonetically and compare it that way. Yeah, I think if it's like thinking about, if that accompanied a musical score probably would be really useful because, yeah, just a little like cheat sheet at the top maybe.

Improving the unification of vowels: provide IPA "cheat sheet"

IPA: some knowledge

RESEARCHER

Have you ever tried changing how you sing vowels to improve your sound? If so, what have you tried?

S2

Yes, I definitely have. Under your tutelage I have definitely like been more conscious of that. So I've kind of taken a few of the songs that I've really tried to focus on, so "Hushabye" and "You'll Never Walk Alone". So I think it's almost like I've put little markers in my head, so that when I know the vowel is coming up, it's not like I know this is coming up now, but it's like when I start singing it and like this is the one that I'm in, I have to sing like this. And I almost just put myself in that character upfront, so there's no way I could get it wrong in theory, because that's just the way that I'm moving my mouth today. So that kind of thing. Um, and so I think that's it. It's just figuring out what the character is beforehand and knowing how it's going to sound and then just trying to stick to it all the way through.

Musical development: trying to improve

RESEARCHER

Yeah, interesting. What does singing in tune mean to you? And do you think there are any differences in staying in tune when you're singing solo versus being in a choir?

S2

Yeah, so I've actually thought about this a bit because in an orchestra or in an instrument quartet you tune up at the beginning and make little adjustments and it's not something that we do in or I've never, I've never done it in a choir actually, but it's not something that we do here. And everyone has like the tendency to lean like flat or sharp, there's just like a natural and when you're singing louder or lower, and then that's going to change too. So I think it's, sorry, what was the question again?

Definition of in tune: natural to "lean" flat or sharp

Other tuning codes: never experienced tuning up in a choir

RESEARCHER

What does singing in tune mean to you?

S2

Yes, I guess singing in tune in a choir is singing in tune with everybody else. Whereas if you're singing solo, it doesn't, you can be in tune to like a tuning fork. But I guess it doesn't really matter that much, unless you've got like an accompaniment. You could kind of just sing it as you want. So yeah, I guess you're just singing in tune with an accompaniment if you're a soloist, but in a choir, yeah, I don't know how people tune up for that. But ideally, you have to be in tune with everybody else or it's gonna be too like buzzy and off.

Definition of in tune: in tune with accompaniment/tuning fork

Definition of in tune: singing the same as each other

RESEARCHER

How do you make sure you're singing in tune?

S2

I suppose when we start off the sessions, I try and do a very brief warm up. I don't warm up before every single practice. When I'm at home, and if I'm practising along to something, then I will check myself against that. But when we're in the choir when we start singing, I guess I just kind of like, try to listen to the general sound around me. And sometimes there's bits where I sing slightly louder than everyone else or someone else things louder and I kind of like listen to that and think "Did that sound about right?" and try and adjust to it, but it is a little bit slapdash.

How to sing in tune: listening to others

How to sing in tune: question

How to sing in tune: warm up

RESEARCHER

This is my final question: if you notice or are told that some notes are a bit flat or sharp, what is your process for fixing them?

S2

Um, just be a bit sharper or flatter, I guess.

RESEARCHER

And what does that mean?

S2

I suppose you just, you'd have to, for me personally, I'd probably sing the note again and then just slightly modulate it upwards or downwards and listen to myself and think "Is that about right?" You have to kind of be making the noise to know whether it's right or wrong, I guess.

Improving tuning: move slightly up or down

Improving tuning: question

RESEARCHER

Well, thank you so much for taking part. Before we finish is there anything else that you'd like to add or share?

S2

Um, I think that's it really. I would be interested to do, I don't even know how you do a tune-up with a choir, but I think that would be a really interesting thing to see, to hear.

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S3 Interview

RESEARCHER

Thank you so much for giving up your time to take part in this study. I'm going to start with some general questions on your background. Can you tell me about your background in singing and in music in general?

S3

Okay, background in singing is for the most part I was brought up in [country]. So basically everybody sings, all the time, everywhere is about as accurate as you can get. Even earlier than that, though, I was originally brought up in Heathrow until I was seven, and we had a very good music teacher there, so we sang in Russian and French and all kinds of things from being very young. Then when I went to [country], of course you sing bilingually, so it was English and [language of country] nearly all the time. My grandma used to sing to us and she's from Hyde in Cheshire. My mum was from Derbyshire, my dad's Cockney. So we had a whole range of linguistic influences when we were very young. In terms of singing, it was just sort of the average class stuff, although I sang in chapel, so we learned solfa as well as regular music. So I'm actually unusual as being someone who can do solfa and read music, it's usually one or the other at home.

Aural experience: use of tonic solfa

Other music experience: reads music

Singing experience: church choir

Singing experience: sang in multiple languages as a child

Then when we went to secondary school, everybody competes in [competitive festivals]. So every year in school, you'd have the [competitive festival]. Each house would prepare a choir. And we'd also do stuff for [national] television. We didn't do much competition stuff. I don't think the teachers were interested enough. But you had the choir concert every year. We didn't have vocal training, per se. It was more things like they'd line us up, so you'd always stand so you're shoulder to shoulder, so you could hear the person next to you singing and that sort of thing. And then when I was towards the sixth form, the choir was taken over by the guy who had the best ladies' choir in the country at the

time. But again, he didn't spend much time with us in terms of training or anything like that. You just went and you sang and you did your thing. Never did any training in terms of vowels or linguistics or anything that I can think of at any time, really.

Singing experience: school choir

And then when I went to college, we had a very good choir there, as I've told you before. And that was a soprano, alto, tenor, bass choir. A very big choir - it was about 300 odd strong and we did experimental music. We sang Mozart's Requiem at the Assembly Rooms. We did "Suor Angelica" at Colston Hall. And we also did the carol concert at Bath Abbey every year, which was lovely. That was really the high point because the acoustics in there are absolutely fabulous. But we did a very wide range of music so again, some would be in Italian, some would be in Latin, some would be in French, you know, it was a really wide range of languages. In terms of learning languages, I suppose I did Italian because I did music when I was growing up. Then obviously there's the [language of country] and the English. My mum insisted I spoke Standard English RP because she was an English teacher. So my accent is a bit weird for someone who has lived in [country] for so long. The village where I lived had an accent, but not very strong. If you went to the next village down, their accents are really, really strong. And I worked in [name of city] for a couple of years and their accent again is really, really strong, even though they don't speak [language of country] down there. I think out of the whole factory, two of us could actually speak [language of country], so that was quite funny. I speak French, although usually only when I'm out there. I'm not one of those people who can swap backwards and forwards in languages, I have to think in one and speak in one. If I'm home and I'm thinking I can speak in [language of country], but I can't switch backwards and forwards very easily. I learned Spanish a very long time ago, but discovered recently that that's completely gone out of my brain. And also, if we go on holiday or anywhere I'll get on Duolingo and I'll learn Bulgarian or you know, Spanish or wherever we happen to be going and get on that. So in terms of range of vowels, mine is probably really, really, really wide.

Singing experience: college choir

RESEARCHER

Have you had any formal training in singing?

S3

No. Actually, that's not quite true. When I was in the sixth form, I had one of the professional singing teachers. She helped me with the aural, but she didn't train me in terms of singing, if you know what I mean. She was working on recalling pitch and all that sort of stuff. Yeah. And, oh, the other thing I did that might actually be really interesting for you was I was having problems breathing - hyperventilating. And I went down to a lady in Southampton, who had developed a sort of voice training thing and she did voice training in the sense of pushing air, and also vowels actually thinking about it. And she actually stopped me hyperventilating and got me to breathe normally. But we also did songs, we did "Send in the Clowns". She'd have me do things like bounce a ball while singing and stuff to try and develop my lung capacity. But that was the only kind of thing that I've actually done that was any kind of voice training of any kind.

Aural experience: received training

Musical development: seeks helps when she needs it

Singing experience: no formal singing training

Singing experience: received breath training

RESEARCHER

And do you play any instruments?

S3

I did play piano and guitar many years ago, and I have bought myself a piano, but I'm not playing it awfully often at the moment.

Instrumental experience: guitar - advanced level

Instrumental experience: piano - advanced level

RESEARCHER

Do you think that that's influenced your singing at all, playing instruments?

S3

Probably the opposite. Because when I'm sitting at the piano trying to sing my voice sounds horrible. If you know what I mean, the same with a guitar really. Whereas I constantly hum or sing when I'm not around an instrument, if that makes sense.

RESEARCHER

And so you addressed some of this already, but do you or have you ever practised ear training such as recognising intervals, chords and rhythms? And if so, can you tell me about that experience?

S3

It was only aural really for the piano because I had to get grade eight to go to university and I really struggled with the aural, particularly the chords. I couldn't, at the time, I couldn't tell the difference between different chords or even different instruments. I don't think I'd had enough practice, I think really. Now, I can do it fairly easily. But I think that's because I've listened to a lot of music since, you know, I decided if I was not going to be that good at being a performer, I was going to be really good at listening. So since then, I've really kind of tried to listen, and, you know, try and work out how music works, if you know what I mean, while I'm listening to it, you know, what's the instrument? What does it do? That kind of thing. And, as I told you, at university the aural training was absolutely pathetic. You know, we really didn't do any, you know, individual training at all, which for a music degree really was quite appalling. So, in terms of singing, more than anything when I used to go backwards and forwards to Chelmsford, I'd sing particularly "Evita". I love "Evita". So I'd sing every part of "Evita" going backwards and forwards to work, you know, kind of belting along with that and other soundtracks that I liked. So my voice was quite strong for a while. And then I got a car that didn't have, you know, a tape deck or whatever in it. I couldn't be bothered with the Spotify and stuff and my

voice had actually got very weak again. So, when I started with the choir, as you know, my voice was very, very weak indeed. And that's one thing I can actually feel, the difference in my voice now after 18 months, it's making a big difference.

Aural experience: "I'm not very good at that"

Aural experience: "Now, I can do it fairly easily"

Aural experience: as part of exams

Aural experience: grade 8 aural

Aural experience: no aural training on music degree

Instrumental experience: piano - advanced level

Musical development: seeks helps when she needs it

Other music experience: music degree

RESEARCHER

That's good. So in terms of aural skills, do you think that you practise that on a regular basis still, in terms of recognising intervals, is that something that you think about or not really?

S3

I don't practise but I've noticed, you know, in terms of sightsinging when we're in choir now, you know, if I have to pitch a middle C, I can pitch a middle C, right. Whereas that was something I had never been able to do in the past. I'd always been able to sightsing and again, that was something that was very rare because the girls used to learn their music from tapes. They didn't learn their music from music for the songs that they sang. Or if they did, they sang solfa, not with music. But my sense of pitch is very much better than it used to be. But I did, when I was younger, I did used to practise singing the intervals, so sort of do to la and so to la and so to ti and you know, when I was sightsinging, but I mean, that was when I was what, 18 I guess.

Aural experience: practised intervals

Aural experience: relative pitch

S3

Is there anything related to your health that you feel impacts your singing voice? If so, would you mind sharing how you manage it? Feel free to only obviously share what you're comfortable with.

S3

It does affect my singing when my back's up, particularly the top bit, which is out at the moment, because it tends to make my chest feel very tight. So, I feel quite nauseous with it. It was last Wednesday at choir, I was having a really horrible session, where everything was just making me feel sick. Nothing otherwise that I've noticed. I've had a lot of colds over the winter and stuff. It's just been a horrible winter like that, but as a rule, nothing with my physical health really affects my voice anymore.

Physical health: back issues

RESEARCHER

And have you ever noticed any changes in your singing voice that might be related to hormonal changes?

S3

Oh, that's an interesting one. The answer is I don't know. It could have been you know this period where I haven't been singing, it has been affected. I noticed my voice got quite reedy and high. It's only since I've been really singing regularly again with a choir that it started to even out, particularly my breathing. And I have noticed my range has got bigger because I was trying, you know, "Take Me to Heaven". And I could sing the top A [A5] in that, I couldn't sing a top A even at college. Sort of F [F5] was my top, but I can do that A quite easily. And my range has also improved going downwards because before it would have been kind of a G [G3], whereas I can actually get down to an E [E3] now without too much difficulty through the songs we've been singing.

Hormonal: not aware of hormonal influences on voice

RESEARCHER

Before joining the choir, how long had it been since you'd had been singing regularly?

S3

Let me think. I had the new car... when did I get the new car? So probably about 2018/19 when I stopped singing regularly you know on the way to work. So I really hadn't sung, you know, full blast every day for quite a few years.

RESEARCHER

So you think this change in range probably happened since joining the choir? I mean the songs in "Evita" have quite a broad range.

S3

I probably had the range, but I probably didn't realise it, if you know what I mean. Because I hadn't kind of measured it. Or even thought about which part of my voice I was using, if you know what I mean.

RESEARCHER

Do you think when you were singing previously, when you said that you knew that an F was the top of your range, that those were things that you thought about or didn't think about? You really felt that an F was the limit?

S3

I thought that the F was the limit when I was at college. We had a session where we did conducting and he had us sing that top F, so I knew I could do that top F but because I sang alto in the choir, we were never asked to sing above that. So I don't actually know whether I could or couldn't if you know what I mean, but it seemed to be my top at the time.

RESEARCHER

If you're comfortable sharing, does neurodiversity such as autism, ADHD, dyslexia, etc. play a role in your life and your singing experience? And if so, would you mind describing that experience?

S3

With hindsight, and I've never been diagnosed, I think I have ADHD. I think it influenced me in terms of the length of time it took me to learn a piece of music. Something I always struggled with, I really, really struggled with when I was younger, particularly at university. My lecturers used to get really sort of stressy with me about how long it would take me to learn something. Once I got it, I'd got it, but I think then that kind of developed an insecurity that I wasn't good enough at it. And it kind of spiralled. So by the time I left university, I actually, I'd done music at university because I wanted to carry on with the piano and the guitar. But then when I left university, I actually didn't want anything to do with music. They'd done such a good job on sort of bashing my self-esteem that I just, I went to the English side and I never really thought about it, other than occasionally wanting to join a choir. Yeah, but I'm, I'm pretty sure that I had, you know, those kinds of learning difficulties.

Mental health: low self-esteem

Musical development: took a long time to learn music

Neurodiversity: undiagnosed ADHD

And I suppose you've noticed with my music, I use colour to reference. So when you look at my scores, they're absolutely covered in different colour highlighters and marks and whatever. And that means I can actually learn the music much more quickly now. Whereas when at university, of course, you weren't, they were borrowed scores, you couldn't mark them up. And that made it much more difficult for me to follow where I was and stay in the right voice, and those sorts of things. And I actually thought very often I was singing out of tune but a friend of mine who had perfect pitch said "No, you're not you're just singing the tenor line up an octave higher". And I still do, I did it again at the session. I'm very prone to try and harmonise what we're singing, rather than singing the actual line. And I try very hard not to, but every now and again, I find "Writing's on the Wall" particularly, for

some reason, I want to put that harmony in rather than singing the line. Does it affect my voice? I don't think it affects my voice, per se. I think it affects more my, it makes me feel insecure in what I'm singing, if that makes sense.

Mental development: uses colour to help learn music

Mental health: low self-esteem

Musical development: has tendency to drift between choral parts

RESEARCHER

So coming on now to questions that are more specific to my study. What comes to mind when you hear the word vowel?

S3

We have seven of them in [language of country], we have a e i o, u, w, y. They're completely different sounds to the English sounds - they are much nicer, much softer.

Definition of vowel: a, e, i, o, u, w, y

RESEARCHER

What do you mean by softer?

S3

More towards the aa [æ] sound rather than ay [eɪ]. [Demonstration of vowel in the language of country] almost as a wave-type sound through it, particularly in and also with the pitches that they sing. In [language of country] we sing at much lower pitches, where with English hymns very often you hear people straining to try and get to the English hymns the way it's written. With the [nationality] hymns, you very rarely hear that kind of strain. So I think the pitch and the gentleness there, I suppose it's like a diphthong where it's kind of longer. I don't know the terminology.

RESEARCHER

I don't know whether that's... A diphthong is where you have two sounds within a vowel.

S3

For example, in [language of country] you would sing [demonstrates the singing of descending notes with two notes to each vowel]

Definition of vowel: misunderstanding of diphthong

RESEARCHER

Sorry, by two sounds, I meant two vowel sounds within a syllable. So like "boy", two sounds within one syllable. But the example that you gave previously, sounded like it was a diphthong, the vowel sound that you demonstrated, because it sounded like it moved between two vowel sounds. In written English, there are five vowel sounds (a,e,i,o,u) and sometimes seven, when we include W and Y. How does this compare with the number of vowel sounds when we speak or sing, and what implications might that have for choral singing?

S3

There's loads of different variations for the AEIOUs. It's, I mean, I can hear it just when I speak to the different people in my family, you know the people from different areas, they all use vowels differently. My grandmother used to sound like Thora Hird, you know, sort of very gentle. My aunt was more Manchester, so imagine Vera Duckworth in Coronation Street. My dad is pure Cockney, you know, so it's quite fast and, you know, he's even funnier because he's Cockney-Welsh, so you get a mixture of these very long and very short vowel sounds, which can be really quite funny sometimes. The variations are enormous and we all seem to pick up accents quite easily. So we pick up different bits, my brother when he was in the RAF, you could tell exactly who he was bunking with by what accent

he came back with - so you know, he'd be a Scouse one week. Now he works up in Aberdeen, his children speak with very strong Scottish accents, but when he's on the phone, he sounds more Cockney than my dad now, which is really, really, really strange. So we hear lots of different vowels all the time. And it's probably one of the only ways that you can actually pick up that I've lived in [country] so long is through some of the vowels I use.

Vowel sounds: five written vowels but more sounds

RESEARCHER

How do you think these variations in vowel sounds might impact choral singing?

S3

It would affect the blending, you know, how you blend with other people. I can hear my voice in some of the tapes, where I think my voice has been a bit flatter than the other girls in the choir. I do try to blend with what I can hear around me. I listen very carefully to try and pick up the same sort of sounds.

Advantages: blended singing

Current approach to unifying vowels: "listen very carefully to try and pick up the same sort of sounds"

RESEARCHER

Okay, we'll come on to talking more about that. Do you notice any differences between how you sing a vowel and how you speak it?

S3

Yes, I tend to be more [nationality of place where S3 lived for a long time] when I sing. Yeah, there is much more of a [nationality] influence when I sing, definitely.

RESEARCHER

Why do you think that is?

S3

I think because when I was growing up, it was very emphasised by my mum that I needed to speak RP, so it had to be very clear, very precise diction. Whereas when I'm singing, it's much freer, and kind of based on people around, do you know what I mean? The way other people sang around me when I was younger, and so on.

Sung vs spoken vowels: spoken is more precise than sung (informed by circumstance)

RESEARCHER

Reflecting on the testing that we did together, do you have any overriding memories or impressions from that experience?

S3

I was interested in how it seemed to be easier to move from one vowel sound to another at different pitches. Certain pitches just seemed to be much easier at different sort of heights, different tones. So certain ones only seemed possible very high when I was listening for them in my head, before I sang them. I couldn't get my voice to do a pitch of that vowel otherwise, that seemed much harder. You know, if you'd asked us to do all of the vowels at the same pitch I think it would have actually been a much more difficult process.

Reflecting on testing: some vowels were easier at different pitches

RESEARCHER

Can you describe any physical changes you notice when making different vowel sounds?

S3

Not that I noticed, apart from raising my chin for some maybe.

Physical changes: chin position

RESEARCHER

Okay, how do you think that you move between say, an ee [i:] and an ah [ɑ:] vowel? How do we form different vowels?

S3

It's the breath that comes out. It's the position of, kind of, the tongue and the chin, those bits that move. And the breath as it goes over those.

Physical changes: chin position

Physical changes: the breath as it goes over the physical changes

Physical changes: tongue position

RESEARCHER

Are there any vowel sounds that you find particularly easy or more difficult to sing?

S3

Don't know, I've never thought about it. I'm finding it harder to hold long vowels at the higher pitch. I know that there's one, isn't there, where we end on a high C [C5]? I find that one's actually quite hard to hold. Can't think which one it is. One of the songs you know, the altos, we go up and our very last note is, I think, it's a long ah [ɑ:].

RESEARCHER

It'd be interested to know which one that is. But you think the vowel sound is an ah [ʌ:]?

S3

[looks for song] it's "You'll Never Walk Alone".

RESEARCHER

Oh okay. What's the word?

S3

Trying to hold it on the same pitch "alone"?

RESEARCHER

On "alone"?

S3

Yeah, that very last one. We sing a high C [C5]. I find that actually quite hard to hold at that pitch.

RESEARCHER

Do you ever notice how other choir members shape their vowels and does it influence your own singing? You've addressed this a bit already.

S3

It does a little bit in the sense that I try and tune into how the people around me are singing, I don't notice how they sing the vowels particularly. I just try to blend with what they're doing.

Current approach to unifying vowels: "don't notice how they sing the vowels particularly"

Current approach to unifying vowels: "try to blend"

RESEARCHER

What do you think the advantages and disadvantages might be of choir members unifying their vowels?

S3

It might not be the sounds you want, the conductor wants and also you're hearing it across the choir. Whereas when sound is projected forward, it sounds totally different. It's one of the things I learned through teaching. You can think that the class is being really naughty, but they have no idea of this wall of sound that's coming towards you. Whereas if you walk into the middle of the classroom, suddenly the dynamic changes. And it was actually one of the things that I used to tell new teachers, "Don't stand at the front, you'll get this wall of sound coming at you, walk into the middle of the room, and the whole dynamic of the class changes." And I think the same thing is true of the choir, you hear the sound going across, but I really notice it in the videos, you know, watching back the videos, the way the sound is so different from the way we hear it in the alto section. The others, you know the rest of the group coming forwards.

Disadvantages: might be wrong as the section hears a different sound to the sound at the front

RESEARCHER

What strategies do you think could help ensure more unified vowels within each section?

S3

I think using words, you know, like you said with the aa [æ/], a word like "cat", so people know exactly. Most people would say a word like "cat" the same way. So maybe certain words that just cue people into particular vowels. Although I'm not sure how well that actually works, because my husband when I first met him, he kept going on about these owls, and I said "Darling, what owls are you talking about? This doesn't make any sense." And he didn't mean owls, he meant ales as in beer.

Improving the unification of vowels: provide reference words for vowels

RESEARCHER

Do you have any experience with interpreting or using the symbols from the International Phonetic Alphabet?

S3

I don't think I've ever actually seen it.

IPA: no knowledge

RESEARCHER

Okay, that's fair enough. And have you ever tried changing how you sing vowels to improve your sound? If so, what have you tried?

S3

Yes, but more in terms of breathing the sound if that makes sense. So, when you're going for "alone" breathing from the stomach, rather than from up here. I suppose a richer sound, rather than a change of sound, if that makes sense.

Vowel modification: improve vowel by breathing

RESEARCHER

So you enable the richer sound by breathing lower, is that what you said? Would you not breathe lower all the time or just for specific moments, like the end of that song where it's particularly helpful?

S3

I do, I find I'm doing it more and more - that the breathing is going down to my stomach because I'm getting better control, but I also noticed, you know, when I was started with the choir, I was like, "How do I hold this note? I've got no breath there." I notice, it's actually, I'm having to use far less breath now. So that has, that has improved a lot. I noticed, you know, with several of the songs now, I'm actually not having to go down deep into the body to find some kind of air to do that. It's just flowing more now.

RESEARCHER

What does singing in tune mean to you?

S3

Okay, that's an interesting one. What does singing in tune mean? It means it doesn't sound discordant against other people. Does that make sense? Yeah, I think singing in tune is you can sing the actual tune, but again in [country], we would naturally break into harmony anyway. But it's when you get a sort of discordant or dissonant voice that would be out of tune to me.

Definition of out of tune: "discordant or dissonant"

RESEARCHER

When you said that you sang experimental music, which can often be discordant - would you regard that as out of tune?

S3

I suppose it's intentionally out of tune, isn't it? It's designed to create that dissonance.

RESEARCHER

And do you think it's easier to stay in tune when singing alone or with other people?

S3

I actually think it's easier to stay in tune when you're singing with other people.

How to sing in tune: listening to others

RESEARCHER

Okay, for what reason?

S3

Because when you're on your own, it's easy for your voice to kind of wander off in different directions. Whereas when you're with other people you're trying to keep in line with them. The only other time it's difficult is sometimes when you pick up one of the other voices.

Causes of poor tuning: Other choir members can influence my tuning

How to sing in tune: listening to others

RESEARCHER

In a different section?

S3

A different section, yes.

RESEARCHER

How do you make sure you're singing in tune?

S3

I practise against the piano if I'm not sure about a different line. I can hear if I'm not singing what I should be now, whereas I never used to be able to. So for instance, when we were doing the practice the other day, I could tell that the last but one, the penultimate, line that we were singing was the one that was out, even without looking at the music.

How to sing in tune: can hear when it is in tune/out of tune

How to sing in tune: practise with piano

RESEARCHER

And when you say "out" what's your definition of that?

S3

We weren't singing what was written.

Definition of out of tune: "We weren't singing what was written"

RESEARCHER

This is my final question: If you notice or are told that some notes are a bit flat or sharp, what is your process for fixing them? I guess also, how would you define flat or sharp as well?

S3

How do you define flat or sharp? I suppose sharp is when it sounds slightly pitchy. Flat is when it sounds a bit dead.

Definition of in tune: flat - "a bit dead"

Definition of in tune: sharp - "slightly pitchy"

RESEARCHER

Okay.

S3

I think it's actually trying to key into the actual note you need. If I'm looking at the music, I can actually kind of modulate it down and up now. I don't think I could do it if I couldn't see. It's kind of the connection between what the note is and what the sound is in my head now. Whereas when I was younger, I didn't have a sound in my head.

How to sing in tune: focus

Improving tuning: audiation

RESEARCHER

Interesting.

S3

Yeah, my piano teacher always used to say, she never understood it, I was the only pupil she ever had who loved the theory more than the music. But when I was writing the music, I was doing it almost mathematically. You know, I could sit there and write you a perfect Bach chorale. I knew exactly how we do it and you could give me any of those bits, you know, the grade eight bits. And I could sit there and write it all. But I couldn't tell you that I put in an augmented second because I couldn't hear it or if I had made a mistake, I wouldn't be able to know. Where the difference is now is when I'm reading the music, I can actually hear the tones in my head.

Improving tuning: audiation

RESEARCHER

So when you did tonic solfa, you weren't reading from sheet music at all? You were just reading it on its own without any musical notes written?

S3

Yeah in the old chapel booklets, that was when I was very young, they would just have the solfa. So you'd have a key and then you'd have so do la ti.

RESEARCHER

So did you have a perception of what the interval was between the notes or you just knew that this is la and this is ti for example, you weren't thinking that's a second apart?

S3

No, not until much later on.

RESEARCHER

So you just knew that this is do and if I now need to sing la, this is what the sound would be?

S3

Yeah. And that's how I learned to sight-sing as well. Because I couldn't hear the difference, so I'd be singing do to la, do to la, do to la, do to la until I was absolutely sick of the sound. And then I do la ti or I'd do so ti, but that was much later on.

Aural experience: use of tonic solfa

RESEARCHER

And so now, how easy do you find it to apply that to sheet music? Can you see where do is?

S3

Oh immediately, so because I could read music as well because I had learned the piano, I can apply both now. Whereas I think I didn't understand the relationship between the different sounds when I was younger, but having listened to so much music since and also I think because I've sung to soundtracks and things, I'm probably doing these things without actually realising. I've done the music without having any preconceptions of what the note might be or whether it was solfa or whether it was music. So I think I've learned to hear the different pitches in my head now, where as that was what was lacking when I was very young. I couldn't hear the music in my head, but I could sing something you know.

Aural experience: audiation

Aural experience: relative pitch

RESEARCHER

So back to talking about being flat or sharp and how we correct it. Did we get to the process of fixing it? We talked about what it was.

S3

Yeah, if I was flat or sharp, I'd try and hear it. But also just try and pitch the note accurately against the one on the sheet.

How to sing in tune: begins with "reading the music"

Improving tuning: "I'd try and hear it"

RESEARCHER

Is your definition of flat or sharp a different note? If it was on a piano keyboard, would you be imagining it as an A sharp when you were meant to be singing an A?

S3

Yeah, that's how I would visualise it, yeah.

RESEARCHER

Would you ever think about it as being a smaller interval than that, as in within the width of an A.

S3

I see what you mean, yeah.

RESEARCHER

But not in the centre of

S3

the note. Yeah.

RESEARCHER

I guess when you come from playing the piano, where the note is the note

S3

A semitone.

RESEARCHER

I wonder how that influences us as singers.

S3

Yes, it probably does.

RESEARCHER

Yeah, because I guess with piano you don't have to you think about the piano being in tune in the same way, as a piano tuner would come along to tune the instrument. If you play above or below the intended note, you would say that you've played a wrong note rather than being sharp or flat.

S3

The guitar is similar, I suppose. I had a horrible experience in my grade seven exam where it was in a cold church and the strings went out of tune on me. And of course, my sense of pitch was very dodgy, so I had no way of tuning these strings up and it was just an absolute nightmare. So yeah, I get what you're saying about the difference. Think about a longer string as opposed to being a piano note.

Definition of in tune: singing is closer to tuning of guitar/violin than piano

Improving tuning: relating the voice to instrumental tuning

Instrumental experience: guitar - advanced level

RESEARCHER

Well, thank you for taking part. Before we finish, is there anything else that you'd like to add or share?

S3

I don't think so. It's been really interesting.

Created with the Delve Qualitative Analysis Tool (<http://www.delvetool.com>)

S4 Interview

RESEARCHER

Thank you so much for giving up your time to take part in this study. I'm going to start with some general questions on your background. Can you tell me about your background in singing and in music in general?

S4

So I don't have any formal education in singing at all. I started singing as a teenager and realised that I could sing, whatever that means, but I knew that I had some sort of voice, and people would tell me or I could just innately know. So I suppose I was self-teaching then from that age, listening to lots of singers, probably just mainly pop singers at that time. And that's how I learned to sing if you like, so no training. I had a couple of singing lessons, when I was at school, when I was in secondary school. But nothing that would have taught me anything. And then I belonged to school choirs. And so I did that. Again, there was no like training it's just it was a general school choir, like a community choir really. I don't even remember singing in parts, I just remember singing in the choir. And then I started to want to... I did some competitions when I was in my late teens and stuff. Talent contests and things like that. And I won a couple of those. Again, no training. I won a couple of those. I would say at this point. My technique wasn't that great. It was very much just, I think there is some innate talent somewhere. Or something in my tone. You know, it's nice to listen to or you know, I felt that, like I said, I always could sing, but nothing else other than that, and then probably I didn't really do anything else until I started [choir name]. So probably no, I don't think I did any gigging anything up until that point. So what was that? 2009? Yeah.

Musical development: "self-educating"

Musical development: "some innate talent somewhere"

Singing experience: no formal singing training

Singing experience: school choir

So then I joined choir and I think that's where I would say, some sort of education around voice started. And I started to take more of an interest and then on that sort of stepping stone I then wanted to gig, so I started to put together repertoire for singing in pubs and stuff like that. Whilst I was still singing in a choir, and I was singing soprano at that point. I just felt that's where my voice fit the most. And I always say that, you know, choral singing, it does teach you techniques that are you're learning as you're singing, especially when you're singing a harmony. And I think you taught us a lot of stuff that I didn't know. So, so yeah, so doing that. And then I started gigging in pubs and things like that. I think it would probably have been about that time that I started to look into technique, because at this point, I didn't have, I still had what I would not, what I would call strong register breaks, but you know, like, I didn't really know what to call it, I don't really, you know, chest, head, that sort of thing, but just there were bits and breaks in my voice, where everybody has them, but I wanted to try to learn more about how to navigate that. So I probably started to look into what we would now call a mix voice, but I didn't really know those sort of terms then, but just trying to smooth that out. So at that point, I probably was learning about vowel modification, but again I wouldn't have understood any of those terms at that point. But I was just trying to make my voice sound better. So I was doing that as well. And I just think the 10 years or whatever, nine years, whatever we had at the choir, I think my voice just improved a lot and range as well because I was singing mainly soprano, but obviously I would sometimes sing alto and I liked that. But my range definitely improved, my range definitely improved at the top. Definitely. And, you know, I didn't really get into, that was probably it with technique, like I wasn't looking at placement or things like that at that point. It was just trying to, I think my voice was maturing as well. I think around thirty, your voice is probably at its peak, well that's what I read anyway. And I think that's probably true. I think my voice has definitely improved with age and finding my mix and stuff like that through that time. So yeah, so I did that.

Singing experience: gigging in pubs

Singing experience: sung in choirs as an adult

Vowel modification: "one of the ways of making it sound the best ... is by experimenting with changing vo..."

Then I was gigging and stuff, then choir stopped so I wasn't doing it anymore but I was still gigging and I joined a musical theatre company. While I was still there, I joined a musical theatre company and still self-educating the whole time really and then it's only probably been in the last sort of maybe five years that I really sort of been interested in technique to the point where I watched like everything

about everything, and lots of teachers, lots of vocal coaches online and started to really understand not just technique but anatomy a little bit more and different teaching techniques and how they differ so much and people's individuality and their voices. And that there isn't a one way to teach and a lot of it is innate, and a lot of it is finding your way. So yeah, so then that's it and then I joined this choir and still self-educating. Yeah, no formal. I had one lesson with somebody, but I am going to start singing lessons because I do feel I could, obviously you're always improving, I don't think we can ever stop improving your voice.

Musical development: "I am going to start singing lessons"

Musical development: "I don't think we can ever stop"

Musical development: "self-educating"

Singing experience: musical theatre company

Singing experience: sung in choirs as an adult

RESEARCHER

Do you play any instruments?

S4

No.

Instrumental experience: no experience

RESEARCHER

Do you or have you ever practised ear training such as recognising intervals, chord, rhythms, and if so, can you tell me more about that experience?

S4

I would say no because my theory in music is not great. Although through, obviously choral singing, I have definitely learned to read music a lot better. So it's not that I completely can't read music, it's just no, again, training, formal training, but because of that, a lot of my learning is through ear. And so

I'd say that that's primarily my, the way I learn. And that means when I'm learning harmony as well, it's by ear a lot of time, although not so much in later years, I use both: I use music and I will use by ear, but because I've used my ear so much throughout my whole life, that's probably my go to. Because at the beginning, especially theory, on what notes something was, didn't exist for me. So I would have to learn those intervals by ear. And I wouldn't know that that was going from A to B or whatever it was. So whereas obviously I have more of an idea now. And the music does definitely help. I think definitely looking at sheet music helps you especially if you're struggling to get it by ear, then that's when I need the sheet music, if that makes sense.

Aural experience: "learn things a lot by ear"

Aural experience: no formal training

Musical development: "I don't think we can ever stop"

RESEARCHER

Is there anything related to your health that you feel impacts your singing voice? If so, would you mind sharing how you manage it? Feel free to only share what you're comfortable with.

S4

I think obviously singing is so much your your head I mean, you can get have great technique, but if you're not in the right headspace, or you've got a doubt in your mind, or you think you're gonna get ill or whatever it might be, that obviously affects your performance. So for me, they're physical and mental things that I do. Physically, I have like nasal polyps, which affects my allergies and things and I have to keep them under control. It means I can end up with quite a lot of catarrh, especially if I've had a cold. That could take like three months to get rid of. So I'm paranoid about all of that, catarrh is like probably the thing that affects my voice or I think it affects my voice whether it does objectively affect my voice. I know it does, it must do, but I definitely feel like it does. So I like to be completely clear of that. So if I'm coming up to a performance, I will do everything that I possibly can to get rid of anything or just to keep my voice healthy. And that means sleeping, getting enough sleep, drinking water, steaming, I also restrict liquids like tea, which isn't particularly good for your throat. I don't eat dairy or chocolate and things like this. I don't do this all the time because that'd be ridiculous. No

alcohol, I think that is probably it. No lozenges. Nothing drying out the throat and I do do all of those things if I'm performing at least a week, probably a week coming up to a performance. When I was gigging, regularly gigging, I didn't do that. Because you can't because you're doing it all the time. But I would probably for maybe the day before or the two days before, I'd be trying to make sure my voice is staying healthy. But for a performance like a show then yeah, a week before and then during. So that's all physical, and warming my voice up all the time or just singing every day. I think that's really important as well, singing every day, a little bit, or at least every couple of days. You know, it's all a physical thing and you've got to exercise it otherwise it just doesn't, you know, it's not going to work like you want it to work, so that as well and then you've gotta be careful you're not overusing it. So that's physically and then mentally, I just have to work on my confidence, and obviously that can go up and down with outside influences, and different things that you do, maybe it's a performance maybe it's something somebody says but just continually trying to keep confidence good. That's always a struggle because you can't really control it yourself as well as you would like. Whereas the physical stuff you've got a lot more control of which is probably why I do so much of that stuff, because it's completely within my control.

Mental health: confidence varies

Physical health: catarrh

Physical health: nasal polyps

Physical health: singing most days

Physical health: vocal hygiene regime approaching performances

RESEARCHER

Have you noticed any changes in your singing voice that you think might be related to hormonal changes? And have you made any adjustments to accommodate these changes?

S4

No, not yet, although I'm waiting for that to happen. I haven't noticed anything at the moment.

Hormonal: not aware of hormonal influences on voice

RESEARCHER

If you're comfortable sharing does neurodiversity such as autism, ADHD, dyslexia, etc play a role in your life and your singing experience? If so, would you mind describing that experience?

S4

No, I don't think so. Not for me personally.

Neurodiversity: neurotypical

RESEARCHER

So moving now to some questions that are more specific to my study. What comes to mind when you hear the word vowel?

S4

Vowels are a really key part of singing. When you're singing, I think you're always thinking about vowels or at least when you're learning or when you're first given a song, vowels can change the sound completely. So I think it's the intrinsic part of singing and being aware of vowels that you're singing on, especially as you are getting higher up in your range. I think people tend to not think about it as much when you're low in your range because it doesn't have as much impact on the actual sound. But definitely when you're going higher up your range, you'd need to modify vowels, I think you just do especially the higher you get. It's all about the integrity of the sound that you're wanting and it's all about what you want, though, isn't it or how you would want to sound.

Definition of vowel: "key part of singing"

Definition of vowel: "vowels can change the sound completely"

Definition of vowel: awareness of role of vowels in higher range

Vowel modification: less aware of approach to low notes

Vowel modification: use in higher range

RESEARCHER

In written English, there are five vowel letters (a, e, i, o, u), sometimes seven if we include W and Y, how does this compare with the number of vowel sounds when we speak or sing and what implications might that have for choral singing?

S4

So vowels in singing can be any sort of sound, anything that's not a hard consonant I suppose you could call it a vowel in singing. Like we did with your exercises there's loads of different sounds in there that were not AEIOU. So if a lyric is written with an 'oo' sound, people might interpret that slightly differently, especially if they have different accents. And the way they use and the placement that they're using or if they're narrowing their vowel or widening their vowel, then it's going to sound different in a choral setting, though, when we're in choral settings, we all need to be able to make sure that we're singing those vowels, whatever they may be, even if they're not AEIOU, if they are a sound, any sound, then we need to make sure that we're all singing it with the same technique, placement, mouth shape, whatever it may be, and in the same way.

Current approach to unifying vowels: choral singers should approach vowels in the same way

Vowel sounds: any sound that's not a hard consonant

Vowel sounds: five written vowels but more sounds

Vowel sounds: singers can interpret vowels in different ways

RESEARCHER

Do you notice any differences between how you sing a vowel and how you speak it?

S4

Yeah, well, like I just said before, especially if you're singing higher in your range, then you may need to modify your vowel to be able to make it sound the way you want it to sound or the way it would sound best when it's sung. And therefore sometimes, actually, a lot of the time, any vowel that is written sometimes just does better on an 'ah' [/a:/] if you're singing really high, right? So you would

change it and it doesn't make any difference to the listener. They still know what the word is, because the brain doesn't change it, like you're changing it, they just hear the word but for you, you're modifying the vowel.

Vowel modification: /a:/ works well in higher range

Vowel modification: listener still comprehends word

Vowel modification: use in higher range

RESEARCHER

Reflecting on the testing we did together, do you have any overriding memories or impressions from that experience?

S4

I was just concentrating really hard on keeping pitch. And because it's not easy is it? I think it is hard when you're changing vowel and you're trying to keep pitch.

Reflecting on testing: "really concentrating"

RESEARCHER

Can you describe any physical changes you notice when making different vowel sounds?

S4

They're not as a result of making the vowel sound. I'm making a physical change to change the vowel sound if you know what I mean. So, I'm intentionally changing my mouth shape or placement or whatever it may be to change the vowel. So it comes as an intention, or at least I try to make it intentional. I'd make anything I do intentional and I think that is good singing as well. Like just being intentional and not just hoping that it just comes the way you want it to come out. I don't think they

ever do that. Because I think that's just luck. And I don't think singing should be based on luck. If you're a good singer, then you are intentional with your singing. So I'm thinking about the shape of my mouth or how I'm gonna sing a vowel before it comes out.

Musical development: "intentional"

Physical changes: intentional physical change to change vowel

Physical changes: shape of mouth

RESEARCHER

Are there any vowel sounds that you find particularly easy or more difficult to sing?

S4

So depending on where you are in your voice, I think there's different difficulties. So if you're up high, and actually it's funny, a lot people say 'ee' is really difficult higher in your range. I actually find it in my voice not that difficult around an E [E5], an F [F5], where a lot of people would, that's my happy place really vocally or maybe a bit lower D [D5], E, F. My mixed belt is really strong there and it doesn't really matter what vowel I'm on, where the vowel matters to me is around B [B4], where my voice would naturally go from chest to head. I try to navigate that so that it's nice and smooth. That's where I have to really think about my vowel choice because if I'm too wide, there's definitely a possibility of my voice breaking or it not sounding how I want it to sound. So narrowing my vowel at that point is something I have to think about and concentrate on, so that we get through that bit. And then up high, as I say, obviously belting on an 'oo' is difficult and often you'll modify the vowel there as well. I mean, 'ah', 'aw' and 'er' are all great vowels for belting, so they can be okay but you've got to be so careful you don't go too wide because there's that risk again of breaking even when you're high up, so just try to keep it is as a balance: you want the sound that you want, the resonance that you want and how you want it to sound but you instinctively wants to go wide because we know that's going to give the biggest belt or the you know the biggest sort of volume, not just volume but that biggest sound and your body wants to do that. So you're always sort of like thinking no narrow in, narrow in because you know you're safer and you're going to think much better if you're narrowing your vowel so but not too much. So I think, you know, general rule for me would be up and then out. Yeah, so just and then not

too far going out. So if that makes sense. And then down low, I would say if I'm singing low notes, I do think about my vowels, but it's not as maybe I'm not as practised in what I need to do, but I know that I'm changing something. When I'm singing really low down in my range. Until I'm doing it I don't think I can tell you. I don't know if I can tell you what I do with my vowels in the low range - I probably do widen them slightly. But anyway, I can't think.

Vowel modification: helps with register changes

Vowel modification: less aware of approach to low notes

RESEARCHER

Do you ever notice how other choir members shape their vowels and does it influence your own singing?

S4

Hmm, interesting question. I wouldn't say that other choir members influence my singing generally. In the current choir that I'm singing in... no. I don't think currently, our choir is at a stage where I'm thinking about blend. And maybe I should do, but I'm not because I think everybody's just doing their own thing. Nobody's really thinking about, not nobody. I won't say nobody, because I don't know. I'm sure there are people that are thinking about their technique and what vowel they're singing on and how they are conveying that vowel and how they're singing it. There are a lot of people that haven't sung for very long and just a little bit inexperienced. But there's some that's not either, so it's not everyone but I would say because of that I'm not going to change. I'm pretty confident in the way I'm singing. Not to say that I'm always singing right because I'm sure I'm not or how chorally I would want to sing. But I think I have more experience to know how I think it should sound and therefore I don't tend to listen.

Current approach to unifying vowels: "I'm not going to change" approach to match others at this point

Current approach to unifying vowels: current choir is inexperienced

RESEARCHER

But if the choir was more experienced?

S4

Yeah, then then that would be different because I think we would all be trying to want to make one sound. Or we would notice it at least and discuss it and figure out what the best way to sing something would be.

Improving the unification of vowels: a more experienced choir "would all be trying to ... make one sound"

Improving the unification of vowels: a more experienced choir would "figure out what the best way to sing ..."

RESEARCHER

What do you think are the potential advantages and disadvantages of choir members unifying their vowels?

S4

Advantages are that the choral sound would just sound as one. There wouldn't be that sounds like oh, you can hear that voice and that voice and that voice it would just sound more cohesive. Which is a nicer sound to listen to. And in my opinion, when you're listening to choirs sing or any choral singing, that's the sort of sound that you're looking for, a sort of nice blended sound. When you've got harmony involved, which of course you're have in choirs, then you don't want like loads of different vowels in the different parts because it is going to sound disjointed, it's not going to sound like it's, it's not going to have that nice harmony sound that you're looking for when you're listening and it's going to sound disjointed and just not pleasant to listen to. So that's the advantages of having good vowel technique in a choir. And the disadvantages, I think if you're somebody like me, who is also a soloist, in the gigging sense or in musical theatre, or whatever I might do. It's difficult sometimes because it's not you're only genre of singing. So you're sometimes going to be singing chorally like you wouldn't sing when you're a soloist. And that's fine. I think it's all good because it's all building on your vocal technique and your experience and making you a better singer. But you just have to bear

that in mind that the way you think chorally is not how you would sing it, more often than not, how you would sing it if you were going to sing it as a solo or wherever. But I think that is just something you learn to do so and often you might, as a soloist, make the choice that that sounds better in my voice on this particular vowel say or I'd personally sing it like this. This is how it it sounds best in my voice, but that doesn't serve the choir as a whole. So you have to, you'd have to change it.

Advantages: blended singing

Disadvantages: compromises individual sound

RESEARCHER

What strategies do you think could help ensure more unified vowels within each section?

S4

I think teaching the advantages - yeah, just the need to be educated on the difference that it can make. And maybe listening to other choirs, I think that's really good - choirs that have that technique I think is really helpful to hear the difference and then some choirs that are not doing that. If you can somehow try to see the difference or hear the difference, I think sometimes for inexperienced choral singers, they don't really know what the difference is or how much difference vowels would make. So I suppose you need to try to find a way to prove to them or show them how much difference it makes and obviously that probably comes from listening. And then just improving their general singing technique overall, whether that be through different singing lessons, and choral singing on its own I think, I mean, in my experience choral singing itself is singing was like singing lessons for me. So just not on a one-to-one basis, but I definitely learned a lot through choral singing, so I think that their technique will improve just by being in a choir, but if you really want to get that that vowel thing down, I think they really need to understand how much difference, hear how much difference it makes.

Improving the unification of vowels: improve general technique

Improving the unification of vowels: show the difference it can make

RESEARCHER

Do you have any experience with interpreting or using the symbols from the International Phonetic Alphabet?

S4

No.

IPA: no knowledge

RESEARCHER

Have you ever tried changing how you sing vowels (we've sort of talked about this already) to improve your sound? If so, what have you tried?

S4

Have I ever tried changing my vowel? Yeah, all the time. I mean, literally all the time. As I said at the beginning like it's one of the most important things, I think. I mean, there's other important things, but vowel is definitely something that I'm thinking about whenever I'm singing - it makes such a huge difference, it might just be something coming from the solo stuff I do. I'm always looking for how is this going to sound the best, every single phrase or whatever I'm singing. So, one of the ways of making it sound the best it can be is by experimenting with changing vowel.

Vowel modification: "literally all the time"

Vowel modification: "one of the ways of making it sound the best ... is by experimenting with changing vo..."

RESEARCHER

What does singing in tune mean to you? Do you think there are differences in staying in tune when singing solo versus being part of a choir?

S4

What does singing in tune mean to me? Well, singing in tune is singing on pitch. I try to be as accurate as I can no matter what setting I'm in. But obviously in choral singing accuracy is so important because they're in harmony a lot of the time and just a little semitone out or a little smidge out is going to make a difference to the overall harmony. So yes, it's probably more important. And then we've got the whole conversation about vibrato as well, but it can probably make a difference in choral singing, although I don't know if, I don't know if the changes in vibrato actually do enough to affect the harmony, I don't necessarily think that they do but anyway. And then with solo singing I mean, I'm always trying to be as accurate in pitch as possible. But yes, I suppose if you are slightly off pitch, the average listener at a gig isn't going to notice, you are, but they're not but you would in a choral setting. I don't ever want that to happen, but I suppose it's just not as quite as important. But that doesn't mean to say that you're not always going to be in tune, you know. Yeah. I wouldn't want, I wouldn't want to, you know, I wouldn't want not to be in tune. Yeah, I suppose that's my answer. It probably is more important in a choral setting. I think that it's important no matter what.

Definition of in tune: "singing on pitch"

Definition of out of tune: "a little smidge out"

Definition of out of tune: impact of vibrato on tuning in choral singing

RESEARCHER

So do you think we use find it easier to stay in tune when singing alone or with others?

S4

Ah well, it's easier on your own, I'd say just generally probably because you're not having to think about making sure your harmony line is right. I mean, you're just singing the tune and that's always easier. So I'd say generally, singing melodies is always going to be easier, right? So generally the soprano line is easier. And you haven't got to think about your tuning as much because even though you should be all the time, but it's the melody right, so it's just innately easier. If you're singing any other line that's not the melody. Yeah, you are having to, it's harder. Always. You're concentrating a lot more I think on just staying on pitch. So yeah it is harder. Definitely.

How to sing in tune: harder to be in tune on a harmony line

RESEARCHER

How do you make sure you're singing in tune?

S4

Um, so, for me probably, I will have, I will have drilled that particular vocal line like I would have spent ages learning it. And the way I learn it would be to sing it again and again. Just learn it in isolation and then sing it against usually a higher harmony or the melody or whatever. I would know I'm singing out of tune by ear. I can hear mostly not always, but mostly I can hear that. And I suppose that's just from experience of singing. You know if I hear someone sing and they're out of tune, then I know. I find that interesting, as well actually. Some people can't necessarily hear when someone's out of tune. If it's slightly flat or slightly sharp, very slightly, I might not pick it up and that might be something to do with the fact that I don't play an instrument. But usually, I can hear it now especially as I've got older, I can definitely hear slightly flat and slightly sharp more acutely than I would have done before but it is by ear. And I suppose chorally when everyone is singing together and you're singing a part, you know if you're singing something different to somebody else or say you're not in tune, you're not singing correctly but yeah. If you're unaccompanied, it's probably harder because you've got nothing, you're not listening to any kind of music, but obviously whatever accompaniment you're listening to is what keeps you in tune as well because you're listening to that and making sure that you can just hear when it's not right.

Aural experience: possibility that lack of instrumental experience impacts aural skills

How to sing in tune: can hear when it is in tune/out of tune

How to sing in tune: learning by repetition

How to sing in tune: listening to others

How to sing in tune: might not detect slightly flat or sharp

How to sing in tune: use of accompaniments

Improving tuning: awareness of tuning has improved over time

RESEARCHER

If you notice, and this is my final question, if you notice or are told that some notes are a bit flat or sharp, what is your process for fixing it?

S4

What is my process for fixing it? Um, if it's a a bit flat I will try to brighten up my vowel. Usually like by smiling slightly or by thinking over and up and just make sure it's not flat, so you're not going under. And then if it's sharp, I'm not. I'm so much more likely to be flat than sharp. But if I'm sharp, sometimes you know what, I'm sharp when I'm nervous and I know it straightaway, I can definitely pick up sharpness more than flatness in my voice. Although, like I said, that's all got much better in the years that I've been singing. But usually, sharpness is an accident. It's because, it's because I'm nervous and I know it straightaway. And all I do to correct that is because I know that I'm sharp before someone's told me, I don't need to do anything to correct it. I just sing it how I would normally sing it and just try to take out the nerves. I don't do anything different.

Causes of poor tuning: "sharpness is an accident"

Causes of poor tuning: nerves

Improving tuning: flat - aim above the note

Improving tuning: flat - brighten the vowel

Improving tuning: release nerves

Physical changes: smiling

RESEARCHER

Well, thank you for taking part and before we finish is there anything else that you'd like to add or share?

S4

In terms of vowels or choral singing generally?

RESEARCHER

Anything that you feel is relevant.

S4

No, no, not really. No, I think you've asked all the questions really. Yeah.

Created with the Delve Qualitative Analysis Tool (<http://www.delvetool.com>)

S5 Interview

RESEARCHER

So, thank you for taking the time to take part in this study. I'm going to ask you some general questions on your background to begin with. Can you tell me about your background in singing and in music in general?

S5

So, I've been singing since I was 11, so it's 25 years actually. So at the beginning it was just like joining school projects, but they were choirs. In [S5's home country], we have this tradition of singing either in [S5's native language], Latin or English. It really depends on the genre, but mainly I was singing in a cappella choirs. Normally the genres were like gospel, opera - this kind of music, not much pop. So I joined the first choir when I was 11. Then when I joined high school, there was a different project, but very similar style until I was in my 20s. And then, with a group of friends that were coming from the same project, we decided to carry on after school, we did it until I was probably 25. And obviously I moved to the UK and I joined different choirs, from small choirs to big projects like [name of symphonic chorus] for a bit.

Singing experience: school choir

Singing experience: sung in choirs as an adult

RESEARCHER

Have you had any formal training in singing?

S5

So, I took some lessons. They were more like when I was trying to get into the music academy in my home town. So to get ready for that I took like three months lessons because we had to prepare an audition, which was like - the genre was opera, operatic, so it wasn't like pop or anything like that, or jazz or anything. I wanted to become an opera singer. I wanted to study for that. So, I just got trained three months to study for that. Then I got some lessons before joining the [name of symphonic chorus] because they had another audition, so I wanted to get ready for that audition. But again, it might be like three/six months and now I've been taking some lessons from a vocal coach because I want to develop like my head voice, let's say, yeah, let's see, more long-term training.

Musical development: seeks helps when she needs it

Singing experience: singing lessons

RESEARCHER

Do you read music?

S5

No, in [home country] we don't, even if you come out from the Academy of Music. We don't read music from sight, per se. So, if you give me a piece of music, I will need to really read it or study it a bit before I can sing it to you. I cannot just, for sightreading, you know, I cannot do that.

Other music experience: does not read music

RESEARCHER

And [name of symphonic chorus], do they not have a sightreading test?

S5

Yes, so they gave me a piece of music. They gave me a couple of hours to get ready for it. So again, I had a little bit of time to prepare, it wasn't just like, okay, here you go.

RESEARCHER

Okay, so they give you a piece of music like that, they email it to you then?

S5

Yes, so it was a weird audition because I was part of a choir called [name of choir]. So we had to audition through our director. So if [name of director] thought we were ready for it, then we joined as extra singers. Because [name of symphonic chorus] needed extra people, they decided okay if you think your people in your choir are okay, so it wasn't directly with the [name of symphonic chorus].

RESEARCHER

That makes sense.

S5

I had a few hours to prepare it.

RESEARCHER

But just from the music, they didn't give you a track or anything?

S5

The good thing is, I have a very good pitch. So even if they don't give me the first note, I can start on pitch. And, and that's something they really liked. And then back then I was singing much more - I could reach an E [E6], so they were like okay, we like it, we like the voice, so obviously they were like

please you need to really study and read the music, we want you to get ready. And I did, I went above and beyond, but I overcome the barrier of not sightreading.

Aural experience: has perfect pitch

Other music experience: has other attributes that compensate for not reading music

RESEARCHER

What was your approach then when they sent you that piece of music? Did you ever think I'm not going to be able to do this because I don't read music?

S5

No, no, no, whatever type of music you send to me, I'm so good at memorising the melody, for example. Very, very good. Even if it's not, you know, pop music, sometimes the melody repeats itself. While if you do opera or things like that, it's hard because it changes all the time. But even if it changes all the time, I'm very good at catching melodies and lines. I might hear it once or twice and I already got it and then obviously following on paper, I'm okay with that.

Musical development: good memory

Other music experience: has other attributes that compensate for not reading music

RESEARCHER

And is that what happened at that audition process? That they played it to you?

RESEARCHER

No, no, no.

RESEARCHER

So, they just sent you a piece of music and then when you turned up you were supposed to sing it?

S5

Yes, basically what they've done here is that they want one solo of your choice. So, I've prepared "Angele Dei" from the movie "The Mission", so I've done "Angele Dei" as a solo. Then they sent me the day before the meeting, before they sent me the piece of their choice. It was an "Ave Maria", but I don't remember which one it was, to be honest with you. Then they sent me a scale. I still remember a little bit, but it was basically an up and down. It was just a weird one, it wasn't simple, probably the one I struggled the most really. So, they sent me that. And then once I was there, we just improvise so they were playing for me and I have to repeat whatever they were playing. So, the same time, the same pitch.

RESEARCHER

The "Ave Maria", were you able to look that up to work out how it went? Was it a famous "Ave Maria" that you were able to YouTube and find out how it went?

S5

Yes.

RESEARCHER

Right, so you had to do a piece of your own, an "Ave Maria" that you were able to look up online, for example, and then a vocal exercise and then you had to recall pitches that they played for you.

S5

Hmm.

RESEARCHER

Right, I've got it. So, on a similar subject, have you ever practised ear training such as recognising intervals or chords or rhythms and if so, can you tell me about that experience?

S5

So right now with my vocal coach, we're trying to do that and I'm not, I'm not very good at that. So I can, so if you tell me for example, to start a song and we take a song from our repertoire for example. I can start with the right pitch - it's like I have memories like that. I'm memorising like that. Or even a pop song I know for example "Angele Dei" starts like "Ah" [sings E4], yes, I'm pretty sure that "Ah" [sings E4] is sol, I'm sorry a G.

Aural experience: "I'm not very good at that"

Aural experience: does not have perfect pitch

Musical development: good memory

RESEARCHER

Oh, interesting. So, before you were five years old, did you have music in your house?

S5

Yes. Yeah, yeah, absolutely. So my father was very passionate about music, he played music all the time. When I was three years old, I'd been gifted with a manwalker? I don't know if you remember. Do you remember the little cassette player?

Other music experience: musical family

S5

A little one. Aw, a Walkman.

S5

So I used to play Michael Jackson all the time. So since I was three years old going over and over and over again. And lots of other artists, and my brother, he got a diploma in guitar. So he's a great guitarist, but I never, I never studied music, I loved singing. So I always sung, but I never studied music and when I decided to join the Academy when I was like 24/25, then I was in the UK and decided to remain in the UK. So I gave up on starting the Academy, but it is a desire of mine to study music and learn more about you know, the theory behind it.

Instrumental experience: no experience

Other music experience: musical family

RESEARCHER

Is there anything related to your health that you feel impacts your singing voice? If so, would you mind sharing how you manage it? Feel free to obviously only share what you're comfortable with.

S5

The only thing I've noticed is that after the pregnancy and after becoming a mum, my voice is lower. While before that, it was much easier for me to just, you know, sing higher notes. This is the only thing I found out. I don't know if it's because of hormones. I don't know. If it's because of ageing. I have no idea, but it's something I've noticed.

Hormonal: post-pregnancy

Physical health: "my voice is lower"

Physical health: age

RESEARCHER

Actually, that was my next question: I was going to ask if you'd noticed any changes in your voice related to hormonal changes? So that's interesting.

S5

I don't have a physical issue or anything like that, apart from the back pain you know, you know I have problems with my back, but that doesn't impact my voice. Yeah, so the only thing I could say is the hormones. I believe, I mean, someone told me it could be.

Physical health: back issues

RESEARCHER

So, when you say lower do you mean that you have an extended lower range, so more low notes as well? Or do you just mean you can't sing as high as you used to be able to? Or is it something else?

S5

I cannot sing as high as I used to and I find it hard to breathe honestly. You need to also consider that I got 30kg more after the pregnancy. I used to be 50kg, and now I'm 78 or something, so 25kg or more anyway, so I feel lots of fatigue. But it's this breathing that I, I'm running out of breath when I sing.

Physical health: "find it hard to breathe" when singing

Physical health: gained weight

RESEARCHER

Do you think that your back pain affects your breathing?

S5

It could affect my breathing a little bit because if I stand still for a long time, then obviously I'm suffering with my back pain and I, yeah, and I kind of get in an uncomfortable position and it's not very good for, you know, for my lungs. I guess if you stay like this in pain then you're not going to sing

very well, but, but this is a problem I have since I was 18. So, the big, the big difference I've noticed is after having the baby or anyway during the pregnancy and after the pregnancy. That's the big difference I've noticed.

Hormonal: post-pregnancy

Hormonal: pregnancy

RESEARCHER

So, you noticed the singing during your pregnancy? The change in your range?

S5

So, I cannot go lower. I just cannot go. I think it's all about breathing anyway, it's about breathing. It seems like I have lots of fatigue and I cannot get there. I can get to high notes, but if I'm like tired or I'm not breathing well, then there's a disaster. I don't get there with confidence.

Physical health: "find it hard to breathe" when singing

RESEARCHER

How old were you when you got pregnant?

S5

Um, so the first time was 2020, so I was 32 and then the second time was late 2020 which was 32.

RESEARCHER

And how old are you now?

S5

36.

RESEARCHER

If you're comfortable sharing does neurodiversity such as autism, ADHD, dyslexia, etc play a role in your life and your singing experience? If so, would you mind describing that experience?

S5

I'm in the process of getting diagnosed with ADHD. I'm not sure if I have you know, any of the you know, neurodiversity disorders, maybe ADHD, autism. I'm not sure, just that when I was doing therapy, then my psychotherapist was like it's worth to get a diagnosis, in case you have it. So, we are in the process of assessing whether I have ADHD and this is only because I get distracted very easily. Like if I have a conversation with you, and something is going on it might be that I just stop the conversation and I focus on something else. It's hard for me to focus on you and look at you when I'm when I'm talking to you. And it's not because I'm I want to be unpolite or something, it's just because I find it easier to look at the wall when I'm talking to you, so my train of thoughts remain stable. And I don't know if you noticed, but when we do the dance move, the other day I was focusing on the electric socket. I was just focusing on that and just do my dancing move. If I look or sometimes I look at the clock, and just do my dancing move. If I start looking at people like I look at you, I look at the girls, then I get confused. Because instead of thinking of the moves I need to do, I'm getting distracted by what they're doing, what they're saying, are they talking to me?

Musical development: struggles to focus

Neurodiversity: being assessed for ADHD

And so there are some things like in everyday life, I mean, there's so much there's a long, long list I can go over with you of things that made me and my therapist believe that I have ADHD, and all these affect the music. I think that I always found it easier to learn by doing, than learn by the book. So that's why probably I never learned how to read music. I'm very good at following music. You need to

consider that I used to turn pages for a piano player, so I can follow the music and I was turning the pages during the concerts, even if I'm not able to sightread the music. I have kind of like practical skills, but I find it hard to learn something on paper.

Musical development: "found it easier to learn by doing"

RESEARCHER

How do you follow the piano music?

S5

Um, for example, they start playing and I can see the main melody. So even if it's like, obviously they have, they have, so they have double pentagram because one is following the right hand and the other one the left hand, let me say that. With a main melody, I can follow it. So if it's going up, if it's going down, if it's, there is a jump, I'm following, I don't know how.

RESEARCHER

You can follow the pattern of the line?

S5

Absolutely. I'm just listening and I can tell you like it's going up, it's going down. Oh, you know, and then I'll change it, turn the page.

RESEARCHER

So moving to some questions that are more specific to my study. What comes to mind when you hear the word vowel?

S5

Open your mouth. Because obviously, when you, when you start opera the first thing they say is "open your mouth". So even when you do an "ee" [i:] you need to be ee [i:] [demonstrating increased lip spreading]. But whatever you do with the vowel, just open your mouth, which is basically what we do naturally in [S5's native language]. We have our five vowels - a, e, i, o, u and they are very open. And these are the only sounds we have because we read as we write.

Definition of vowel: "open your mouth"

Definition of vowel: a, e, i, o, u

RESEARCHER

And so in written English, there are five vowel sounds (a, e, i, o, u), sometimes seven if you include w and y. How does this compare with the number of vowel sounds when we speak or sing and what implications might that have for choral singing?

S5

Yeah, so what I do and something I don't do if I sing in [native language] or Latin, because the sound is exactly as it is written down. But in English, I need you to tell me how it sounds and then in brackets on top of the word, I will put the sounds to make. For example, as you said, you see if it is a long ee [i:] sound then I will put double "i".

Improving the unification of vowels: writes required sound above word

Vowel sounds: five written vowels but more sounds

RESEARCHER

So in [S5's native language], just to be clear for me, if you saw an "a" written down, it's always pronounced as an "ah" [a:], there's never any variation?

S5

No, no variation, nothing.

RESEARCHER

Is there anything that is a bit confusing that you can think of in [S5's native language]?

S5

The only thing that we have, but for national speakers, no problem, it is not an issue. But I think that if you are a foreigner and you're learning, probably the only thing is that we have stress. There are words where you just change the stress and it will change the meaning of the word and the sounds of the word. And this might be confusing, but for us, it's quite normal.

RESEARCHER

Do you notice any differences between how you sing a vowel and how you speak it?

S5

Ah, in [S5's native language], the only thing is that everything is to be opened or at least the way I studied opera. In fact, if you listen to an opera piece, sometimes you don't understand very well what they say. And this is for us too, even if you speak [S5's native language], it is just because they so open so much the vowel, that at some point you lose the consonant, if that makes sense. That's the only thing I can notice, but I believe it's due to the fact that, I don't know probably it is easier to sing the vowels. I mean, even especially if you go higher on the register. The more you open, the easier it becomes for you to reach a specific note.

Definition of vowel: awareness of role of vowels in higher range

Sung vs spoken vowels: loss of clear diction in opera

Sung vs spoken vowels: sung vowels are more open

Vowel modification: use in higher range

RESEARCHER

When you say open, can you just define what you mean when you say open?

S5

I don't, I don't know.

RESEARCHER

What do you do when you go high?

S5

Technically, I have no idea maybe I just expand my lungs and I do. I don't know to push the sounds out. The problem is when you do a consonant like a "T" or "B", it's always a small sound, it's like you need to close it somehow. While if you do a vowel, you're just opening.

RESEARCHER

Right, I get you.

S5

That's the only thing I notice when I see or I hear something in [S5's native language]. And in English, English there's so many, even so many accents. Like different from simple English, the American, but even in English there are lots of different accents. There are times where I really need to ask, how do

you want me to sing it and what vowel do you want me to pronounce and I need to make a note otherwise I would just pronounce it differently.

Vowel sounds: requires guidance

RESEARCHER

Reflecting on the testing that we did together, do you have any overriding memories or impressions from that experience?

S5

Ah, it was a nice experience and really interesting actually. Cause there were a couple of sounds, even if it were just vowels because you know I might struggle with “th” or this kind of sound or with the “h” because for us “h”, it doesn't have any sound. I find interesting that I can struggle with vowels too. Do you remember that we did an “oh” [əʊ] that was that was similar to “oo” [u:]? I couldn't repeat it because it's like, I need to train my muscle first to do it because I could not do it. You need to see I don't have a natural 'th' - if I was going to say "that I need to brush my teeth". Sometimes I say it with an 'f', because I can not pronounce the 'th' because otherwise I'll say "I brush my teet" which is not very good.

Reflecting on testing: "interesting"

Reflecting on testing: recreating vowel sounds was sometimes difficult

RESEARCHER

Can you describe any physical changes you notice when making different vowel sounds?

S5

Physical changes?

RESEARCHER

What happens physically when you go from an “ah” [a:] to an “ee” [i:] for example?

S5

Well, I feel obviously my palette moves in a different way. Yeah, the only thing I'm doing, this.

Physical changes: palette moves as vowel changes from /a:/ to /i:/

RESEARCHER

And are there any vowel sounds that you find particularly easy or more difficult to sing?

S5

Okay, so “ee” [i:] and “eh” [e] it's very complicated because [a:], [o] and [u:] are all are quite nice and actually pleasant to do to be honest with you, but the [i:] and the [e], because it's very hard to make them round. It makes sense?

RESEARCHER

They make your lips go horizontal?

S5

Yeah.

RESEARCHER

Okay. Do you ever notice how other choir members shape their vowels and does it influence your own singing?

S5

To be honest with you, I never thought of what people do to make this sound. I don't, well, even if I think there are lots of techniques are there. So, you're following a technique to make a specific vowel, we are all different so at the end of the day Choir Member A might make exactly the same sounds as I'm doing or maybe she's using a different technique, she's putting her mouth in a different position. Is it correct? I'm not sure. Do we need to do it the same way? I don't know as long as she's comfortable with the sounds and with that position, I really don't mind what they do. Yeah, I don't know. I guess from your point of view, because obviously, I'm sure you know, all the techniques and you know that there is a specific way of improving the sound and the shape of the vowel because I don't know them, then I trust obviously the director and I get the feedback and then I try to mix the two things, so techniques and the way I make the sound, but no about the other members, I don't know, I never, never truly mind what they do.

Current approach to unifying vowels: "concentrate on what I'm doing" rather than others

Improving the unification of vowels: under direction

RESEARCHER

What do you think the potential advantages and/or disadvantages might be of choir members unifying their vowels, so singing their vowels in the same way?

S5

That's important, that's absolutely important because it's like, the sounds that come out of it, it's completely different. It's like just singing a word and just singing something else. In the sense of making the same sounds, absolutely, we should all blend together. The thing is, like, let's say I don't really mind how you get there, as long as your sound matches with mine and we all do the same thing

at the same time. The important thing is to blend. Think about when we sing pieces that have lots of voices, I have done pieces that have eight different voices singing at the same time, for example, and in between these eight small groups, people do different stuff, we need to blend, we need to do the same thing. It is important, for example, when we did the Symphony of a Thousand, the Mahler one and [name of chorus master] he brought in a German vocal coach for us to do the right sound, to make the right sound altogether. So it is important to make the right, the same sound at the same time and it will be amazing if we can do kind of vocal workshops where we can, you know, know other voices a little bit better like the other members' voices and try to blend those together, so to answer your question, yes, it is very, very important to blend our voices together to make exactly the same sound. The way we reach that, in the sense I don't, I don't mind as long as we do the same thing. I don't know, I'm not an expert, I don't know whether there are specific techniques for us to do exactly the same thing with the same technique. I don't know. But if there was then we follow the same technique because we need to be on the same page.

Advantages: "sounds a lot better if everyone's singing the same thing"

Advantages: blended singing

Current approach to unifying vowels: it is important that the sounds match not the approach

Improving the unification of vowels: training

RESEARCHER

What strategies do you think could help ensure more unified vowels within each section?

S5

I think these workshops could be very, very good if we do something like that. I used to do it with other choirs. And yeah, we were just, we were just doing lots of exercise together or even just improvising, for example, a person starts with a with a note and then another person comes with another vowel. I mean we blend together, we try to explore our voices. We work a lot on exploring our voices. I think that that's the best way. I'm sure, I'm sure there are better ways of doing that. By in my experience, I thought that this was very beneficial. We did a workshop with [professional a cappella group], for example. And that was so good, it was fantastic. Like we improvised a lot. We did

beatboxing as well because he was very good beatboxer. We did that too. And it was, it was very nice. Very nice. I have videos I might share with you, if you'd like to watch. We were doing, even just games, little games, there was the music machine code, where we had to create kind of a machine, like a train. And so I was going "choo choo" and someone else was adding another sound. So we were kind of trying to blend in the rhythm, we had the same aim to make the working machine and obviously people has to come out with different pitches or different, not melodies but, parts if I was saying "choo choo", someone else might say "whoop whoop" or you know different words. It was very nice to blend it together and we did lots of exercises. I mean we had a two days' workshop, so it was full of exercises. And we ended up singing together a beautiful piece of music.

Improving the unification of vowels: training

RESEARCHER

Do you have any experience with interpreting or using the symbols from the International Phonetic Alphabet? Do you know what I mean? If you want to know how to pronounce a word and you look it up in the dictionary, the symbols that show you how to pronounce a word.

S5

I'm familiar with that. But again, in [home country], we don't have that because obviously, we don't need to have a guide on how to pronounce stuff because we read it as we write. So I'm familiar with that because of the Oxford Dictionary, and yes, so I'm familiar with that. But if you ask me to explain it to you, I don't know it.

IPA: limited understanding

RESEARCHER

Have you ever tried changing how you sing vowels to improve your sound? If so, what have you tried?

S5

To improve my vowels, I've tried to change the posture. I've tried to change the position of my hands. The way I breathe. Sometimes, you know if you breathe too much, then it's not necessarily the best way. Yeah, I think I think that's it for now.

Vowel modification: improve vowel by breathing

Vowel modification: improve vowels through alignment changes

RESEARCHER

What does singing in tune mean to you? And do you think there are differences in staying in tune when you're in a choir and when you're singing solo?

S5

So I think, I'm, I don't know how you say it, I think I'm singing on tune for whatever I'm doing, even if I'm singing with a band, for example, or I'm singing in a choir. So, I think that even if I'm not singing the correct part, which sometimes might happen, but I'm still in tune if that makes sense. Now I'm not saying I'm singing different parts, because I studied a lot so I'm doing my part. But even if for instance, I'm making a mistake, and I'm singing the soprano 2 part it is still in tune. You will never notice that I'm going like that there is someone doing something else so I'm in still in tune. And in the choir, well it is important to be in tune. And again, I don't mind if you're singing someone else's part, as long as it's in tune because it's very frustrating to hear a completely different note and for someone to not realise that, for example. And if I sing alone obviously, that's very, very noticeable because you are the only one singing. So if you don't start in tune or if you go out of tune during the you know the song then people will hear that. Personally, I hope, I think I'm always in tune. For example, for some of the, do you remember when I sang alone, I had to change some of the songs because I couldn't, I couldn't either reach to the higher notes or to the lower notes, so I tried to arrange it in a way that I was still on tune but doing something different.

Definition of in tune: "in harmony to the other parts"

Definition of out of tune: wrong note does not equal out of tune

How to sing in tune: change the arrangement

Other tuning codes: "I'm always in tune"

Singing experience: band

RESEARCHER

So does singing in tune mean to you not singing the wrong note? Don't feel that you're led by what I'm saying. But is that your understanding of singing in tune and that singing out of tune means that you're singing the wrong note?

S5

Yes, I think or the wrong pitch.

Definition of out of tune: "wrong pitch"

RESEARCHER

I'm probably asking you for something very obvious and you might be thinking she already knows that, but tell me your very basic understanding of singing in tune.

S5

For example, say I sing the nursery rhyme, "the wheels on the bus go round and round" [sings the correct melody]. And I sing it like that, you will see that my husband is doing "the wheels on the bus go round and round" [sings with the incorrect melody and within a smaller range of pitches]. I feel like it's simple, just keep it like that, I don't mind you go like on another pitch but just, just keep it as it is like, you know, so for me singing in tune is the same pitch. The right tune throughout the song and yeah, let's say you might make some differentiation because you cannot reach the notes, for example, but it needs to sound smooth and enjoyable.

Definition of in tune: "smooth and enjoyable"

Definition of in tune: "The right tune"

How to sing in tune: change the arrangement

RESEARCHER

Do you find it easier to stay in tune with the choir or when you're on your own?

S5

I find it, I find it easy both ways. I'm so used to singing in choirs and singing with so many other melodies going on that I don't, I never lose my own. But even if, even if, for example, if you put me now, at the end of the alto section, I will still perform my own part. I wouldn't be bothered by the others singing. I actually love the harmonies, actually I love it. I don't really mind, I don't find it hard to sing along. No I don't. I don't find it hard either whether I am a cappella or if I'm with a track.

Causes of poor tuning: "I don't find it hard ... whether ... a cappella or ... with a track"

Causes of poor tuning: Other choir members won't influence my tuning

RESEARCHER

How do you make sure you're singing in tune?

S5

You know, I have no idea. How do I make sure I sing on tune? Even if I'm singing a cappella, I'm pretty sure I'm singing on tune because of my memory probably. I mean you're giving me something to think about obviously. For example, again when I did the show at the pub, I had to sing an a cappella song and it was a pop song. And I just went on the stage. I knew it was an E, but I just think about in my head like it should be like [sings E4] as I started the song, and it went okay, the whole song I listen to it, and I never went off pitch or out of tune. Yes, I struggle to the high notes. I push it too much as I was always using only my chest voice, but apart from that was on tune.

Causes of poor tuning: register issues

How to sing in tune: memory

RESEARCHER

So when you were practising for the competition, did you ever record yourself and listen back to you singing?

S5

Yes, yes, I did that for my own purposes. Yeah.

RESEARCHER

And so this is my final question: If you notice, or are told that some notes are a bit flat or sharp. What is your process for fixing them?

S5

It happens, it happens. So, when it happens especially during this competition time in February, I cry for help. So I went to this vocal coach and I said I need your help because I'm struggling to probably, probably because I'm tired but I don't know, but I'm struggling to keep the note. So I mean, I can see my own mistakes. I can, I can feel it, I can hear and it's very frustrating. I really, I'm really suffering for it. If I feel that I'm making mistakes, I feel horrible. Because in the past they were not very often actually, no. I had, I remember when I was in my 20s and I joined this long-term project, this choir. And we did national competitions as well. We went to, you know, this kind of stuff like X-Factor or The Voice and we passed the first initial auditions. So we were kind of a strong choir, very good choir. We were performing too, we were dancing too, doing these things too. The director was always trying to double check with me if the pitch was correct, so she trusts me and if there were solo parts, if they were, she always trusted me that she could count on me on a clean performance and everything. And today no, today I don't feel the same. But I feel I don't know, sad, tired about it. I don't know. So I reached out to this vocal coach, I don't know if she can help me. Yeah, because I leave it as a very bad experience for me.

How to sing in tune: can hear when it is in tune/out of tune

Improving tuning: training

Musical development: seeks helps when she needs it

Other tuning codes: "I'm always in tune"

Other tuning codes: not reliably in tune anymore

RESEARCHER

What has prompted that: feedback that you got in the competition or what you were feeding back to yourself when you were preparing for the competition?

S5

Obviously, people were taking videos, so by watching the videos. The first thing that came to me was when I did the a cappella version of "Shallow". Yes, it's beautiful to sing when it's transposed and I love it especially when I'm in the rock band. It's fantastic. But in that specific piece, for example, "I'm on the deep end" [sings], I really struggled to get up there. And I felt wow, that's horrible. I don't want to do that. And I'm sure there is something to do like a mixed head and belt voice maybe and because she's an expert on these like mixing the different voices and stuff. And she works in musicals, she has this beautiful, you know, head voice. I thought maybe she can help me and I asked for help. So the first thing I thought of was I need to ask for help because this is not acceptable. And I don't mind, yes I'm in a pub, they don't, you know, this is not the end of the day, it is the end of the day for me, because I always thought I was a strong singer.

Causes of poor tuning: register issues

Improving tuning: training

RESEARCHER

In the moment, when you were singing you didn't anything, you just noticed it when you listened?

S5

I know that I was struggling, I was struggling. So I, and I have to be honest, when I tried it at home, it was absolutely fine. But the problem is as soon as I went on the stage, I ran out of breath because I was anxious. You have to be judged and people were looking at you. So I ran out of breath in places sometimes I was like "Oh come on lungs, push". So I was kind of concentrated on the sides of the crowd for me to just like, "Don't worry, there is no-one, just sing" and so I delivered this. But I found out straight away about the struggles. I was like yeah, so it was in tune, it was a cappella, it was a hard piece. Maybe I was anxious, nervous, whatever you want. So I need to improve the breathing, I need to improve everything like controlling this voice. And then when I heard the recording I was kind of disappointed as well. People give me feedback. For example, "Oh my god that was brilliant", "That was beautiful". I will often, I don't just take the feedback like "Oh fantastic". When I messed up the note for our concert, I cried for two days. I felt I let down myself and the choir, two days I cried. I said to my husband, "I'm done, I cannot even show up anymore to choir". I tried it during the practice because I'm like, "Can I do it?" And yes, I can do it during the practice and what happened during the concert I have no idea.

Causes of poor tuning: breathing issues

Definition of vowel: "Julie Andrews"

Mental health: nerves

RESEARCHER

Which concert are we talking about?

S5

The one that the church. I don't know what happened to my voice. It just went, I went there and I just don't know what happened. I was so disappointed. I cried for two days, I was so disappointed. Because even if the choir members were, they were very sweet, they were like "It was so hard, don't worry, don't worry". I'm worried, that's not good. It's not, it's not good. And especially you tried to do so much during the rehearsal and 90% of the line is actually very good. And then you go for the concert, which is the main reason why you practise and that could happen with anything. I mean, it

could happen with anything. What if it happens with other stuff? So it's kind of scared me and I went to this vocal coach and I told them straightaway. So we tried to work, it is long-term work obviously, we're doing to try to fix all these issues with breathing.

RESEARCHER

Well, thank you very much for taking part. Before we finish, is there anything else that you'd like to add or share?

S5

No, thank you so much.

Created with the Delve Qualitative Analysis Tool (<http://www.delvetool.com>)

S6 Interview

RESEARCHER

Thank you so much for giving up your time to take part in this study. I'm going to start with some general questions on your background. Can you tell me about your background in singing and in music in general?

S6

Um, I was in a church choir when I was 18 for a couple of months and I also sang with the school when I was 18 as well. And then that was it until I joined [name of choir].

Singing experience: church choir

Singing experience: school choir

Singing experience: sung in choirs as an adult

RESEARCHER

And have you ever had any formal training in singing?

S6

No.

Singing experience: no formal singing training

RESEARCHER

And do you play any instruments?

S6

No.

Instrumental experience: no experience

RESEARCHER

Do you or have you ever practised ear training such as recognising intervals, chords and rhythms, and if so, can you tell me about that experience?

S6

I said I haven't played an instrument, but I I've done a little bit of practice trying to learn the piano.

Probably just with that really, but nothing, unless it's been in within the choir that I'm in now.

Aural experience: no formal training

Instrumental experience: piano - beginner level

RESEARCHER

Is there anything related to your health that you feel impacts your singing voice? If so, would you mind sharing how you manage it? Feel free to only share what you're comfortable with.

S6

Probably my age because I think I sound completely different now than what I used to sound and also I'm menopausal as well, so I think that has something to do with it because I think your voice can be quite dry.

Hormonal: menopausal

Physical health: age

RESEARCHER

And when you say you sound different, how do you sound different?

S6

I think my voice is deeper now I'm older, than it was when I was younger. So I will probably have been a bit of a higher pitch when I was younger, but now I'm older I think it's more comfortable, a little bit lower, but then that might be because I'm not used to singing in my head voice.

Physical health: "my voice is lower"

RESEARCHER

And when you were in the church choir, do you remember which part you sang?

S6

Yes, it was very high and I don't think I stayed very long because of that and also a lot of it was in Latin as well. So it was, it was a little bit mind-blowing.

RESEARCHER

And so, you've sort of covered this, but have you ever noticed any changes in your singing voice that you think might be related to hormonal changes?

S6

Um, yeah, definitely. I think it's definitely, my voice, generally speaking, is lower than it has been previously.

RESEARCHER

If you're comfortable sharing does neurodiversity such as autism, ADHD, dyslexia, etc. play a role in your life and your singing experience? If so, would you mind describing that experience?

S6

No, not in my personal life, it doesn't, not with my singing either.

Neurodiversity: neurotypical

RESEARCHER

Now moving to questions that are more specific to my study. What comes to mind when you hear the word "vowel"?

S6

When I hear the word vowel, it reminds me of the rhyme "how now brown cow" because it sounds very much like "vowel". And also Julie Andrews as well and the way that she speaks. I've been told that my diction is quite good as well, so obviously, depending on who I'm speaking to, depends on what my diction is like as well. So I do like to pronounce words and I love words as well.

Definition of vowel: "how now brown cow"

Definition of vowel: "Julie Andrews"

RESEARCHER

In written English, there are five vowel sounds (a, e, i, o, u), sometimes seven, if we include w and y. How does this compare with the number of vowel sounds when we speak or sing, and what implications might that have for choral singing?

S6

We make a different sound sometimes that wouldn't be the normal sound when we speak. So when

we're speaking the word, it will be a completely different vowel or sound, sorry, to when we're singing it. But in order to make it sound right, we have to sing that vowel in a different way. So that when, so the listener can hear the word, but if we were singing it in the way that we would speak, it might not come across as a word and it would get lost. So you have to emphasise the vowel maybe in a different way.

Sung vs spoken vowels: sung vowels can be different to spoken vowels

RESEARCHER

That was my next question, do you notice any differences between how you sing a vowel and how you speak it?

S6

Definitely.

RESEARCHER

Reflecting on the testing we did together, do you have any overriding memories or impressions from that experience?

S6

I think it was slightly easier the second time around because I knew what I was expecting. And then obviously, when I realised I didn't have to sing it in the same key as what they were singing in, it made it a lot better. What I did with it is, I sort of repeated it in my head before I actually sang it out, which made it easier as well.

Reflecting on testing: "slightly easier the second time around because I knew what I was expecting"

Reflecting on testing: better when not trying to match pitch of demo

Reflecting on testing: pre-imagining made it easier

RESEARCHER

Can you describe any physical changes you notice when making different vowel sounds?

S6

I think maybe changing the shape of your face when you're making those different vowel sounds. Because then it comes out differently when you change the shape of your mouth. Like when I was just saying "How now brown cow" to say that like that, you have, your face, if you said "How now brown cow" my face is completely different to how, if I was saying it and pronouncing it. So your face shape and mouth, the shape of your mouth changes.

Physical changes: face

Physical changes: shape of mouth

RESEARCHER

Do you mean your lips or inside your mouth?

S6

My lips.

Physical changes: shape of lips

RESEARCHER

Are there any vowel sounds that you find particularly easy or more difficult to sing?

S6

I think an "ee" [i:] is quite difficult - it's a weird sound.

S6

At all pitches, high and low?

S6

Probably high, low probably, I'm trying to do it now. But no, I think it's quite a difficult sound to make.

I think because of the shape that, where your tongue has to be in your mouth as well, to make that sound.

Physical changes: tongue position

RESEARCHER

And easy ones or have you not noticed any?

S6

I think when you're singing an "ah" [ɑ:] it's an "ah" [ɑ:] even though it's an "a" [letter], isn't it? So it's difficult, isn't it, or an "oo" [u:], an "oo" [u:] but then that, yeah. I don't know, it's difficult thing because an "a" [letter], you're not singing an "ay" [eɪ] are you, it's an "ah" [ɑ:] sound, isn't it? So I can't say that I've really noticed really, because when you are singing those vowel sounds, you try to emphasise them anyway.

RESEARCHER

Do you ever notice how other choir members shape their vowels and does it influence your own singing?

S6

Yes. And I think that's to do with like the way the mouth is when they're singing certain words. And my mouth, I don't know because sometimes, other than when you're videoing yourself, you don't, you can't see what your mouth is doing. But I do notice maybe the shape of their mouth when they're singing certain words is maybe different to the way that mine is, but then it might be because they are in soprano 1.

Current approach to unifying vowels: higher voices approach vowels differently to lower voices

Current approach to unifying vowels: notice mouth shapes of others

Physical changes: shape of mouth

RESEARCHER

Okay, and do you mean that you see that when you watch back the videos of rehearsals or do you find yourself staring at people in rehearsals?

S6

Some people are really watchable, you know. And so I suppose yeah, so when you are looking at some people singing and when we've done our little group things as well, we tend to do it in a little circle. So you can just then see people, but when we're in rehearsals, we're in a line so you don't see people. So when we're doing our little groups, you do tend to look at people and I am a watcher as well, I think. And it probably does look like I'm staring, but I'm not, I'm just watching because I just find people really intriguing and just their actions and their mannerisms as well, I think are really intriguing. So, yeah, I suppose so. When you're standing in front of us conducting and you're singing the song, I am looking at your mouth and the way you use your mouth to sing a certain word. And maybe people like [name of choir member] as well, because of the way she uses her mouth it's just, it's amazing, just watching her, she's so watchable.

RESEARCHER

Following up on what you said about the mouth shape of soprano 1s, do you think that there can be a difference in the mouth shape between different sections when they are singing the same vowel?

S6

I think so because I think that when they're singing a certain, when they're obviously singing in the higher range, then obviously they have to go a lot more into their head voice, which is why their mouths might go the way that it does. So yeah, I think so.

Current approach to unifying vowels: higher voices approach vowels differently to lower voices

RESEARCHER

What do you think the potential advantages and/or disadvantages might be of choir members unifying their vowels, so singing them the same way?

S6

I think it would sound amazing if everyone sang the same because otherwise it just clashes, doesn't it? Yeah, I think it would, I think it would, it would sound so much better if everybody sang that word the same way. It's a bit like when you, when you finish on a sh [/ʃ/], isn't it, if everybody finishes or starts that at the same time. Otherwise, it's sort of like a, like a waterfall effect, isn't it, or a domino effect, isn't it, and there's no definition to it.

Advantages: "sounds a lot better if everyone's singing the same thing"

Advantages: diction is clearer

RESEARCHER

What if you have a soprano 1 singing a top G and the altos are singing a low note on the same vowel?

S6

Well, then you've got, I don't know. I suppose if they're singing a different note, then you've got a clash there anyway, haven't you? Or it could be a harmony. I still think it would sound better if it was the same vowel or the same sound that was coming out if it was the same word we were all singing. Otherwise, it sounds like a completely different word. It's sort of like singing different, if we're singing a different vowel, like if I'm singing, we're from Essex, "how" [/hæʊ/] and then "how" [/haʊ/], they sound like two different words, doesn't it? So you could, you could sound like you were singing a different song.

RESEARCHER

And what strategies do you think could help ensure more unified vowels within each section?

S6

Those rhymes, we could all do. And the fact that you shout think Julie Andrews, because she's very, well because she's very, her diction and the way that she talks is so, she uses all of the letters in the word, doesn't she, so you know what word she is saying. And it's gonna sound really weird now, but my favourite word is "Winnebago", right. Because of all the, the way that your mouth moves and, and all the sounds you can get out of just that word. And people think I'm weird when a van goes past and I just, and it's a Winnebago, and I just say the word "Winnebago". It's such a good word. And actually, I think if everybody was singing the same thing, it would just sound so much better. So if we all practised maybe saying that, when we saw that word we know that's how we're gonna sing it.

Advantages: "sounds a lot better if everyone's singing the same thing"

Improving the unification of vowels: practise speaking the words

Improving the unification of vowels: use tongue twisters (slow version)

S6

And when you said rhymes do you mean like "How now brown cow"?

S6

Yeah. It was the, I can't remember, if you remember, when you were young, saying "Red lorry, yellow lorry", those sorts of things. It's about being able to, like tongue twister things, aren't they? But not saying them so quick that you can't understand what they are. But for that word, so when we see that word in that song, this is how we're going to sing that word and everybody knows.

Improving the unification of vowels: use tongue twisters (slow version)

RESEARCHER

How do they remember that?

S6

Um, practice.

Improving the unification of vowels: practise speaking the words

RESEARCHER

Do you have any experience with interpreting or using the symbols from the International Phonetic Alphabet? Like when you look up a word in the dictionary and it shows you how to pronounce the word.

S6

I do do that. Um, because there's some words and there are a bit of, I can't say, I can't even say it now because I can't remember the bloody word. But anyway, there's a word - do you know, when you hear the sound in the room? I can never say that word.

IPA: limited understanding

RESEARCHER

Acoustics.

S6

That's it. And even though I could repeat it back to you now. When I have to say it again, I can't. And it's also like a foreign language isn't it? If you want to say a foreign language to someone and you want them to understand you, I would look it up, so that you can pronounce it properly.

RESEARCHER

Yeah. Have you ever tried changing how you sing vowels to improve your sound? If so, what have you tried?

S6

Probably channelling Julie Andrews to be honest. I said before I quite like words and I like diction and to speak properly. I hate it when people shorten words. I hate it when people shorten words in text, let alone when they're just talking. But I think that if you speak nicely, it's just so much nicer, isn't it? And it's nicer to listen to. So if you're going to sing that way, it's going to be so much nicer to listen to.

Vowel modification: "channelling Julie Andrews"

RESEARCHER

What about when you sing high notes in [a specific solo], do you ever think about changing how you sing those vowels to improve your sound?

S6

I think I can sweep sometimes to the word "one" because it sounds like a "w" [letter]. So I might do that to start with, but when I do the higher notes, when I'm in my head voice, I try and I have it in my head because I think you said to me drop into it rather than then go up to it. So maybe when I'm in the higher notes then I tried to drop into it and actually I can hear the difference and I can hear when I'm doing it when I'm sweeping up to it as well. So when I'm in my head voice and I'm dropping into it, it sounds like "one" than "one" with a "w" [letter]. But easier to do that in the higher notes than the lower notes and so I don't know why. It's sort of like practice and training, but I found it hard to drop into it in than when I'm in my head voice, when I am sort of like probably lower range.

Improving tuning: flat - aim above the note

Musical development: trying to improve

Vowel modification: doesn't appear to consciously modify vowels

S6

What does singing in tune mean to you? Do you think there are any differences in staying in tune singing solo versus singing as part of a choir?

S6

When someone's singing in tune, I think I can hear it when they're not. And I can hear in tune as well, so I think I can hear that. But then you have, like, the song that [name of choir member] and I are doing. It's got two different parts to it, haven't they? So when we're both singing different words, we're obviously singing the song, but we're singing two different parts, but I think it still sounds really nice. I think I can hear when someone's not singing in tune.

How to sing in tune: can hear when it is in tune/out of tune

RESEARCHER

Okay, are you able to describe it, in perhaps a more obvious way?

S6

Sounds awful. You can just hear it, can't you? It's like, I think if you're watching, that thing where all the chairs turn around, what's that programme called?

Definition of out of tune: "not good"

RESEARCHER

"The Voice".

S6

Yeah, that's it and then and then someone sings a bum note. You know you can feel yourself go "ooh", can't you? Sort of like a little cringe because you know they've just sang a bum note. Or like when you know that you've just, like I did the other day, when I sang and I just, the first time when I came back from holiday and I'd had Covid, and then I just went "Oh my god, that sounds awful". Because I could hear it sounded awful. As it does, as it would do if I normally, if I was well, sort of thing, and normally sang it. And I suppose a bit like when you have a cold or you have your, your, if you have your headset, your ears in, I think people who have their ears in completely, their singing can sound out of tune, but if you take one out, but have one in, you can then hear yourself properly. Then you're probably singing in tune. But with both of them on, that is probably louder and you can't hear yourself. But with one out, you can hear yourself. When I'm singing, I tend to just have one ear in, so I can hear if it's in tune or not in tune.

How to sing in tune: can hear when it is in tune/out of tune

RESEARCHER

That's interesting because my next question is how do you make sure you're singing in tune?

S6

So I only have one ear in. I'm conscious that there are other people in this house and they don't need to hear me singing out of tune. But also you can hear when you're singing a different note, maybe to what, you know, the practice track is or something and you're not hitting it, you can hear it.

Improving tuning: listen to rehearsal track

RESEARCHER

Would you define singing out of tune as singing the wrong note?

S6

Not necessarily because it might still blend and it might sound nice because it might harmonise. And I know that my daughter says to me sometimes when we're in the car, "Why do you always have to harmonise to it" because I think it sounds nice. And actually I can't hit that note. But yeah, so it doesn't necessarily, if you're singing the wrong note it doesn't necessarily mean it will sound like out of tune. Because as I said it could harmonise it could actually, it can actually sound nicer, but if you're singing a song that is supposed to be that tune, and that part isn't a harmonising part, then it will take away from the parts that are harmonising.

Definition of in tune: "in harmony to the other parts"

Definition of out of tune: wrong note does not equal out of tune

RESEARCHER

But do you think that in your voice part, you could be singing all the right notes that you've been allocated and that you could...

S6

Is that not just your voice though? It is subjective isn't it? Because like, if you're watching "The Voice", I might go "Oh my God, that voice was amazing" and it gives me goosebumps and stuff like that. But then [name of husband] will be sitting there and going, "Oh no, they're awful, I don't like that". So everyone's voice is subjective. I can listen to myself and think "Oh my God, that sounds awful". And I was having a conversation with [name of husband] today about the fact that I've not been able to do that in two times in practice now and it's really worrying me. And then, but when I've been at home, I've been able to do it. And he said, "Well, what I've heard so far is..." you know, just building my ego up a little bit, massaging my ego, "it sounds really good", but the thing is, is the fact that that is subjective. Somebody else might hear it and go "Cringe I hate that...", you know, "that doesn't do it for me", because music is subjective, everyone likes different genres and different types of music and maybe different voices do different things to different people.

RESEARCHER

Do you find it easier to stay in tune when singing alone or with others?

S6

With others, I think unless I've got a set part, then I'm okay. But if someone else goes wrong, it can really, massively put me off though.

Causes of poor tuning: Other choir members can influence my tuning

RESEARCHER

So this is my final question: if you notice or are told that some notes are a bit flat or sharp, what is your process for fixing them?

S6

I'd go back and listen to the track. Like at the moment, I've been listening to not the full version, but the practice version because they did something differently, but just so that I can get that first note as well because I think that when I've been doing it, it's probably been a bit lower than it should be. So just so I can hit that first note, then the rest will hopefully then come, shouldn't it, sort of thing?

How to sing in tune: start on the right note

Improving tuning: listen to rehearsal track

RESEARCHER

Thank you so much for taking part. Before we finish, is there anything else that you'd like to add or share?

S6

No, thank you.

Created with the Delve Qualitative Analysis Tool (<http://www.delvetool.com>)

S7 Interview

RESEARCHER

Thanks very much for giving up your time to take part in this study. I'm going to start with some general questions on your background. Can you tell me about your background in singing and in music in general?

S7

Background in singing is not very much. I mean, literally when I was at school, in the sixth form we created our own choir, we called it the New Age Choir. And I probably didn't even do much singing, I did more playing the piano and arranging the music. But yeah, that's probably it, that's all I've really done, but I do have a musical background.

Singing experience: school choir

So I learnt the piano and the flute and the violin while I was at school, um, did Music GCSE, did AS Music. And then stopped mostly, I stopped all instruments at grade five because I didn't do grade five theory until much, much later. About eight years ago, my dad bought me a piano, really nice piano secondhand, but lovely and with it you got a free piano tune six months later, and the lady that tuned it was also a teacher. And she would kind of come back every six months or a year to tune it and I was like, "What I could really do with is some lessons" and she would say "I'm so busy, I'm so busy". And eventually she said "Do you know what, I probably have got some time now", so had lessons and I also found a course at Southend Adult college, where I was able to finally do my grade five theory. And the lady that taught the class put me in touch with her husband afterwards because the class was like this drop-in class for adults and they were all different abilities. And so because I kind of did know it, I did learn it, I just never took the test, so it was quite easy to kind of go through it. Took it, passed it and she said, "Well, I don't I won't go beyond grade five," she said, "but my husband will, so if you want to". So I met him and then I did grade six theory as well, which I know most people don't bother with. So I think I was probably a bit bored or something or wanting to sort of stretch my brain

and at the same time I did grade six piano, grade seven and then finally grade eight. And I had sort of two different teachers teaching me so the guy that that was doing the music theory and also the lady that was the piano tuner.

Instrumental experience: piano - advanced level

Instrumental experience: strings - intermediate level

Instrumental experience: woodwind - intermediate level

Musical development: "a bit bored or ... wanting to ... stretch my brain"

Musical development: seeks helps when she needs it

Other music experience: grade 6 music theory

Other music experience: GSCE/AS/A-Level Music

So yeah, I mean, that's my sort of more recent music history, and I did resurrect the flute, as well. And the guy that was doing the music theory, he used to run like a daytime ensemble, mostly for really old people. But because I wasn't working, I went and it was like in the middle of nowhere in Billericay. So I'd do that and it was great. It was really good to be able to do that again. And realise that yeah, you know, you can just pick it up again. And then I've taught, I did, I did do a bit of piano teaching as well. Sort of while I was doing my more recent grades and before I went back to work because my kids were small, and then that kind of stopped with the pandemic, which was kind of fine with me really. And I didn't pick it up again. I've only taught my kids to play, so one of them has done a couple of exams, the other one hasn't. He can still play, just refuses to take exams. So yeah, there you go. That's kind of it really I suppose and I think music has probably always just been there. My dad's always, he's always played in a band, bass guitar or something. And my mum, you know, musical as well, she can play the guitar, used to sing a bit, but yeah, and her dad was musical - not that I ever met him. But there's always been, you know, that kind of influence and also cousins that are very musical as well. Some are performers, some teachers and yeah there you go. Is that enough?

Instrument experience: piano teaching

Instrumental experience: woodwind ensemble

Other music experience: musical family

RESEARCHER

Yes. Have you had any formal training in singing?

S7

No, could probably do with some.

Singing experience: no formal singing training

RESEARCHER

And do you or have you ever practised ear training such as recognising intervals, chords rhythms, and if so, can you tell me more about that experience?

S7

Well, just all the training that you have to do for ABRSM music and so I did grade eight, probably, was it 2021? So it wasn't that long ago. So you do have to be able to say what intervals you can hear and yeah.

Aural experience: as part of exams

Aural experience: grade 8 aural

RESEARCHER

And so, how did you find that?

S7

You know, I think if I did it now I'd find it easier, having been in the choir for a year and a half. And it was obviously sightsinging as well and again, I think it would be easier now because obviously when we learn a piece, that's what we're doing, isn't it? I found it okay, I didn't, I didn't love it. It wasn't my favourite thing, but I had a good teacher.

Aural experience: "I found it okay"

RESEARCHER

So was it the situation where three weeks before the exam, all of a sudden, the aural book comes out or did they teach you..?

S7

No, and I actually, no because I know, I know the deal. I know kind of how exams work. And I mean, even when I was a kid, I used to go to a Saturday music school. And there was a lady there who was the aural teacher and you just, you just used to go and have an aural lesson and it was very kind of informal and you just sort of dropped in with other kids and she'd kind of teach you a bit and someone else a bit and someone else a bit. So it was, yeah, it was kind of done by someone that was their sort of field of expertise, if you like and so this guy that I mentioned before, he's taught, you know, up to grade eight, many, many times over many, many years. And so I actually went to him for aural training, while I still had the other piano teacher because the piano teacher I had said, "Look, to be honest with you, I'm not really good at the aural training, buy the book, buy the book with a CD" she said and I thought oh, I mean, I'm teaching myself, which I don't really want to do.

Aural experience: consistent training

Aural experience: received training

RESEARCHER

Yeah, that's interesting. Do you think that your violin playing helped at all?

S7

Um, I don't know actually. What to hear whether a note is right?

RESEARCHER

Yes, in terms of aural training. I'm always interested to know pianists versus violinists, for example, or string players, because it's a different skill, isn't it?

S7

Interestingly, my son, one of my sons, is learning the violin. So once a week, I make him practise and it's painful for everybody concerned. And I say "Can't you hear that that's not right, it's a B flat. This is where you put your finger. Can't you hear it? Change it." So yeah, whereas I suppose he, he learned the piano first and it's just you know, you just press the notes, don't you?

RESEARCHER

And that's exactly what I mean. So I'm really interested to know whether violinists have an advantage when it comes to singing. Because exactly as you said, pianists: there's a G press it or a clarinettist, these are the fingers, you know, the violin you have to have some sense of what the note should sound like.

S7

Otherwise it's awful. Maybe, I don't know. I think I've always known that I can sing in tune, but I've never been under any illusions that I've got a particularly nice voice. So you know, I've always been comfortable that I can hear the notes. I mean, I don't think I've got like perfect pitch or anything. I saw my aunt recently and she was talking about my cousin who is a musician and she said she realised when he was about 12 that he knew what the notes were just by listening to them and he'd be listening to his sister play the piano, and go "No, F sharp" and she went "How do you know it's F sharp and not like C sharp?" and she tested him and she realised that he did know. I haven't got that.

How to sing in tune: can hear when it is in tune/out of tune

RESEARCHER

Very few of us do. Is there anything related to your health that you feel impacts your singing voice? If so, would you mind sharing how you manage it? Feel free to obviously only share what you're comfortable with.

S7

No, I don't think so. I think having played the flute, I think that is helpful, especially with those longer notes and kind of breathing from, because you're taught to kind of breathe from the diaphragm. I mean, I had a teacher that used to sort of tap you on the stomach almost and you know, and go "From there, from there". So I think that may be helpful, but healthwise, no, I think maybe when I've had a cold or something or if I've had COVID then it might take a little while to come back. But then it always does come back, so fingers crossed.

Physical health: no health concerns

RESEARCHER

Have you noticed any changes in your singing voice that you think might be related to hormonal changes?

S7

Not yet. Maybe, I don't know. I think, I don't know actually, because I haven't really sung for that long. It's difficult to say, isn't it? So maybe when I was younger, could I have sung higher maybe? And as you get older, does your voice get a bit deeper?

Hormonal: not aware of hormonal influences on voice

RESEARCHER

Sometimes as well, some people may feel on a monthly basis that they experience changes.

S7

No, I don't think so. I'm not that, maybe I'm just not that perceptive.

RESEARCHER

Now moving to questions that are more specific to my study. What comes to mind when you hear the word vowel?

S7

Well, two things: Maybe, just literally a, e, i, o, u, but obviously you know I'll be thinking about you probably and saying well hang on it's not "er" [ɜ/], it's "aa" [æ/] or something and then you'd be thinking about specific songs, like you've got the Essex way of saying things where we try not to do that in singing, so yeah, maybe those, those two.

Definition of vowel: a, e, i, o, u

Sung vs spoken vowels: avoidance of Essex accent when singing

Vowel sounds: five written vowels but more sounds

RESEARCHER

In written English, there were five vowels (a, e, i, o, u), sometimes seven if we include w and y. How does this compare with the number of vowel sounds when we speak or sing? And what implications might that have for choral singing?

S7

Yes, and I think probably I'm not very knowledgeable in that respect. Just because there is a vowel, there are lots of different ways of saying it, you know, when you teach children to read you do it phonetically. But you know, depending on the words and where the vowel is in that word, it will do a

different job.

IPA: understanding of phonics

RESEARCHER

Do you notice any differences between how you sing a vowel and how you speak it?

S7

Yes, I think with some songs, if we're trying to make sure that you know, we sing it in a certain style you know, I don't know, something that we want to sound posh, then we, that's where we make sure we pronounce everything. But then when we speak, we drop you know drop the "t"s off the end of words or you may be flattening your vowels or broadening them, depending on your accent. So you probably do think more about pronunciation when you're singing. Because you think about your audience and can they understand the words that you're singing? You know like sometimes you listen to a performer and you think "What are they saying? What are those words?" and you hear it wrong - is it Peter Kay that does that in his act? "Mercy" is one "begging you for mercy" sounds like "birdseed", "begging you for birdseed". It's kind of how you want it to come across. I think we do think about it much more in the choir. You probably also think about how you pronounce words, depending on who you're speaking to, you know if you're at work or if you're speaking to children, kind of setting a good example or you're just talking to your mates and you just relax.

Sung vs spoken vowels: more conscious of pronunciation when singing

Sung vs spoken vowels: style of song can determine pronunciation choices

RESEARCHER

Reflecting on the testing that we did together, do you have any overriding memories or impressions from the experience?

S7

I think it was okay. I found it fairly straightforward. I remember trying to concentrate. I remember thinking “Right what has Emma said, what am I doing?” And just really concentrating before I sang. And I think because you wanted them slurred and you didn't want there to be a break between the two vowels, so I was really kind of saying “Right, don't put a break in”.

Reflecting on testing: "fairly straightforward"

Reflecting on testing: "really concentrating"

RESEARCHER

Can you describe any physical changes you notice when making different vowel sounds?

S7

No. Do you mean like the shape of your mouth? Yeah, so I mean, there was a tip that I think you gave, I think you said that your mouth makes an “oh” [əʊ] sound, but actually I want you to make an “ee” [i:] sound. I don't know how we do that. But yeah, so maybe that's, you know, you think about the shape of your mouth.

Physical changes: shape of mouth

RESEARCHER

Are there any vowel sounds that you find particularly easy or more difficult to sing?

S7

No, I don't think so.

RESEARCHER

Do you ever notice how other choir members shape their vowels and does it influence your own singing?

S7

I suppose if someone's next to you and they're doing a good job, as in they are pronouncing their vowels correctly, then it will encourage you to do the same thing. But conversely, if you hear somewhere in the distance, someone sounds a bit Essex, you might cringe and go "Oh, I don't want to sound like that". Maybe, I don't, it's not something that I think of that much to be honest. I've thought about it because you've suggested it. Unless you pull us up on it, unless you say "I don't want 'how' [haʊ] to be 'how' [hæʊ]".

Current approach to unifying vowels: "it's not something that I think of that much"

Current approach to unifying vowels: may be influenced by singers "doing a good job"

Improving the unification of vowels: under direction

Sung vs spoken vowels: avoidance of Essex accent when singing

RESEARCHER

What do you think the potential advantages and disadvantages might be of choir members unifying their vowels?

S7

Well, I think with a choir, you want it to sound almost like one voice. You want it to sound blended. And you don't want the audience to be able to hear there's a difference. And if it, if they're not unified, then you might go "Oh, someone doesn't sound quite right there" or "What was that word?" because maybe it changes whether you can really hear what the word is that they're saying, or the words.

Advantages: blended singing

Advantages: diction is clearer

RESEARCHER

What strategies do you think could help ensure more unified vowels within each section?

S7

I don't know. I think it's just singing together and repetition. And also if, if you've, you know, as Director, you've noticed it, and you've pointed it out, then we'll make a note of it, and hopefully, we'll work on that, I suppose. Yeah.

Improving the unification of vowels: sing together more

Improving the unification of vowels: under direction

Improving the unification of vowels: use repetition

RESEARCHER

Do you have any experience with interpreting or using the symbols from the International Phonetic Alphabet?

S7

Do you mean like alpha, beta, bravo, tango?

RESEARCHER

When you look up a word up in the dictionary to see how you pronounce it, and it has, sometimes the symbols are quite obvious, and sometimes they might look a bit like a back to front C or something like that.

S7

So I guess the answer is probably no.

IPA: no knowledge

RESEARCHER

Have you ever tried changing how you sing vowels to improve your sound? If so, what have you tried?

S7

I mean, it would be for me, it would have to be, you know, like a particular word. You know, “Take note that on that particular word we want to make sure that we don't have the ‘er’ [ə/] sound, we want the ‘aa’ [æ/] the sound”, so that's how I would look at it. I wouldn't think “Oh, I've got a problem singing this, so work on that”. It would have to be, you know, a case by case basis. Especially because some songs you know, you want them to have a particular sound like when we were singing "Wannabe" it's more relaxed, isn't it, it's kind of more you don't have to pronounce everything properly. You kind of want it to be like that, not as posh as perhaps "Climb "Ev'ry Mountain".

Vowel modification: under direction

RESEARCHER

Okay. What does singing in tune mean to you? Do you think there are any differences in staying in tune when singing solo versus being in a choir?

S7

Well, I mean, if you sing a solo and you don't sing in tune or you're slightly off, you can probably get away with it, depending on what the backing track or the accompaniment is, but I mean if you're singing in unison with other people and someone is ever so slightly off, that's yeah, I would notice it and and try to move slightly. I think vibrato helps to kind of mask these things, almost, I think. My dad was telling me about my cousin's wife who is a singer and she was talking about someone else and said they use vibrato a lot because they can't hold a note. I noticed it recently actually, I was singing

with, I don't know if it was, just one or two or three of us and I thought "Ooh we sound ever so slightly not quite right, is it me? Not sure". So I do notice it and I do want to fix it. Yeah, it's painful to me if it's not in tune.

Definition of out of tune: "a little smidge out"

Definition of out of tune: "vibrato helps to ... mask" poor tuning

How to sing in tune: can hear when it is in tune/out of tune

RESEARCHER

So how would you define singing in tune?

S7

Well, that, that's what you expect. That's the standard. I mean, it's got to be in tune. I mean, you can call it you know, like, heavenly or joyful, but you wouldn't want anything less I think, than that. I mean, my husband can't sing in tune. So I mean, if he sings on his own it's not too bad, but if you try and sing with him, he'll just kind of slip, slip about and yeah, it's not good.

Definition of in tune: "That's the standard"

Definition of out of tune: "not good"

RESEARCHER

I guess I'm asking for what is probably just so obvious in your mind, a definition of what is not singing in tune? What does your husband do?

S7

Well, I mean, he probably changes key. He just doesn't stay in the same key. It's not melodic, it's not harmonious.

Definition of out of tune: unintentional key changes

RESEARCHER

What about when playing the violin, what would be “not in tune”?

S7

Too flat, too sharp. So just not quite hitting the note? Yeah, just slightly, slightly off. So it wouldn't be you know, a different note. It would be, it would be within that note, just not quite right, because you can do, you can do that, can't you? On a violin you can sort of, if your B flat is just not flat enough, but it's not a B, you're somewhere in the middle, which you can't obviously do with the piano, but you can do with voice.

Definition of in tune: singing is closer to tuning of guitar/violin than piano

Definition of out of tune: "a little smidge out"

Improving tuning: relating the voice to instrumental tuning

RESEARCHER

Do you find it easier to stay in tune when singing alone or with others?

S7

I quite like singing in harmony. That then allows me to stay in tune because especially (well assuming they're in tune), because you've got that interval between whatever you're singing and whatever they're singing. So yeah, I think I'd probably prefer that. I don't know - sing on your own, I haven't really got much experience of singing on my own, so I don't know. I think it'd be fine, I think, as long as I've got a backing track or accompaniment or something then yeah, I could do it.

How to sing in tune: use of accompaniments

How to sing in tune: use the harmony

RESEARCHER

How do you make sure you're singing in tune?

S7

Well, you've got to make sure that you start on the right note. So, if we're singing a quartet, which we are, then we will make sure that we've got our starting note. I mean, I'll have that in my head for the one we're doing because I don't sing first. So I will kind of, I would just really think about it or I might hum it so that I come in correctly. And then after that, it's a bit of kind of muscle memory that you remember what the note should be and it's concentration as well for me. And again, it's also singing in harmony with other people assuming they're right, then you can kind of bounce off that as well, so that you can just hear the interval I think.

How to sing in tune: audiation

How to sing in tune: focus

How to sing in tune: memory

How to sing in tune: start on the right note

How to sing in tune: use the harmony

Singing experience: quartet

RESEARCHER

This is my final question: if you notice, or are told that some notes are a bit flat or sharp, what is your process for fixing them?

S7

Well, if you're a bit flat, you've gotta go up a bit, if you're a bit sharp, you've got to go down a bit. And again, I'd probably do it by ear, so I just would just hear it and probably know. Yeah, and again, that takes me back to violin practice with my son, because I'm always saying "Just up a bit" and he'll go "Which way is it?" and so yes.

Improving tuning: "I'd try and hear it"

Improving tuning: move slightly up or down

RESEARCHER

Well thank you so much for taking part. Before we finish is there anything else that you'd like to add or share?

S7

No, I don't think so.

Created with the Delve Qualitative Analysis Tool (<http://www.delvetool.com>)

S8 Interview

RESEARCHER

Thanks so much for giving up your time to take part in this study. I'm going to start with some general questions on your background. Can you tell me about your background in singing and in music in general?

S8

Yeah, so I was in a children's choir from probably about the age of seven, maybe even a bit younger. And that was with the church choir, but we were really lucky and we had these amazing choir leaders. Very modern and part of it, we made a record so I've been in a recording studio when I was very little; we were on Songs of Praise. So I've been really lucky. That was probably my introduction to singing and then I was always in school choirs at high school. Then I probably had a bit of a lull when I was a student, didn't do any singing probably at all. And then I was in the gospel choir, a local gospel choir for about 10 years, then I probably had another lull, but in that lull, I was also running the choir at church. So the original choir I was in had disappeared many years ago and I was keen to follow in their footsteps, but that took me about 30 years. So then I ran my children's choir and we did quite a few little concerts. And that was lovely. And then I joined your choir.

Singing experience: children's choir

Singing experience: ran children's choir

Singing experience: school choir

Singing experience: sung in choirs as an adult

RESEARCHER

And have you had any formal training in singing?

S8

No, no, I mean, I've had music lessons because of my piano playing and my recorder playing and I've had some really good choir leaders over the years. So probably instruction from fantastic choir leaders has been training as a group, but not one-to-one.

Singing experience: group training, but not one-to-one

Singing experience: no formal singing training

RESEARCHER

And then in terms of your instruments, what's the background there?

S8

That has been doing through the grades, so for both instruments up to grade six, again with very good teachers.

Instrumental experience: piano - advanced level

Instrumental experience: woodwind - advanced level

RESEARCHER

And do you or have you ever practised ear training such as recognising intervals, chords and rhythms?

S8

Yeah, with all the exams, you had to do all that ear testing, there was always the aural part. So yes, definitely recognising intervals, yeah, would be part of it. And then, of course, I should add with my own job now, piano teaching, that's really focused me in on that sort of side of music. So yeah, that has definitely helped more recently.

Aural experience: as part of exams

Aural experience: grade 6 aural

Aural experience: recently have been teaching it

Instrument experience: piano teaching

RESEARCHER

So when you did that, when you were growing up, was that you know, three weeks before the exam all of a sudden the aural book comes out or was it a more ongoing process?

S8

I have got no idea. I cannot remember. I obviously was well trained in it, but I don't remember being taught it strangely. I must have been, but I can't remember.

Aural experience: "I can't really remember"

RESEARCHER

So you don't remember finding it difficult or easy?

S8

I don't think I did find it difficult. I think possibly some of the intervals. I remember, I still find them difficult, those bigger intervals, now to recognise without little tricks.

Aural experience: "I don't think I did find it difficult. I think possibly some of the intervals ... I still find them ..."

RESEARCHER

And if you're comfortable sharing, is there anything related to your health that you feel it impacts your singing voice?

S8

Only probably if I'm stressed or really nervous. I do think, yeah, if I'm stressed, I do not probably have as much breath and if I'm nervous singing I feel like it's not as natural. Only in a solo position, not in a group position, as I tend to be okay in the choir, but I definitely think it impacts when I sing solo,

slightly yeah, nerves.

Mental health: affects breathing

Mental health: nerves

RESEARCHER

And what do you experience in those situations?

S8

Probably worry about getting words wrong, not getting tunes wrong. It would only be over getting words wrong and I think I've always had that since I was in the gospel choir I remember singing some solos and really worrying about the words. Never melodies, just words.

RESEARCHER

If you're comfortable sharing does neurodiversity such as autism, ADHD, dyslexia, play a role in your life and your singing experience?

S8

Don't know, I think I am a little bit neurodiverse, but I've never been diagnosed with any of those things, but it is in our family. So I would think, yeah a little bit.

Neurodiversity: "a little bit neurodiverse, but I've never been diagnosed"

RESEARCHER

Do you think that affects your singing or your music?

S8

I think it makes, I think something has made me a good musician. A natural musician, I think.
Definitely, definitely as a child, I don't know about as an adult, but yeah, definitely. Yeah, possibly.
Yeah, possibly, definitely.

Musical development: it has possibly influenced musical skills positively

RESEARCHER

And have you noticed any changes in your singing voice that you think might be related to hormonal changes?

S8

Ooh, um, no, I would say not actually, I think I can sing higher now than I used to think I could,
possibly, but I thought it went the other way, as you got older, your voice got lower. But I think this
higher singing is more through experience of being in your choir and the range, stretching myself.

Hormonal: not aware of hormonal influences on voice

RESEARCHER

So moving to questions that are more specific to my study, what comes to mind when you hear the word "vowel"?

S8

Just the five vowels really, initially, but obviously since being in the choir, a lot more, that there's not
just one vowel sound.

Definition of vowel: a, e, i, o, u

Vowel sounds: five written vowels but more sounds

RESEARCHER

In written English, there are five vowel sounds (a, e, i, o, u), sometimes seven if we include w and y. How does this compare with the number of vowel sounds when we speak or sing, and what implications might that have for choral singing?

S8

Big implications, I would say, really makes a big difference. Because often they can be the longer part of the word in the song. But yeah, really big difference because it really changes the way it comes across.

Sung vs spoken vowels: sung vowels are sustained

RESEARCHER

Do you notice any differences between how you sing a vowel and how you speak it?

S8

I think when I sing it, if I'm concentrating on it, I do try and sing it in a more posh way than I would speak it. Definitely.

Sung vs spoken vowels: "sing it in a more posh way"

RESEARCHER

And reflecting on the testing that we did together, do you have any overriding memories or impressions from that experience?

S8

It was really interesting, but quite hard. That's what I would say yeah, I enjoyed it, but interesting and challenging.

Reflecting on testing: "challenging"

Reflecting on testing: "interesting"

RESEARCHER

Do you know what you found challenging about it?

S8

Sometimes just remembering what you had to do, but that could be a hormone thing. And sometimes just actually mimicking the correct vowel sound was harder than you think. You'd think it'd be really easy, but actually creating that sound was not always as easy as you think it might be.

Reflecting on testing: "remembering what you had to do" was hard

Reflecting on testing: recreating vowel sounds was sometimes difficult

RESEARCHER

Can you describe any physical changes you notice when making different vowel sounds?

S8

Only just the shape of my mouth, I suppose: tongue position, shape of mouth. Yeah, that would be all I'd say.

Physical changes: shape of mouth

Physical changes: tongue position

And are there any vowel sounds that you find particularly easy or more difficult to sing?

S8

So easy are "ay" [eɪ] and maybe "ee" [i:] as well, but "oh" [əʊ] and "ow" [aʊ] are probably the harder ones.

RESEARCHER

Is that at a specific pitch or just generally?

S8

Not necessarily a specific pitch, no. I'd have to do it to really think about it, I think. Yeah.

RESEARCHER

Do you ever notice how other choir members shape their vowels and does it influence your own singing?

S8

Hmm, maybe if it was really obviously wrong, yes. But I think I do really concentrate on what I'm doing. I think I would probably notice pitch mistakes over vowel mistakes, I think, unless it was particularly slangy or Southend-y.

Current approach to unifying vowels: "concentrate on what I'm doing" rather than others

Current approach to unifying vowels: "more in tune with hitting the right note rather than how the vowels s...

RESEARCHER

What do you think the potential advantages and/or disadvantages might be of choir members unifying their vowels?

S8

Just big advantages, really. You'd get a purer sound, a more together sound. I can't think of any disadvantages. I mean, it might be harder for people, but I think it would be, it's a positive for the choir.

Advantages and disadvantages: "it might be harder for people, but ... it's a positive for the choir"

Advantages: purer and more together

Disadvantages: no disadvantages

RESEARCHER

What strategies do you think could help ensure more unified vowels within each section?

S8

Oh, just training and then maybe just focusing on one vowel sound and really working through that. Perhaps not, not changing the vowel sound in the beginning and then working on two vowel sounds, building up like that, maybe not throwing too many.

Improving the unification of vowels: training

RESEARCHER

Yeah, okay. Do you have any experience with interpreting or using the symbols from the International Phonetic Alphabet?

S8

Um, what are the symbols?

RESEARCHER

You know if you look a word up in the dictionary, and it shows you how to pronounce the word and sometimes...

S8

Yeah, yeah. No, only in as, only in as much as looking in the dictionary, learning how to pronounce new words. I mean, I was phonetically trained in teaching children to read, but that is a different type of phonetics, but I do really understand phonics, perhaps more so than some people purely because I've had to teach it.

IPA: limited understanding

IPA: understanding of phonics

RESEARCHER

Having never taught a child how to read, how do you teach them?

S8

Well as in that if you're reading a word with an "a" in and you're sounding it out, say it's the word "rat". So r-a-t [/rə/-/æ/-/tə/] I know that "a" makes an "aa" [/æ/] sound in "rat", but when it's put with an "i", it makes a different sound in "rain". So I know that side of phonics, which would relate to singing totally.

RESEARCHER

Do you teach children those rules or do they just...

S8

You teach them the rules, so you teach them the simple phonetics and then you teach them that when you sometimes put those vowels with another vowel, it changes. So I suppose I do have an advantage there in that if I see a vowel with another vowel with another letter, I know what sound it could make, but then that's basic reading really. We all do it without thinking.

RESEARCHER

But it's interesting because when we think about vowels, we often think about a, e, i, o, u and not all those sounds that we make.

S8

I have done that training, but not as far as singing, I've never been trained to sing vowels properly.

RESEARCHER

Have you ever tried changing how you sing vowels to improve your sound? If so, what have you tried?

S8

Well, really through what you have taught us to focus on sometimes that holding the vowel and then coming off the vowel. I don't consciously sing in a special way. I'm just doing, apart from what I said about sometimes about the pronunciation being a little bit posher. It's more trying to follow what you say, so that we all do that sound together.

Improving the unification of vowels: under direction

Vowel modification: doesn't appear to consciously modify vowels

RESEARCHER

And then [in a specific solo] on those high notes, do you just sing those words as they come out your mouth?

S8

Yeah, I do really. I really do. I could look at them in more detail, especially the higher ones, just trying to think of that particularly high bit at the end. Yeah, but "more", so there's the "or" [ɔ:] would that be the vowel sound in it?

RESEARCHER

Yeah.

S8

No, I just sing it as it comes out my mouth and I probably, that would help because I've been practising it and noticing that I'm making it short. And it could be, yeah, so that, so no, I am, I do just sing, sing, sing along without always thinking. So yeah, that's yeah. I will do that. I'll try that.

Musical development: "I will do that. I'll try that."

Vowel modification: "I just sing it as it comes out my mouth"

RESEARCHER

What does singing in tune mean to you? And do you think there are differences in singing in tune in the choir and singing solo?

S8

Singing in tune means we're all singing, obviously we are singing our parts, but we're singing at the same pitch as each other. So, if we are all singing at the same pitch, we're singing in tune, but we're also in harmony to the other parts. And sorry, what was the other part of the question?

Definition of in tune: "in harmony to the other parts"

Definition of in tune: singing the same as each other

RESEARCHER

Do you think it's different, you know, singing solo to singing in a choir in terms of staying in tune?

S8

Yeah, I think as a soloist, I'd definitely made sure I listened to it a lot to make sure I knew the tune, but I don't think I have a problem staying in tune because I think I've got quite a good ear for listening to the accompaniment. So, I think I'm lucky in that I think it comes fairly naturally to me. And I wouldn't say I find it easier or harder once I've learned the tune.

How to sing in tune: use of accompaniments

RESEARCHER

How do you make sure you're singing in tune?

S8

For me it would be, to begin with, it would be reading the music. That is the big thing for me. Looking at the, like you said, the intervals, noticing how the notes are moving. And then as I'm actually singing, I just hear it in my head, you know, and also if it's with accompaniment, definitely making sure that I am staying in tune with that accompaniment.

How to sing in tune: audiation

How to sing in tune: begins with "reading the music"

How to sing in tune: use of accompaniments

RESEARCHER

So this is my final question: if you notice or are told that some notes are a bit flat or sharp, what is your process for fixing it?

S8

If it's flat, I would sing up a bit, sort of try and aim for above the note. If it's sharp, I think maybe I'd soften a little bit. That's the strategies I seem to remember using. Ah yeah, because when you play a recorder, it's really easy to have your recorder not warmed up enough. That's what I vaguely remember my teacher telling me something about how you have to soften or louden.

Improving tuning: flat - aim above the note

Improving tuning: relating the voice to instrumental tuning

Improving tuning: sharp - "soften a little bit"

RESEARCHER

Well, thanks so much for taking part. Before we finish, is there anything else that you'd like to add or share?

S8

No, that's been really interesting. Made me think. I think sometimes, you know, we all just want to sing for pleasure and it just sort of comes out your mouth, doesn't it? And I think it is really good to dissect it a bit because I think that's what makes us you know, through your leadership, a better choir. If you don't think, it's easy to be a bit sloppy, isn't it? And that's really, really important. No, it's great. Thank you.

Musical development: "intentional"

RESEARCHER

Thank you.

Created with the Delve Qualitative Analysis Tool (<http://www.delvetool.com>)

Appendix 7: Themes, sub-themes, categories and codes

Theme	Sub-theme	Category	Code Name	S1	S2	S3	S4	S5	S6	S7	S8	Total occurrences
Contexts of learning	Background	Feedback on testing	Reflecting on testing: "challenging"								1	1
Contexts of learning	Background	Feedback on testing	Reflecting on testing: "fairly straightforward"						1			1
Contexts of learning	Background	Feedback on testing	Reflecting on testing: "interesting"	1				1			1	3
Contexts of learning	Background	Feedback on testing	Reflecting on testing: "really concentrating"				1			1		2
Contexts of learning	Background	Feedback on testing	Reflecting on testing: "remembering what you had to do" was hard								1	1
Contexts of learning	Background	Feedback on testing	Reflecting on testing: "slightly easier the second time around because I knew what I was expecting"						1			1
Contexts of learning	Background	Feedback on testing	Reflecting on testing: "take for granted"		1							1
Contexts of learning	Background	Feedback on testing	Reflecting on testing: better when not trying to match pitch of demo						1			1
Contexts of learning	Background	Feedback on testing	Reflecting on testing: level of difficulty varied	1	1							2
Contexts of learning	Background	Feedback on testing	Reflecting on testing: pre-imagining made it easier						1			1
Contexts of learning	Background	Feedback on testing	Reflecting on testing: recreating vowel sounds was sometimes difficult					1			1	2
Contexts of learning	Background	Feedback on testing	Reflecting on testing: some vowels were easier at different pitches			1						1
Contexts of learning	Background	Hormonal	Hormonal: menopausal						1			1
Contexts of learning	Background	Hormonal	Hormonal: not aware of hormonal influences on voice		1	1	1			1	1	5
Contexts of learning	Background	Hormonal	Hormonal: post-pregnancy					2				2
Contexts of learning	Background	Hormonal	Hormonal: postmenopausal	1								1
Contexts of learning	Background	Hormonal	Hormonal: pregnancy					1				1
Contexts of learning	Background	Instrumental experience	Instrument experience: piano teaching							1	1	2
Contexts of learning	Background	Instrumental experience	Instrument experience: guitar - advanced level			2						2
Contexts of learning	Background	Instrumental experience	Instrument experience: piano - advanced level			2				1	1	4
Contexts of learning	Background	Instrumental experience	Instrument experience: piano - beginner level	1					1			2
Contexts of learning	Background	Instrumental experience	Instrument experience: piano - level unknown		2							2
Contexts of learning	Background	Instrumental experience	Instrument experience: strings - intermediate level							1		1
Contexts of learning	Background	Instrumental experience	Instrument experience: woodwind - advanced level								1	1
Contexts of learning	Background	Instrumental experience	Instrument experience: woodwind - beginner level	1								1
Contexts of learning	Background	Instrumental experience	Instrument experience: woodwind - intermediate level		2					1		3
Contexts of learning	Background	Instrumental experience	Instrument experience: no experience				1	1				2
Contexts of learning	Background	Instrumental experience	Instrument experience: church band		1							1
Contexts of learning	Background	Instrumental experience	Instrument experience: woodwind ensemble		1					1		2
Contexts of learning	Background	Instrumental experience	Instrument experience: youth orchestra		1							1
Contexts of learning	Background	Instrumental experience	Musical development: opportunity to learn variety of instruments		1							1
Contexts of learning	Background	Music theory and reading	Other music experience: does not read music					1				1
Contexts of learning	Background	Music theory and reading	Other music experience: grade 3/4 music theory	1								1
Contexts of learning	Background	Music theory and reading	Other music experience: grade 6 music theory							1		1
Contexts of learning	Background	Music theory and reading	Other music experience: GCSE/AS/A-Level Music							1		1
Contexts of learning	Background	Music theory and reading	Other music experience: has other attributes that compensate for not reading music					2				2
Contexts of learning	Background	Music theory and reading	Other music experience: music degree			1						1
Contexts of learning	Background	Music theory and reading	Other music experience: reads music			1						1
Contexts of learning	Background	Other music experience	Musical development: "immersed" in music		1							1
Contexts of learning	Background	Other music experience	Musical development: I've just always tried to carry on making a little bit of music		1							1
Contexts of learning	Background	Other music experience	Other music experience: musical family		1			2		1		4
Contexts of learning	Background	Other music experience	Singing experience: received breath training			1						1
Contexts of learning	Background	Other music experience	Singing experience: sang in multiple languages as a child			1						1
Contexts of learning	Background	Physical health	Physical health: "find it hard to breathe" when singing					2				2
Contexts of learning	Background	Physical health	Physical health: "my voice is lower"						1	1		2
Contexts of learning	Background	Physical health	Physical health: age						1	1		2
Contexts of learning	Background	Physical health	Physical health: back issues			1		1				2
Contexts of learning	Background	Physical health	Physical health: catarrh				1					1
Contexts of learning	Background	Physical health	Physical health: gained weight						1			1
Contexts of learning	Background	Physical health	Physical health: nasal polyps				1					1
Contexts of learning	Background	Physical health	Physical health: no health concerns	1						1		2
Contexts of learning	Background	Physical health	Physical health: singing most days				1					1
Contexts of learning	Background	Physical health	Physical health: vocal hygiene regime approaching performances				1					1
Contexts of learning	Background	Singing experience	Singing experience: gigging in pubs				1					1
Contexts of learning	Background	Singing experience	Singing experience: no formal singing training	1	1	1	1		1	1	1	7
Contexts of learning	Background	Singing experience	Singing experience: singing lessons					1				1
Contexts of learning	Background	Singing experience	Singing experience: band		1			1				2
Contexts of learning	Background	Singing experience	Singing experience: children's choir								1	1
Contexts of learning	Background	Singing experience	Singing experience: church choir			1			1			2
Contexts of learning	Background	Singing experience	Singing experience: college choir			1						1
Contexts of learning	Background	Singing experience	Singing experience: group singing		1							1
Contexts of learning	Background	Singing experience	Singing experience: group training, but not one-to-one								1	1
Contexts of learning	Background	Singing experience	Singing experience: musical theatre company				1					1
Contexts of learning	Background	Singing experience	Singing experience: quartet		1					1		2
Contexts of learning	Background	Singing experience	Singing experience: ran children's choir								1	1

Appendix 7: Themes, sub-themes, categories and codes

Theme	Sub-theme	Category	Code Name	S1	S2	S3	S4	S5	S6	S7	S8	Total occurrences
Contexts of learning	Background	Singing experience	Singing experience: school choir	1	1	1	1	1	1	1	1	8
Contexts of learning	Background	Singing experience	Singing experience: sung in choirs as an adult	1			2	1	1		1	6
Contexts of learning	Background	Singing experience	Musical development: reluctance to sing		2							2
Contexts of learning	Cognitive processes	Learning challenge	Mental health: "anxiety-inducing"	1								1
Contexts of learning	Cognitive processes	Learning challenge	Mental health: "It puts me on tenterhooks"	1								1
Contexts of learning	Cognitive processes	Learning challenge	Mental health: affects breathing							1		1
Contexts of learning	Cognitive processes	Learning challenge	Mental health: confidence varies	1		1						2
Contexts of learning	Cognitive processes	Learning challenge	Mental health: low self-esteem			2						2
Contexts of learning	Cognitive processes	Learning challenge	Mental health: nerves					1		1		2
Contexts of learning	Cognitive processes	Learning challenge	Musical development: "segment my mind into doing different things"	1								1
Contexts of learning	Cognitive processes	Learning challenge	Musical development: struggles to focus	1			1					2
Contexts of learning	Cognitive processes	Learning challenge	Musical development: has tendency to drift between choral parts		1							1
Contexts of learning	Cognitive processes	Learning challenge	Musical development: took a long time to learn music		1							1
Contexts of learning	Cognitive processes	Learning challenge	Improving tuning: release nerves			1						1
Contexts of learning	Cognitive processes	Learning challenge	Causes of poor tuning: nerves			1						1
Contexts of learning	Cognitive processes	Learning strategy	Musical development: interested in pattern matching	1								1
Contexts of learning	Cognitive processes	Learning strategy	Musical development: uses colour to help learn music			1						1
Contexts of learning	Cognitive processes	Learning strategy	Musical development: "found it easier to learn by doing"					1				1
Contexts of learning	Cognitive processes	Learning strategy	Musical development: "some innate talent somewhere"				1					1
Contexts of learning	Cognitive processes	Learning strategy	Musical development: good memory					2				2
Contexts of learning	Cognitive processes	Learning strategy	Musical development: it has possibly influenced musical skills positively							1		1
Contexts of learning	Cognitive processes	Learning strategy	How to sing in tune: learning by repetition	1			2					3
Contexts of learning	Cognitive processes	Learning strategy	How to sing in tune: focus			1			1			2
Contexts of learning	Cognitive processes	Learning strategy	How to sing in tune: memory				1		1			2
Contexts of learning	Cognitive processes	Neurodiversity	Neurodiversity: "a little bit neurodiverse, but I've never been diagnosed"							1		1
Contexts of learning	Cognitive processes	Neurodiversity	Neurodiversity: being assessed for ADHD					1				1
Contexts of learning	Cognitive processes	Neurodiversity	Neurodiversity: being assessed for ASD		1							1
Contexts of learning	Cognitive processes	Neurodiversity	Neurodiversity: neurotypical	1			1		1			3
Contexts of learning	Cognitive processes	Neurodiversity	Neurodiversity: undiagnosed ADHD			1						1
Contexts of learning	Individual vs choir	Individual before choir	Current approach to unifying vowels: "I'm not going to change" approach to match others at this point				1					1
Contexts of learning	Individual vs choir	Individual before choir	Disadvantages of unifying vowels: compromises individual sound				1					1
Contexts of learning	Individual vs choir	Influence of group	Improving the unification of vowels: a more experienced choir "would all be trying to ... make one sound"				1					1
Contexts of learning	Individual vs choir	Influence of group	Causes of poor tuning: Other choir members can influence my tuning			1			1			2
Contexts of learning	Individual vs choir	Influence of group	Current approach to unifying vowels: "try to blend"			1						1
Contexts of learning	Individual vs choir	Influence of group	Advantages and disadvantages of unifying vowels: "it might be harder for people, but ... it's a positive for the choir"							1		1
Contexts of learning	Individual vs choir	Influence of group	Current approach to unifying vowels: choral singers should approach vowels in the same way				1					1
Contexts of learning	Individual vs choir	Influence of group	Current approach to unifying vowels: may be influenced by singers "doing a good job"						1			1
Contexts of learning	Individual vs choir	Influence of group	Causes of poor tuning: Other choir members won't influence my tuning					1				1
Contexts of learning	Individual vs choir	Influence of group	Definition of in tune: tuning is "more disciplined when you're within the choir"	1								1
Contexts of learning	Individual vs choir	Influence of group	Vowel sounds: singers can interpret vowels in different ways		1		1					2
Contexts of learning	Individual vs choir	Lack of awareness of group	Current approach to unifying vowels: "it's not something that I think of that much"						1			1
Contexts of learning	Individual vs choir	Lack of awareness of group	Current approach to unifying vowels: "concentrate on what I'm doing" rather than others					1		1		2
Contexts of learning	Individual vs choir	Lack of awareness of group	Current approach to unifying vowels: "don't notice how they sing the vowels particularly"		1	1						2
Contexts of learning	Individual vs choir	Requires leadership	Vowel modification: under direction	1						1		2
Contexts of learning	Individual vs choir	Requires leadership	Improving tuning: under direction	1								1
Contexts of learning	Motivation for improvement	Compliant but/or lacks proactivity	Musical development: "it's not really something that I take too much notice of"	2								2
Contexts of learning	Motivation for improvement	Compliant but/or lacks proactivity	Vowel modification: "I just sing it as it comes out my mouth"							1		1
Contexts of learning	Motivation for improvement	Volition	Current approach to unifying vowels: notice mouth shapes of others						1			1
Contexts of learning	Motivation for improvement	Volition	Improving the unification of vowels: writes required sound above word					1				1
Contexts of learning	Motivation for improvement	Volition	Improving tuning: "go over it, over and over again"	1								1
Contexts of learning	Motivation for improvement	Volition	Musical development: "a bit bored or ... wanting to ... stretch my brain"						1			1
Contexts of learning	Motivation for improvement	Volition	Musical development: "how far I could go"		1							1
Contexts of learning	Motivation for improvement	Volition	Musical development: "I am going to start singing lessons"				1					1
Contexts of learning	Motivation for improvement	Volition	Musical development: "I don't think we can ever stop"				2					2
Contexts of learning	Motivation for improvement	Volition	Musical development: "I will do that. I'll try that."							1		1
Contexts of learning	Motivation for improvement	Volition	Musical development: "intentional"				1			1		2
Contexts of learning	Motivation for improvement	Volition	Musical development: "self-educating"				2					2
Contexts of learning	Motivation for improvement	Volition	Musical development: enjoyed learning		1							1
Contexts of learning	Motivation for improvement	Volition	Musical development: seeks help when she needs it			2			1			1
Contexts of learning	Motivation for improvement	Volition	Musical development: trying to improve		1				1			2
Contexts of learning	Motivation for improvement	Volition	Other tuning codes: never experienced tuning up in a choir		1							1
Technical areas of development	Aural skills	Perceptions of aural ability	Improving tuning: awareness of tuning has improved over time				1					1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: as part of exams	1		1				1	1	4
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: does not have perfect pitch					1				1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: grade 6 aural								1	1

Appendix 7: Themes, sub-themes, categories and codes

Theme	Sub-theme	Category	Code Name	S1	S2	S3	S4	S5	S6	S7	S8	Total occurrences
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: grade 8 aural		1	1				1		3
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: has perfect pitch					1				1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: no aural training on music degree			1						1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: relative pitch			2						2
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: "learn things a lot by ear"				1					1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: audiation			1						1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: consistent training		1				1			2
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: use of tonic solfa			2						2
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: practised intervals			1						1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: received training		1	1			1			3
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: recently have been teaching it							1		1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience "struggle to do those kinds of things right now"		1							1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: "I can't really remember"	1						1		2
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: "I don't think I did find it difficult. I think possibly some of the intervals ... I still find them difficult"							1		1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: "I'm not very good at that"			1		1				2
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: no formal training				1		1			2
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: possibility that lack of instrumental experience impacts aural skills				1					1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: "I found it okay"						1			1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: "Now, I can do it fairly easily"			1						1
Technical areas of development	Aural skills	Perceptions of aural ability	Aural experience: found ear tests easy			1						1
Technical areas of development	Aural skills	Use of listening to improve sound	Current approach to unifying vowels: "more in tune with hitting the right note rather than how the vowels sound"	1						1		2
Technical areas of development	Aural skills	Use of listening to improve sound	Current approach to unifying vowels: it is important that the sounds match not the approach					1				1
Technical areas of development	Aural skills	Use of listening to improve sound	Disadvantages of unifying vowels: might be wrong as the section hears a different sound to the sound at the front			1						1
Technical areas of development	Aural skills	Use of listening to improve sound	Definition of in tune: in tune with accompaniment/tuning fork		2							2
Technical areas of development	Aural skills	Use of listening to improve sound	Definition of in tune: singing the same as each other	1	1					1		3
Technical areas of development	Aural skills	Use of listening to improve sound	How to sing in tune: might not detect slightly flat or sharp				1					1
Technical areas of development	Aural skills	Use of listening to improve sound	Improving tuning: "I'd try and hear it"			1			1			2
Technical areas of development	Aural skills	Use of listening to improve sound	Improving tuning: audiation			2						2
Technical areas of development	Aural skills	Use of listening to improve sound	Improving tuning: listen to rehearsal track						2			2
Technical areas of development	Aural skills	Use of listening to improve sound	How to sing in tune: audiation						1	1		2
Technical areas of development	Aural skills	Use of listening to improve sound	How to sing in tune: can hear when it is in tune/out of tune	1		1	1	1	2	2		8
Technical areas of development	Aural skills	Use of listening to improve sound	How to sing in tune: listening to others	2	1	2	1					6
Technical areas of development	Aural skills	Use of listening to improve sound	How to sing in tune: practise with piano			1						1
Technical areas of development	Aural skills	Use of listening to improve sound	How to sing in tune: use of accompaniments				1		1	2		4
Technical areas of development	Aural skills	Use of listening to improve sound	How to sing in tune: use the harmony						2			2
Technical areas of development	Aural skills	Use of listening to improve sound	Current approach to unifying vowels: "listen very carefully to try and pick up the same sort of sounds"			1						1
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: "The right tune"					1				1
Technical areas of development	Intonation	Perspectives on intonation	Definition of out of tune: "discordant or dissonant"			1						1
Technical areas of development	Intonation	Perspectives on intonation	Definition of out of tune: "We weren't singing what was written"			1						1
Technical areas of development	Intonation	Perspectives on intonation	Definition of out of tune: "wrong pitch"					1				1
Technical areas of development	Intonation	Perspectives on intonation	Other tuning codes: "I'm always in tune"					2				2
Technical areas of development	Intonation	Perspectives on intonation	Other tuning codes: not reliably in tune anymore					1				1
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: "in harmony to the other parts"					1	1		1	3
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: "singing on pitch"				1					1
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: "smooth and enjoyable"					1				1
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: "That's the standard"						1			1
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: flat - "a bit dead"			1						1
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: natural to "lean" flat or sharp		1							1
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: sharp - "slightly pitchy"			1						1
Technical areas of development	Intonation	Perspectives on intonation	Definition of in tune: singing is closer to tuning of guitar/violin than piano			1			1			2
Technical areas of development	Intonation	Perspectives on intonation	Definition of out of tune: "a little smidge out"				1		2			3
Technical areas of development	Intonation	Perspectives on intonation	Definition of out of tune: "not good"						1	1		2
Technical areas of development	Intonation	Perspectives on intonation	Definition of out of tune: unintentional key changes						1			1
Technical areas of development	Intonation	Perspectives on intonation	Definition of out of tune: wrong note does not equal out of tune					1	1			2
Technical areas of development	Intonation	Singing in tune	Causes of poor tuning: "sharpness is an accident"				1					1
Technical areas of development	Intonation	Singing in tune	Causes of poor tuning: breathing issues					2				2
Technical areas of development	Intonation	Singing in tune	Causes of poor tuning: register issues					2				2
Technical areas of development	Intonation	Singing in tune	How to sing in tune: harder to be in tune on a harmony line				1					1
Technical areas of development	Intonation	Singing in tune	Improving tuning: flat - aim above the note	1			1		1		1	4
Technical areas of development	Intonation	Singing in tune	Improving tuning: flat - brighten the vowel				1					1
Technical areas of development	Intonation	Singing in tune	Improving tuning: move slightly up or down		1				1			2
Technical areas of development	Intonation	Singing in tune	Improving tuning: question		1							1
Technical areas of development	Intonation	Singing in tune	Improving tuning: relating the voice to instrumental tuning			1			1	1		3
Technical areas of development	Intonation	Singing in tune	Improving tuning: sharp - "soften a little bit"							1		1
Technical areas of development	Intonation	Singing in tune	Improving tuning: training	1				2				3

Appendix 7: Themes, sub-themes, categories and codes

Theme	Sub-theme	Category	Code Name	S1	S2	S3	S4	S5	S6	S7	S8	Total occurrences
Technical areas of development	Intonation	Singing in tune	Improving tuning: use of breath	1								1
Technical areas of development	Intonation	Singing in tune	How to sing in tune: begins with "reading the music"			1				1		2
Technical areas of development	Intonation	Singing in tune	How to sing in tune: change the arrangement					2				2
Technical areas of development	Intonation	Singing in tune	How to sing in tune: question		1							1
Technical areas of development	Intonation	Singing in tune	How to sing in tune: start on the right note						1	1		2
Technical areas of development	Intonation	Singing in tune	How to sing in tune: warm up		1							1
Technical areas of development	Intonation	Singing in tune	Causes of poor tuning: "I don't find it hard ... whether ... a cappella or ... with a track"					1				1
Technical areas of development	Intonation	Singing in tune	Definition of out of tune: "vibrato helps to ... mask" poor tuning							1		1
Technical areas of development	Intonation	Singing in tune	Definition of out of tune: impact of vibrato on tuning in choral singing				1					1
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: "how now brown cow"						1			1
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: "Julie Andrews"					1	1			2
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: "open your mouth"		1			1				2
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: misunderstanding of diphthong			1						1
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: "key part of singing"				1					1
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: "shapes on the inside of your mouth"		1							1
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: "there's no start and end to it"		1							1
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: "vowels can change the sound completely"				1					1
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: "you breathe out the air"		1							1
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: a, e, i, o, u (w, y)		1	1		1		1	1	5
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: awareness of role of vowels in higher range				1	1				2
Technical areas of development	Vowels	Definition of vowel	Definition of vowel: use of tongue		1							1
Technical areas of development	Vowels	Definition of vowel	IPA: limited understanding					1	1		1	3
Technical areas of development	Vowels	Definition of vowel	IPA: no knowledge		1	1	1			1		4
Technical areas of development	Vowels	Definition of vowel	IPA: some knowledge		1							1
Technical areas of development	Vowels	Definition of vowel	IPA: understanding of phonics						1	1		2
Technical areas of development	Vowels	Definition of vowel	Vowel sounds: alphabets are a way of "reducing down something that's really, really complex"		1							1
Technical areas of development	Vowels	Definition of vowel	Vowel sounds: any sound that's not a hard consonant				1					1
Technical areas of development	Vowels	Definition of vowel	Vowel sounds: five written vowels but more sounds			1	2	1		1	1	6
Technical areas of development	Vowels	Definition of vowel	Vowel sounds: infinite number of vowel sounds theoretically		1							1
Technical areas of development	Vowels	Definition of vowel	Vowel sounds: requires guidance		1			1				2
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: "sing it in a more posh way"							1		1
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: spoken is more precise than sung (informed by circumstance)			1						1
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: sung vowels are more open					1				1
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: avoidance of Essex accent when singing		1					2		3
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: loss of clear diction in opera					1				1
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: more conscious of pronunciation when singing							1		1
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: style of song can determine pronunciation choices							1		1
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: sung vowels are sustained		1						1	2
Technical areas of development	Vowels	Sung vs spoken vowels	Sung vs spoken vowels: sung vowels can be different to spoken vowels						1			1
Technical areas of development	Vowels	Changing vowels	Physical changes: "overexaggerating"		1							1
Technical areas of development	Vowels	Changing vowels	Physical changes: chin position			2						2
Technical areas of development	Vowels	Changing vowels	Physical changes: face		1				1			2
Technical areas of development	Vowels	Changing vowels	Physical changes: palette moves as vowel changes from /a:/ to /i:/					1				1
Technical areas of development	Vowels	Changing vowels	Physical changes: smiling				1					1
Technical areas of development	Vowels	Changing vowels	Physical changes: intentional physical change to change vowel					1				1
Technical areas of development	Vowels	Changing vowels	Physical changes: shape of lips						1			1
Technical areas of development	Vowels	Changing vowels	Physical changes: shape of mouth		1			1		2	1	6
Technical areas of development	Vowels	Changing vowels	Physical changes: the breath as it goes over the physical changes			1						1
Technical areas of development	Vowels	Changing vowels	Physical changes: tongue position			1			1		1	3
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: a more experienced choir would "figure out what the best way to sing something would be"				1					1
Technical areas of development	Vowels	Changing vowels	Current approach to unifying vowels: higher voices approach vowels differently to lower voices		1				2			3
Technical areas of development	Vowels	Changing vowels	Disadvantages of unifying vowels: no disadvantages								1	1
Technical areas of development	Vowels	Changing vowels	Advantages and disadvantages of unifying the vowels: affects the sound			1						1
Technical areas of development	Vowels	Changing vowels	Advantages of unifying vowels: "sounds a lot better if everyone's singing the same thing"		2			1	2			5
Technical areas of development	Vowels	Changing vowels	Advantages of unifying vowels: blended singing				1	1	1			4
Technical areas of development	Vowels	Changing vowels	Advantages of unifying vowels: diction is clearer						1	1		2
Technical areas of development	Vowels	Changing vowels	Advantages of unifying vowels: purer and more together								1	1
Technical areas of development	Vowels	Changing vowels	Current approach to unifying vowels: current choir is inexperienced				1					1
Technical areas of development	Vowels	Changing vowels	Disadvantages of unifying vowels: difficult to give comprehensive guidance		1							1
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: improve general technique				1					1
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: practise speaking the words						2			2
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: provide IPA "cheat sheet"		1							1
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: provide reference words for vowels				1					1
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: show the difference it can make					1				1
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: sing together more							1		1

Appendix 7: Themes, sub-themes, categories and codes

Theme	Sub-theme	Category	Code Name	S1	S2	S3	S4	S5	S6	S7	S8	Total occurrences
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: training					2			1	3
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: under direction		1			1		2	1	5
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: use repetition							1		1
Technical areas of development	Vowels	Changing vowels	Improving the unification of vowels: use tongue twisters (slow version)						2			2
Technical areas of development	Vowels	Changing vowels	Vowel modification: "channelling Julie Andrews"						1			1
Technical areas of development	Vowels	Changing vowels	Vowel modification: doesn't appear to consciously modify vowels						1		1	2
Technical areas of development	Vowels	Changing vowels	Vowel modification: improve vowel by breathing			1		1				2
Technical areas of development	Vowels	Changing vowels	Vowel modification: improve vowels through alignment changes					1				1
Technical areas of development	Vowels	Changing vowels	Vowel modification: less aware of approach to low notes				2					2
Technical areas of development	Vowels	Changing vowels	Vowel modification: "literally all the time"				1					1
Technical areas of development	Vowels	Changing vowels	Vowel modification: "one of the ways of making it sound the best ... is by experimenting with changing vowel"				2					2
Technical areas of development	Vowels	Changing vowels	Vowel modification: /a/ works well in higher range				1					1
Technical areas of development	Vowels	Changing vowels	Vowel modification: helps with register changes				1					1
Technical areas of development	Vowels	Changing vowels	Vowel modification: listener still comprehends word					1				1
Technical areas of development	Vowels	Changing vowels	Vowel modification: use in higher range				2	1				3
Technical areas of development	Vowels	Changing vowels	Vowel sounds: No apparent knowledge of vowel sounds	1								1
Technical areas of development	Vowels	Changing vowels	Vowel sounds: written vowels are a "generalisation"		1							1

Appendix 8: Audit trail

Category	Code Name	S1	S2	S3	S4	S5	S6	S7	S8	Total occurrences
Cognitive process	Mental health: "anxiety-inducing"		1							1
Cognitive process	Mental health: "It puts me on tenterhooks"		1							1
Cognitive process	Mental health: affects breathing							1		1
Cognitive process	Mental health: confidence varies		1		1					2
Cognitive process	Mental health: low self-esteem			2						2
Cognitive process	Mental health: nerves					1			1	2
Cognitive process	Musical development: "segment my mind into doing different things"		1							1
Cognitive process	Musical development: interested in pattern matching		1							1
Cognitive process	Neurodiversity: "a little bit neurodiverse, but I've never been diagnosed"								1	1
Cognitive process	Neurodiversity: being assessed for ADHD					1				1
Cognitive process	Neurodiversity: being assessed for ASD		1							1
Cognitive process	Neurodiversity: neurotypical		1		1		1			3
Cognitive process	Neurodiversity: undiagnosed ADHD			1						1
Feedback on testing	Reflecting on testing: "challenging"								1	1
Feedback on testing	Reflecting on testing: "fairly straightforward"							1		1
Feedback on testing	Reflecting on testing: "interesting"		1			1			1	3
Feedback on testing	Reflecting on testing: "really concentrating"				1			1		2
Feedback on testing	Reflecting on testing: "remembering what you had to do" was hard								1	1
Feedback on testing	Reflecting on testing: "slightly easier the second time around because I knew what I was expecting"						1			1
Feedback on testing	Reflecting on testing: "take for granted"		1							1
Feedback on testing	Reflecting on testing: better when not trying to match pitch of demo						1			1
Feedback on testing	Reflecting on testing: level of difficulty varied		1	1						2
Feedback on testing	Reflecting on testing: pre-imagining made it easier						1			1
Feedback on testing	Reflecting on testing: recreating vowel sounds was sometimes difficult					1			1	2
Feedback on testing	Reflecting on testing: some vowels were easier at different pitches			1						1
Hormonal	Hormonal: menopausal						1			1
Hormonal	Hormonal: not aware of hormonal influences on voice		1	1	1			1	1	5
Hormonal	Hormonal: post-pregnancy					2				2
Hormonal	Hormonal: postmenopausal		1							1
Hormonal	Hormonal: pregnancy					1				1
Instrumental experience	Instrument experience: piano teaching							1	1	2
Instrumental experience	Instrumental experience: guitar - advanced level			2						2
Instrumental experience	Instrumental experience: piano - advanced level			2				1	1	4
Instrumental experience	Instrumental experience: piano - beginner level		1				1			2
Instrumental experience	Instrumental experience: piano - level unknown			2						2
Instrumental experience	Instrumental experience: strings - intermediate level							1		1
Instrumental experience	Instrumental experience: woodwind - advanced level								1	1
Instrumental experience	Instrumental experience: woodwind - beginner level		1							1
Instrumental experience	Instrumental experience: woodwind - intermediate level			2				1		3
Instrumental experience (group setting)	Instrumental experience: church band		1							1
Instrumental experience (group setting)	Instrumental experience: woodwind ensemble		1					1		2
Instrumental experience (group setting)	Instrumental experience: youth orchestra		1							1
Learning challenge	Aural experience "struggle to do those kinds of things right now"		1							1
Learning challenge	Aural experience: "I can't really remember"		1						1	2
Learning challenge	Aural experience: "I don't think I did find it difficult. I think possibly some of the intervals ... I still find them difficult"								1	1
Learning challenge	Aural experience: "I'm not very good at that"			1		1				2
Learning challenge	Aural experience: no formal training				1		1			2
Learning challenge	Aural experience: possibility that lack of instrumental experience impacts aural skills				1					1
Learning challenge	Causes of poor tuning: "sharpness is an accident"					1				1
Learning challenge	Causes of poor tuning: breathing issues					2				2
Learning challenge	Causes of poor tuning: nerves				1					1
Learning challenge	Causes of poor tuning: Other choir members can influence my tuning			1			1			2
Learning challenge	Causes of poor tuning: Other choir members won't influence my tuning					1				1
Learning challenge	Causes of poor tuning: register issues					2				2
Learning challenge	How to sing in tune: might not detect slightly flat or sharp				1					1
Learning challenge	Musical development: has tendency to drift between choral parts			1						1
Learning challenge	Musical development: reluctance to sing		2							2
Cognitive process	Musical development: struggles to focus		1			1				2
Learning challenge	Musical development: took a long time to learn music			1						1
Learning strategy	Aural experience: "learn things a lot by ear"				1					1
Learning strategy	Aural experience: audiation			1						1
Learning strategy	Aural experience: consistent training		1					1		2
Learning strategy	Aural experience: use of tonic solfa			2						2
Learning strategy	Aural experience: practised intervals			1						1
Learning strategy	Aural experience: received training		1	1				1		3

Appendix 8: Audit trail

Learning strategy	Aural experience: recently have been teaching it								1	1
Learning strategy	Current approach to unifying vowels: may be influenced by singers "doing a good job"							1		1
Learning strategy	How to sing in tune: audiation							1	1	2
Learning strategy	How to sing in tune: begins with "reading the music"			1					1	2
Learning strategy	How to sing in tune: can hear when it is in tune/out of tune	1		1	1	1	2	2		8
Learning strategy	How to sing in tune: change the arrangement					2				2
Learning strategy	How to sing in tune: focus			1				1		2
Learning strategy	How to sing in tune: learning by repetition	1			2					3
Learning strategy	How to sing in tune: listening to others	2	1	2	1					6
Learning strategy	How to sing in tune: memory					1		1		2
Learning strategy	How to sing in tune: practise with piano			1						1
Learning strategy	How to sing in tune: question		1							1
Learning strategy	How to sing in tune: start on the right note						1	1		2
Learning strategy	How to sing in tune: use of accompaniments				1			1	2	4
Learning strategy	How to sing in tune: use the harmony							2		2
Learning strategy	How to sing in tune: warm up		1							1
Learning strategy	Improving the unification of vowels: a more experienced choir "would all be trying to ... make one sound"				1					1
Learning strategy	Improving the unification of vowels: a more experienced choir would "figure out what the best way to sing something would be"				1					1
Learning strategy	Improving tuning: "I'd try and hear it"			1				1		2
Learning strategy	Improving tuning: audiation			2						2
Learning strategy	Improving tuning: flat - aim above the note	1			1		1	1		4
Learning strategy	Improving tuning: flat - brighten the vowel				1					1
Learning strategy	Improving tuning: listen to rehearsal track						2			2
Learning strategy	Improving tuning: move slightly up or down		1					1		2
Learning strategy	Improving tuning: question		1							1
Learning strategy	Improving tuning: relating the voice to instrumental tuning			1				1	1	3
Learning strategy	Improving tuning: release nerves				1					1
Learning strategy	Improving tuning: sharp - "soften a little bit"							1		1
Learning strategy	Improving tuning: training	1				2				3
Learning strategy	Improving tuning: under direction	1								1
Learning strategy	Improving tuning: use of breath	1								1
Learning strategy	Musical development: "found it easier to learn by doing"					1				1
Learning strategy	Musical development: "some innate talent somewhere"				1					1
Learning strategy	Musical development: good memory					2				2
Learning strategy	Musical development: it has possibly influenced musical skills positively							1		1
Learning strategy	Musical development: opportunity to learn variety of instruments		1							1
Learning strategy	Musical development: uses colour to help learn music			1						1
Learning strategy	Vowel sounds: requires guidance		1			1				2
Learning success	Aural experience: "I found it okay"							1		1
Learning success	Aural experience: "Now, I can do it fairly easily"			1						1
Learning success	Aural experience: found ear tests easy		1							1
Learning success	Causes of poor tuning: "I don't find it hard ... whether ... a cappella or ... with a track"					1				1
Learning success	Improving tuning: awareness of tuning has improved over time					1				1
Music theory and reading	Other music experience: does not read music					1				1
Music theory and reading	Other music experience: grade 3/4 music theory		1							1
Music theory and reading	Other music experience: grade 6 music theory							1		1
Music theory and reading	Other music experience: GCSE/AS/A-Level Music							1		1
Music theory and reading	Other music experience: has other attributes that compensate for not reading music					2				2
Music theory and reading	Other music experience: music degree			1						1
Music theory and reading	Other music experience: reads music			1						1
No instrumental experience	Instrumental experience: no experience				1	1				2
Other music experience	Aural experience: as part of exams		1	1				1	1	4
Other music experience	Aural experience: does not have perfect pitch					1				1
Other music experience	Aural experience: grade 6 aural								1	1
Other music experience	Aural experience: grade 8 aural		1	1				1		3
Other music experience	Aural experience: has perfect pitch					1				1
Other music experience	Aural experience: no aural training on music degree			1						1
Other music experience	Aural experience: relative pitch			2						2
Other music experience	Musical development: "immersed" in music		1							1
Other music experience	Musical development: I've just always tried to carry on making a little bit of music		1							1
Other music experience	Other music experience: learned tonic solfa			1						1
Other music experience	Other music experience: musical family		1			2		1		4
Other music experience	Singing experience: received breath training			1						1
Other music experience	Singing experience: sang in multiple languages as a child			1						1
Physical health	Physical health: "find it hard to breathe" when singing					2				2
Physical health	Physical health: "my voice is lower"					1	1			2

Appendix 8: Audit trail

Physical health	Physical health: age					1	1			2
Physical health	Physical health: back issues			1		1				2
Physical health	Physical health: catarrh				1					1
Physical health	Physical health: gained weight					1				1
Physical health	Physical health: nasal polyps				1					1
Physical health	Physical health: no health concerns	1						1		2
Physical health	Physical health: singing most days				1					1
Physical health	Physical health: vocal hygiene regime approaching performances				1					1
Singing experience	Singing experience: gigging in pubs				1					1
Singing experience	Singing experience: no formal singing training	1	1	1	1		1	1	1	7
Singing experience	Singing experience: singing lessons					1				1
Singing experience (group setting)	Singing experience: band		1			1				2
Singing experience (group setting)	Singing experience: children's choir								1	1
Singing experience (group setting)	Singing experience: church choir			1			1			2
Singing experience (group setting)	Singing experience: college choir			1						1
Singing experience (group setting)	Singing experience: group singing		1							1
Singing experience (group setting)	Singing experience: group training, but not one-to-one							1		1
Singing experience (group setting)	Singing experience: musical theatre company				1					1
Singing experience (group setting)	Singing experience: quartet		1					1		2
Singing experience (group setting)	Singing experience: ran children's choir								1	1
Singing experience (group setting)	Singing experience: school choir	1	1	1	1	1	1	1	1	8
Singing experience (group setting)	Singing experience: sung in choirs as an adult	1			2	1	1		1	6
Compliant but/or lacks proactivity	Musical development: "it's not really something that I take too much notice of"	2								2
Compliant but/or lacks proactivity	Vowel modification: "I just sing it as it comes out my mouth"							1		1
Desire to improve	Current approach to unifying vowels: "listen very carefully to try and pick up the same sort of sounds"			1						1
Desire to improve	Current approach to unifying vowels: "try to blend"			1						1
Desire to improve	Current approach to unifying vowels: notice mouth shapes of others						1			1
Desire to improve	Improving the unification of vowels: writes required sound above word					1				1
Desire to improve	Improving tuning: "go over it, over and over again"	1								1
Desire to improve	Musical development: "a bit bored or ... wanting to ... stretch my brain"							1		1
Desire to improve	Musical development: "how far I could go"		1							1
Desire to improve	Musical development: "I am going to start singing lessons"				1					1
Desire to improve	Musical development: "I don't think we can ever stop"				2					2
Desire to improve	Musical development: "I will do that. I'll try that."							1		1
Desire to improve	Musical development: "intentional"				1			1		2
Desire to improve	Musical development: "self-educating"				2					2
Desire to improve	Musical development: enjoyed learning	1								1
Desire to improve	Musical development: seeks help when she needs it			2		2		1		1
Desire to improve	Musical development: trying to improve	1					1			2
Desire to improve	Other tuning codes: never experienced tuning up in a choir	1								1
Learning strategy	Vowel modification: under direction	1						1		2
Intonation: Knowledge and areas for improvement	Definition of in tune: "in harmony to the other parts"					1	1	1	1	3
Intonation: Knowledge and areas for improvement	Definition of in tune: "singing on pitch"				1					1
Intonation: Knowledge and areas for improvement	Definition of in tune: "smooth and enjoyable"					1				1
Intonation: Knowledge and areas for improvement	Definition of in tune: "That's the standard"							1		1
Intonation: Knowledge and areas for improvement	Definition of in tune: "The right tune"					1				1
Intonation: Knowledge and areas for improvement	Definition of in tune: flat - "a bit dead"			1						1
Intonation: Knowledge and areas for improvement	Definition of in tune: in tune with accompaniment/tuning fork		2							2
Intonation: Knowledge and areas for improvement	Definition of in tune: natural to "lean" flat or sharp		1							1
Intonation: Knowledge and areas for improvement	Definition of in tune: sharp - "slightly pitchy"			1						1
Intonation: Knowledge and areas for improvement	Definition of in tune: singing is closer to tuning of guitar/violin than piano				1			1		2
Intonation: Knowledge and areas for improvement	Definition of in tune: singing the same as each other	1	1					1		3
Intonation: Knowledge and areas for improvement	Definition of in tune: tuning is "more disciplined when you're within the choir"	1								1
Intonation: Knowledge and areas for improvement	Definition of out of tune: "a little smidge out"				1			2		3
Intonation: Knowledge and areas for improvement	Definition of out of tune: "discordant or dissonant"			1						1
Intonation: Knowledge and areas for improvement	Definition of out of tune: "not good"						1	1		2
Intonation: Knowledge and areas for improvement	Definition of out of tune: "vibrato helps to ... mask" poor tuning							1		1
Intonation: Knowledge and areas for improvement	Definition of out of tune: "We weren't singing what was written"			1						1
Intonation: Knowledge and areas for improvement	Definition of out of tune: "wrong pitch"					1				1
Intonation: Knowledge and areas for improvement	Definition of out of tune: impact of vibrato on tuning in choral singing				1					1
Intonation: Knowledge and areas for improvement	Definition of out of tune: unintentional key changes							1		1
Intonation: Knowledge and areas for improvement	Definition of out of tune: wrong note does not equal out of tune					1	1			2
Intonation: Knowledge and areas for improvement	How to sing in tune: harder to be in tune on a harmony line				1					1
Intonation: Knowledge and areas for improvement	Other tuning codes: "I'm always in tune"					2				2
Intonation: Knowledge and areas for improvement	Other tuning codes: not reliably in tune anymore					1				1
Vowels: Knowledge and areas for improvement	Advantages and disadvantages of unifying the vowels: affects the sound	1								1

Appendix 8: Audit trail

Vowels: Knowledge and areas for improvement	Advantages and disadvantages of unifying vowels: "it might be harder for people, but ... it's a positive for the choir"								1	1
Vowels: Knowledge and areas for improvement	Advantages of unifying vowels: "sounds a lot better if everyone's singing the same thing"	2				1	2			5
Vowels: Knowledge and areas for improvement	Advantages of unifying vowels: blended singing			1	1	1				4
Vowels: Knowledge and areas for improvement	Advantages of unifying vowels: diction is clearer						1	1		2
Vowels: Knowledge and areas for improvement	Advantages of unifying vowels: purer and more together								1	1
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "concentrate on what I'm doing" rather than others					1			1	2
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "don't notice how they sing the vowels particularly"		1	1						2
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "I'm not going to change" approach to match others at this point				1					1
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "it's not something that I think of that much"							1		1
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "more in tune with hitting the right note rather than how the vowels sound"	1							1	2
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: choral singers should approach vowels in the same way				1					1
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: current choir is inexperienced				1					1
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: higher voices approach vowels differently to lower voices		1				2			3
Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: it is important that the sounds match not the approach					1				1
Vowels: Knowledge and areas for improvement	Definition of vowel: "how now brown cow"							1		1
Vowels: Knowledge and areas for improvement	Definition of vowel: "Julie Andrews"						1	1		2
Vowels: Knowledge and areas for improvement	Definition of vowel: "key part of singing"				1					1
Vowels: Knowledge and areas for improvement	Definition of vowel: "open your mouth"		1			1				2
Vowels: Knowledge and areas for improvement	Definition of vowel: "shapes on the inside of your mouth"		1							1
Vowels: Knowledge and areas for improvement	Definition of vowel: "there's no start and end to it"		1							1
Vowels: Knowledge and areas for improvement	Definition of vowel: "vowels can change the sound completely"					1				1
Vowels: Knowledge and areas for improvement	Definition of vowel: "you breathe out the air"		1							1
Vowels: Knowledge and areas for improvement	Definition of vowel: a, e, i, o, u (w, y)		1	1		1		1	1	5
Vowels: Knowledge and areas for improvement	Definition of vowel: awareness of role of vowels in higher range				1	1				2
Vowels: Knowledge and areas for improvement	Definition of vowel: misunderstanding of diphthong			1						1
Vowels: Knowledge and areas for improvement	Definition of vowel: use of tongue		1							1
Vowels: Knowledge and areas for improvement	Disadvantages of unifying vowels: compromises individual sound				1					1
Vowels: Knowledge and areas for improvement	Disadvantages of unifying vowels: difficult to give comprehensive guidance		1							1
Vowels: Knowledge and areas for improvement	Disadvantages of unifying vowels: might be wrong as the section hears a different sound to the sound at the front			1						1
Vowels: Knowledge and areas for improvement	Disadvantages of unifying vowels: no disadvantages								1	1
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: improve general technique				1					1
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: practise speaking the words						2			2
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: provide IPA "cheat sheet"		1							1
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: provide reference words for vowels			1						1
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: show the difference it can make				1					1
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: sing together more							1		1
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: training					2			1	3
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: under direction		1			1		2	1	5
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: use repetition							1		1
Vowels: Knowledge and areas for improvement	Improving the unification of vowels: use tongue twisters (slow version)						2			2
Vowels: Knowledge and areas for improvement	IPA: limited understanding					1	1		1	3
Vowels: Knowledge and areas for improvement	IPA: no knowledge		1		1	1			1	4
Vowels: Knowledge and areas for improvement	IPA: some knowledge			1						1
Vowels: Knowledge and areas for improvement	IPA: understanding of phonics							1	1	2
Vowels: Knowledge and areas for improvement	Physical changes: "overexaggerating"		1							1
Vowels: Knowledge and areas for improvement	Physical changes: chin position				2					2
Vowels: Knowledge and areas for improvement	Physical changes: face		1					1		2
Vowels: Knowledge and areas for improvement	Physical changes: intentional physical change to change vowel					1				1
Vowels: Knowledge and areas for improvement	Physical changes: palette moves as vowel changes from /a:/ to /i:/						1			1
Vowels: Knowledge and areas for improvement	Physical changes: shape of lips							1		1
Vowels: Knowledge and areas for improvement	Physical changes: shape of mouth		1			1		2	1	6
Vowels: Knowledge and areas for improvement	Physical changes: smiling					1				1
Vowels: Knowledge and areas for improvement	Physical changes: the breath as it goes over the physical changes			1						1
Vowels: Knowledge and areas for improvement	Physical changes: tongue position			1				1	1	3
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: "sing it in a more posh way"								1	1
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: avoidance of Essex accent when singing		1					2		3
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: loss of clear diction in opera						1			1
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: more conscious of pronunciation when singing							1		1
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: spoken is more precise than sung (informed by circumstance)			1						1
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: style of song can determine pronunciation choices								1	1
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: sung vowels are more open						1			1
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: sung vowels are sustained		1						1	2
Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: sung vowels can be different to spoken vowels							1		1
Vowels: Knowledge and areas for improvement	Vowel modification: "channelling Julie Andrews"							1		1
Vowels: Knowledge and areas for improvement	Vowel modification: "literally all the time"						1			1
Vowels: Knowledge and areas for improvement	Vowel modification: "one of the ways of making it sound the best ... is by experimenting with changing vowel"					2				2

Appendix 8: Audit trail

Vowels: Knowledge and areas for improvement	Vowel modification: /a:/ works well in higher range				1					1
Vowels: Knowledge and areas for improvement	Vowel modification: doesn't appear to consciously modify vowels						1		1	2
Vowels: Knowledge and areas for improvement	Vowel modification: helps with register changes				1					1
Vowels: Knowledge and areas for improvement	Vowel modification: improve vowel by breathing			1		1				2
Vowels: Knowledge and areas for improvement	Vowel modification: improve vowels through alignment changes					1				1
Vowels: Knowledge and areas for improvement	Vowel modification: less aware of approach to low notes				2					2
Vowels: Knowledge and areas for improvement	Vowel modification: listener still comprehends word				1					1
Vowels: Knowledge and areas for improvement	Vowel modification: use in higher range				2	1				3
Vowels: Knowledge and areas for improvement	Vowel sounds: alphabets are a way of "reducing down something that's really, really complex"		1							1
Vowels: Knowledge and areas for improvement	Vowel sounds: any sound that's not a hard consonant				1					1
Vowels: Knowledge and areas for improvement	Vowel sounds: five written vowels but more sounds			1	2	1		1	1	6
Vowels: Knowledge and areas for improvement	Vowel sounds: infinite number of vowel sounds theoretically		1							1
Vowels: Knowledge and areas for improvement	Vowel sounds: No apparent knowledge of vowel sounds	1								1
Vowels: Knowledge and areas for improvement	Vowel sounds: singers can interpret vowels in different ways		1		1					2
Vowels: Knowledge and areas for improvement	Vowel sounds: written vowels are a "generalisation"		1							1

Appendix 8: Audit trail

Theme	Category	Code Name	S1	S2	S3	S4	S5	S6	S7	S8	Total occurrences
Cognitive processes	Cognitive process	Mental health: "anxiety-inducing"		1							1
Cognitive processes	Cognitive process	Mental health: "It puts me on tenterhooks"		1							1
Cognitive processes	Cognitive process	Mental health: affects breathing							1		1
Cognitive processes	Cognitive process	Mental health: confidence varies		1	1						2
Cognitive processes	Cognitive process	Mental health: low self-esteem			2						2
Cognitive processes	Cognitive process	Mental health: nerves				1			1		2
Cognitive processes	Cognitive process	Musical development: "segment my mind into doing different things"		1							1
Cognitive processes	Cognitive process	Musical development: interested in pattern matching		1							1
Cognitive processes	Cognitive process	Neurodiversity: "a little bit neurodiverse, but I've never been diagnosed"							1		1
Cognitive processes	Cognitive process	Neurodiversity: being assessed for ADHD					1				1
Cognitive processes	Cognitive process	Neurodiversity: being assessed for ASD		1							1
Cognitive processes	Cognitive process	Neurodiversity: neurotypical		1		1		1			3
Cognitive processes	Cognitive process	Neurodiversity: undiagnosed ADHD			1						1
Contexts of learning	Feedback on testing	Reflecting on testing: "challenging"								1	1
Contexts of learning	Feedback on testing	Reflecting on testing: "fairly straightforward"							1		1
Contexts of learning	Feedback on testing	Reflecting on testing: "interesting"		1			1			1	3
Contexts of learning	Feedback on testing	Reflecting on testing: "really concentrating"				1			1		2
Contexts of learning	Feedback on testing	Reflecting on testing: "remembering what you had to do" was hard								1	1
Contexts of learning	Feedback on testing	Reflecting on testing: "slightly easier the second time around because I knew what I was expecting"						1			1
Contexts of learning	Feedback on testing	Reflecting on testing: "take for granted"		1							1
Contexts of learning	Feedback on testing	Reflecting on testing: better when not trying to match pitch of demo						1			1
Contexts of learning	Feedback on testing	Reflecting on testing: level of difficulty varied		1	1						2
Contexts of learning	Feedback on testing	Reflecting on testing: pre-imagining made it easier						1			1
Contexts of learning	Feedback on testing	Reflecting on testing: recreating vowel sounds was sometimes difficult					1			1	2
Contexts of learning	Feedback on testing	Reflecting on testing: some vowels were easier at different pitches			1						1
Contexts of learning	Hormonal	Hormonal: menopausal						1			1
Contexts of learning	Hormonal	Hormonal: not aware of hormonal influences on voice		1	1	1			1	1	5
Contexts of learning	Hormonal	Hormonal: post-pregnancy					2				2
Contexts of learning	Hormonal	Hormonal: postmenopausal		1							1
Contexts of learning	Hormonal	Hormonal: pregnancy					1				1
Contexts of learning	Instrumental experience	Instrument experience: piano teaching							1	1	2
Contexts of learning	Instrumental experience	Instrumental experience: guitar - advanced level			2						2
Contexts of learning	Instrumental experience	Instrumental experience: piano - advanced level			2				1	1	4
Contexts of learning	Instrumental experience	Instrumental experience: piano - beginner level		1				1			2
Contexts of learning	Instrumental experience	Instrumental experience: piano - level unknown			2						2
Contexts of learning	Instrumental experience	Instrumental experience: strings - intermediate level							1		1
Contexts of learning	Instrumental experience	Instrumental experience: woodwind - advanced level								1	1
Contexts of learning	Instrumental experience	Instrumental experience: woodwind - beginner level		1							1
Contexts of learning	Instrumental experience	Instrumental experience: woodwind - intermediate level			2				1		3
Contexts of learning	Instrumental experience (group setting)	Instrumental experience: church band		1							1
Contexts of learning	Instrumental experience (group setting)	Instrumental experience: woodwind ensemble		1					1		2
Contexts of learning	Instrumental experience (group setting)	Instrumental experience: youth orchestra		1							1
Contexts of learning	Learning challenge	Aural experience: "struggle to do those kinds of things right now"		1							1
Contexts of learning	Learning challenge	Aural experience: "I can't really remember"		1						1	2
Contexts of learning	Learning challenge	Aural experience: "I don't think I did find it difficult. I think possibly some of the intervals ... I still find them difficult"								1	1
Contexts of learning	Learning challenge	Aural experience: "I'm not very good at that"			1		1				2
Contexts of learning	Learning challenge	Aural experience: no formal training				1		1			2
Contexts of learning	Learning challenge	Aural experience: possibility that lack of instrumental experience impacts aural skills				1					1
Contexts of learning	Learning challenge	Causes of poor tuning: "sharpness is an accident"				1					1
Contexts of learning	Learning challenge	Causes of poor tuning: breathing issues					2				2
Contexts of learning	Learning challenge	Causes of poor tuning: nerves				1					1
Contexts of learning	Learning challenge	Causes of poor tuning: Other choir members can influence my tuning			1			1			2
Contexts of learning	Learning challenge	Causes of poor tuning: Other choir members won't influence my tuning					1				1
Contexts of learning	Learning challenge	Causes of poor tuning: register issues					2				2
Contexts of learning	Learning challenge	How to sing in tune: might not detect slightly flat or sharp				1					1
Contexts of learning	Learning challenge	Musical development: has tendency to drift between choral parts			1						1
Contexts of learning	Learning challenge	Musical development: reluctance to sing		2							2
Learning experience	Cognitive process	Musical development: struggles to focus		1			1				2
Contexts of learning	Learning challenge	Musical development: took a long time to learn music			1						1
Contexts of learning	Learning strategy	Aural experience: "learn things a lot by ear"				1					1
Contexts of learning	Learning strategy	Aural experience: audiation			1						1
Contexts of learning	Learning strategy	Aural experience: consistent training		1					1		2
Contexts of learning	Learning strategy	Aural experience: use of tonic solfa			2						2
Contexts of learning	Learning strategy	Aural experience: practised intervals			1						1
Contexts of learning	Learning strategy	Aural experience: received training		1	1				1		3

Appendix 8: Audit trail

Contexts of learning	Learning strategy	Aural experience: recently have been teaching it								1	1
Contexts of learning	Learning strategy	Current approach to unifying vowels: may be influenced by singers "doing a good job"							1		1
Contexts of learning	Learning strategy	How to sing in tune: audiation							1	1	2
Contexts of learning	Learning strategy	How to sing in tune: begins with "reading the music"			1					1	2
Contexts of learning	Learning strategy	How to sing in tune: can hear when it is in tune/out of tune	1		1	1	1	2	2		8
Contexts of learning	Learning strategy	How to sing in tune: change the arrangement					2				2
Contexts of learning	Learning strategy	How to sing in tune: focus			1				1		2
Contexts of learning	Learning strategy	How to sing in tune: learning by repetition	1			2					3
Contexts of learning	Learning strategy	How to sing in tune: listening to others	2	1	2	1					6
Contexts of learning	Learning strategy	How to sing in tune: memory					1		1		2
Contexts of learning	Learning strategy	How to sing in tune: practise with piano			1						1
Contexts of learning	Learning strategy	How to sing in tune: question		1							1
Contexts of learning	Learning strategy	How to sing in tune: start on the right note						1	1		2
Contexts of learning	Learning strategy	How to sing in tune: use of accompaniments				1			1	2	4
Contexts of learning	Learning strategy	How to sing in tune: use the harmony						2			2
Contexts of learning	Learning strategy	How to sing in tune: warm up		1							1
Contexts of learning	Learning strategy	Improving the unification of vowels: a more experienced choir "would all be trying to ... make one sound"				1					1
Contexts of learning	Learning strategy	Improving the unification of vowels: a more experienced choir would "figure out what the best way to sing something would be"				1					1
Contexts of learning	Learning strategy	Improving tuning: "I'd try and hear it"			1				1		2
Contexts of learning	Learning strategy	Improving tuning: audiation			2						2
Contexts of learning	Learning strategy	Improving tuning: flat - aim above the note	1			1		1	1		4
Contexts of learning	Learning strategy	Improving tuning: flat - brighten the vowel				1					1
Contexts of learning	Learning strategy	Improving tuning: listen to rehearsal track						2			2
Contexts of learning	Learning strategy	Improving tuning: move slightly up or down		1					1		2
Contexts of learning	Learning strategy	Improving tuning: question		1							1
Contexts of learning	Learning strategy	Improving tuning: relating the voice to instrumental tuning			1				1	1	3
Contexts of learning	Learning strategy	Improving tuning: release nerves				1					1
Contexts of learning	Learning strategy	Improving tuning: sharp - "soften a little bit"							1		1
Contexts of learning	Learning strategy	Improving tuning: training	1					2			3
Contexts of learning	Learning strategy	Improving tuning: under direction	1								1
Contexts of learning	Learning strategy	Improving tuning: use of breath	1								1
Contexts of learning	Learning strategy	Musical development: "found it easier to learn by doing"				1					1
Contexts of learning	Learning strategy	Musical development: "some innate talent somewhere"				1					1
Contexts of learning	Learning strategy	Musical development: good memory					2				2
Contexts of learning	Learning strategy	Musical development: it has possibly influenced musical skills positively							1		1
Contexts of learning	Learning strategy	Musical development: opportunity to learn variety of instruments	1								1
Contexts of learning	Learning strategy	Musical development: uses colour to help learn music			1						1
Contexts of learning	Learning strategy	Vowel sounds: requires guidance		1			1				2
Contexts of learning	Learning success	Aural experience: "I found it okay"							1		1
Contexts of learning	Learning success	Aural experience: "Now, I can do it fairly easily"			1						1
Contexts of learning	Learning success	Aural experience: found ear tests easy		1							1
Contexts of learning	Learning success	Causes of poor tuning: "I don't find it hard ... whether ... a cappella or ... with a track"					1				1
Contexts of learning	Learning success	Improving tuning: awareness of tuning has improved over time				1					1
Contexts of learning	Music theory and reading	Other music experience: does not read music					1				1
Contexts of learning	Music theory and reading	Other music experience: grade 3/4 music theory	1								1
Contexts of learning	Music theory and reading	Other music experience: grade 6 music theory							1		1
Contexts of learning	Music theory and reading	Other music experience: GCSE/AS/A-Level Music							1		1
Contexts of learning	Music theory and reading	Other music experience: has other attributes that compensate for not reading music					2				2
Contexts of learning	Music theory and reading	Other music experience: music degree			1						1
Contexts of learning	Music theory and reading	Other music experience: reads music			1						1
Contexts of learning	No instrumental experience	Instrumental experience: no experience				1	1				2
Contexts of learning	Other music experience	Aural experience: as part of exams	1		1				1	1	4
Contexts of learning	Other music experience	Aural experience: does not have perfect pitch					1				1
Contexts of learning	Other music experience	Aural experience: grade 6 aural							1		1
Contexts of learning	Other music experience	Aural experience: grade 8 aural	1	1					1		3
Contexts of learning	Other music experience	Aural experience: has perfect pitch					1				1
Contexts of learning	Other music experience	Aural experience: no aural training on music degree			1						1
Contexts of learning	Other music experience	Aural experience: relative pitch			2						2
Contexts of learning	Other music experience	Musical development: "immersed" in music		1							1
Contexts of learning	Other music experience	Musical development: I've just always tried to carry on making a little bit of music		1							1
Contexts of learning	Other music experience	Other music experience: learned tonic solfa			1						1
Contexts of learning	Other music experience	Other music experience: musical family		1			2		1		4
Contexts of learning	Other music experience	Singing experience: received breath training			1						1
Contexts of learning	Other music experience	Singing experience: sang in multiple languages as a child			1						1
Contexts of learning	Physical health	Physical health: "find it hard to breathe" when singing					2				2
Contexts of learning	Physical health	Physical health: "my voice is lower"					1	1			2

Appendix 8: Audit trail

Contexts of learning	Physical health	Physical health: age					1	1				2
Contexts of learning	Physical health	Physical health: back issues			1		1					2
Contexts of learning	Physical health	Physical health: catarrh				1						1
Contexts of learning	Physical health	Physical health: gained weight					1					1
Contexts of learning	Physical health	Physical health: nasal polyps				1						1
Contexts of learning	Physical health	Physical health: no health concerns	1						1			2
Contexts of learning	Physical health	Physical health: singing most days				1						1
Contexts of learning	Physical health	Physical health: vocal hygiene regime approaching performances				1						1
Contexts of learning	Singing experience	Singing experience: gigging in pubs				1						1
Contexts of learning	Singing experience	Singing experience: no formal singing training	1	1	1	1		1	1	1		7
Contexts of learning	Singing experience	Singing experience: singing lessons					1					1
Contexts of learning	Singing experience (group setting)	Singing experience: band		1			1					2
Contexts of learning	Singing experience (group setting)	Singing experience: children's choir								1		1
Contexts of learning	Singing experience (group setting)	Singing experience: church choir			1			1				2
Contexts of learning	Singing experience (group setting)	Singing experience: college choir			1							1
Contexts of learning	Singing experience (group setting)	Singing experience: group singing		1								1
Contexts of learning	Singing experience (group setting)	Singing experience: group training, but not one-to-one							1			1
Contexts of learning	Singing experience (group setting)	Singing experience: musical theatre company				1						1
Contexts of learning	Singing experience (group setting)	Singing experience: quartet		1				1				2
Contexts of learning	Singing experience (group setting)	Singing experience: ran children's choir								1		1
Contexts of learning	Singing experience (group setting)	Singing experience: school choir	1	1	1	1	1	1	1	1		8
Contexts of learning	Singing experience (group setting)	Singing experience: sung in choirs as an adult	1			2	1	1		1		6
Motivation for improvement	Compliant but/or lacks proactivity	Musical development: "it's not really something that I take too much notice of"	2				1					2
Motivation for improvement	Compliant but/or lacks proactivity	Vowel modification: "I just sing it as it comes out my mouth"							1			1
Motivation for improvement	Desire to improve	Current approach to unifying vowels: "listen very carefully to try and pick up the same sort of sounds"			1							1
Motivation for improvement	Desire to improve	Current approach to unifying vowels: "try to blend"			1							1
Motivation for improvement	Desire to improve	Current approach to unifying vowels: notice mouth shapes of others						1				1
Motivation for improvement	Desire to improve	Improving the unification of vowels: writes required sound above word					1					1
Motivation for improvement	Desire to improve	Improving tuning: "go over it, over and over again"	1									1
Motivation for improvement	Desire to improve	Musical development: "a bit bored or ... wanting to ... stretch my brain"							1			1
Motivation for improvement	Desire to improve	Musical development: "how far I could go"		1								1
Motivation for improvement	Desire to improve	Musical development: "I am going to start singing lessons"				1						1
Motivation for improvement	Desire to improve	Musical development: "I don't think we can ever stop"				2						2
Motivation for improvement	Desire to improve	Musical development: "I will do that. I'll try that."							1			1
Motivation for improvement	Desire to improve	Musical development: "intentional"				1			1			2
Motivation for improvement	Desire to improve	Musical development: "self-educating"				2						2
Motivation for improvement	Desire to improve	Musical development: enjoyed learning		1								1
Motivation for improvement	Desire to improve	Musical development: seeks help when she needs it			2		2		1			1
Motivation for improvement	Desire to improve	Musical development: trying to improve		1				1				2
Motivation for improvement	Desire to improve	Other tuning codes: never experienced tuning up in a choir		1								1
Motivation for improvement	Learning strategy	Vowel modification: under direction	1						1			2
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: "in harmony to the other parts"					1	1	1	1		3
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: "singing on pitch"				1						1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: "smooth and enjoyable"					1					1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: "That's the standard"							1			1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: "The right tune"						1				1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: flat - "a bit dead"			1							1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: in tune with accompaniment/tuning fork		2								2
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: natural to "lean" flat or sharp		1								1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: sharp - "slightly pitchy"			1							1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: singing is closer to tuning of guitar/violin than piano			1				1			2
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: singing the same as each other	1	1					1			3
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of in tune: tuning is "more disciplined when you're within the choir"	1									1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: "a little smidge out"				1			2			3
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: "discordant or dissonant"			1							1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: "not good"						1	1			2
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: "vibrato helps to ... mask" poor tuning							1			1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: "We weren't singing what was written"			1							1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: "wrong pitch"					1					1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: impact of vibrato on tuning in choral singing				1						1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: unintentional key changes							1			1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Definition of out of tune: wrong note does not equal out of tune					1	1				2
Perceptions of intonation	Intonation: Knowledge and areas for improvement	How to sing in tune: harder to be in tune on a harmony line				1						1
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Other tuning codes: "I'm always in tune"						2				2
Perceptions of intonation	Intonation: Knowledge and areas for improvement	Other tuning codes: not reliably in tune anymore						1				1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Advantages and disadvantages of unifying the vowels: affects the sound		1								1

Appendix 8: Audit trail

Perceptions of vowels	Vowels: Knowledge and areas for improvement	Advantages and disadvantages of unifying vowels: "it might be harder for people, but ... it's a positive for the choir"								1	1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Advantages of unifying vowels: "sounds a lot better if everyone's singing the same thing"	2				1	2			5
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Advantages of unifying vowels: blended singing			1	1	1				4
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Advantages of unifying vowels: diction is clearer						1	1		2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Advantages of unifying vowels: purer and more together								1	1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "concentrate on what I'm doing" rather than others					1			1	2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "don't notice how they sing the vowels particularly"		1	1						2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "I'm not going to change" approach to match others at this point				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "it's not something that I think of that much"							1		1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: "more in tune with hitting the right note rather than how the vowels sound"	1							1	2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: choral singers should approach vowels in the same way				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: current choir is inexperienced				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: higher voices approach vowels differently to lower voices		1				2			3
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Current approach to unifying vowels: it is important that the sounds match not the approach						1			1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: "how now brown cow"							1		1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: "Julie Andrews"						1	1		2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: "key part of singing"				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: "open your mouth"		1			1				2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: "shapes on the inside of your mouth"		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: "there's no start and end to it"		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: "vowels can change the sound completely"				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: "you breathe out the air"		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: a, e, i, o, u (w, y)		1	1		1		1	1	5
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: awareness of role of vowels in higher range				1	1				2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: misunderstanding of diphthong			1						1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Definition of vowel: use of tongue		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Disadvantages of unifying vowels: compromises individual sound				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Disadvantages of unifying vowels: difficult to give comprehensive guidance		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Disadvantages of unifying vowels: might be wrong as the section hears a different sound to the sound at the front			1						1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Disadvantages of unifying vowels: no disadvantages							1		1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: improve general technique				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: practise speaking the words						2			2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: provide IPA "cheat sheet"		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: provide reference words for vowels			1						1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: show the difference it can make				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: sing together more							1		1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: training					2			1	3
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: under direction		1			1		2	1	5
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: use repetition							1		1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Improving the unification of vowels: use tongue twisters (slow version)						2			2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	IPA: limited understanding						1	1		3
Perceptions of vowels	Vowels: Knowledge and areas for improvement	IPA: no knowledge	1		1	1				1	4
Perceptions of vowels	Vowels: Knowledge and areas for improvement	IPA: some knowledge		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	IPA: understanding of phonics							1	1	2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: "overexaggerating"		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: chin position			2						2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: face		1				1			2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: intentional physical change to change vowel				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: palette moves as vowel changes from /a:/ to /i:/					1				1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: shape of lips						1			1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: shape of mouth	1			1		2	1	1	6
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: smiling				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: the breath as it goes over the physical changes			1						1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Physical changes: tongue position			1			1		1	3
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: "sing it in a more posh way"								1	1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: avoidance of Essex accent when singing	1						2		3
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: loss of clear diction in opera					1				1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: more conscious of pronunciation when singing							1		1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: spoken is more precise than sung (informed by circumstance)		1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: style of song can determine pronunciation choices							1		1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: sung vowels are more open					1				1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: sung vowels are sustained		1						1	2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Sung vs spoken vowels: sung vowels can be different to spoken vowels						1			1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: "channelling Julie Andrews"						1			1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: "literally all the time"				1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: "one of the ways of making it sound the best ... is by experimenting with changing vowel"				2					2

Appendix 8: Audit trail

Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: /a:/ works well in higher range				1						1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: doesn't appear to consciously modify vowels						1			1	2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: helps with register changes				1						1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: improve vowel by breathing			1		1					2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: improve vowels through alignment changes					1					1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: less aware of approach to low notes				2						2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: listener still comprehends word				1						1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel modification: use in higher range				2	1					3
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel sounds: alphabets are a way of "reducing down something that's really, really complex"		1								1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel sounds: any sound that's not a hard consonant				1						1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel sounds: five written vowels but more sounds			1	2	1			1	1	6
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel sounds: infinite number of vowel sounds theoretically			1							1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel sounds: No apparent knowledge of vowel sounds		1								1
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel sounds: singers can interpret vowels in different ways			1		1					2
Perceptions of vowels	Vowels: Knowledge and areas for improvement	Vowel sounds: written vowels are a "generalisation"			1							1

Resources for developing the listening skills of amateur choral singers

For choral directors

Movable-do

Resources for teaching this approach to sight-singing

Sing on Sight by Audrey Snyder

Sight-singing method for choral singers that uses movable-do

Presented over two volumes with teacher and
student books and an accompanying CD

Sing on Sight: A Practical Choral Sight-Singing
Course – volumes 1 and 2

(Snyder, 2007, 2011)

Pitch

Introducing Re
Re is the pitch that is the upper next-door neighbor to do.
If do is designated as the pitch F, then re is the pitch G.



Practice with Re
Sight-sing the following exercises.



Introducing Mi
Mi is the pitch that is the upper next-door neighbor
to re. If do is designated as the pitch F, then mi is
the pitch A.



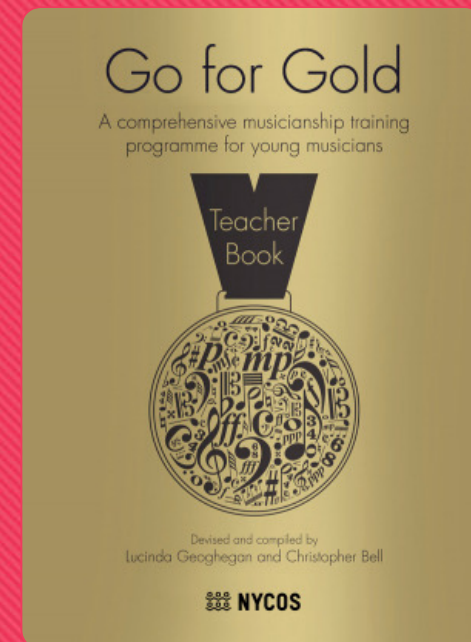
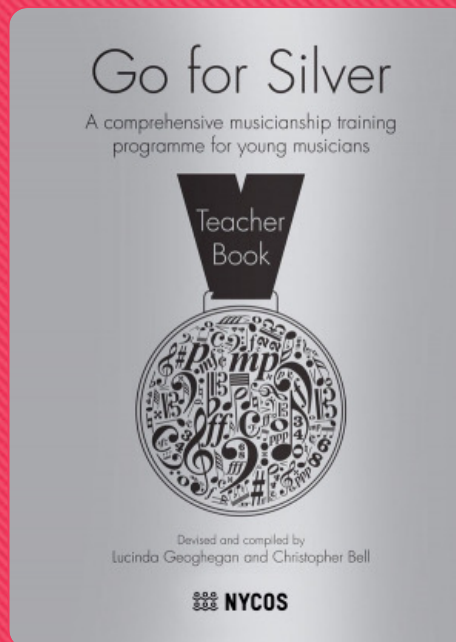
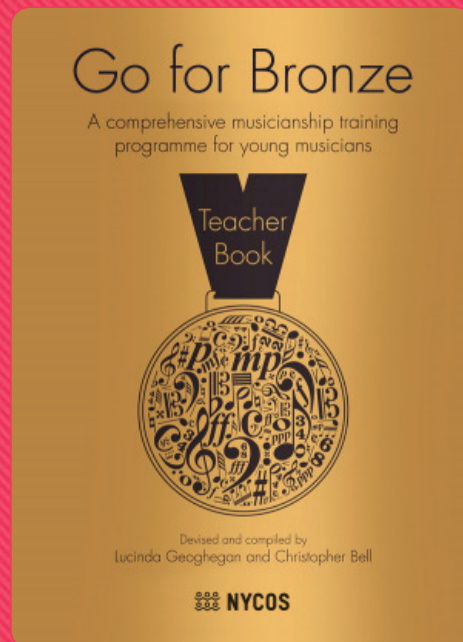
Practice with Mi
Sight-sing the following exercises.



Sing on Sight / Volume 1

● ● ○ ● ●

(Snyder, 2007, p. 8)



National Youth Choir of Scotland

NYCOS have produced a programme for training young musicians in addition to offering workshops for choral leaders.

<https://www.nycos.co.uk> (NYCOS, 2024)



Curwen Hand Signs



(Kodaly Music Education Institute of Australia, 2003)

Mental effects and manual signs of tones in keys

John Curwen's own title and descriptions of his hand signs

(Curwen, 1884, p. viii)



Ideas for teaching the hand signs

(Hale, 2023)



<https://youtu.be/nLtpE9mUn60?si=d7Rjgy7Qjz7x01ZE>

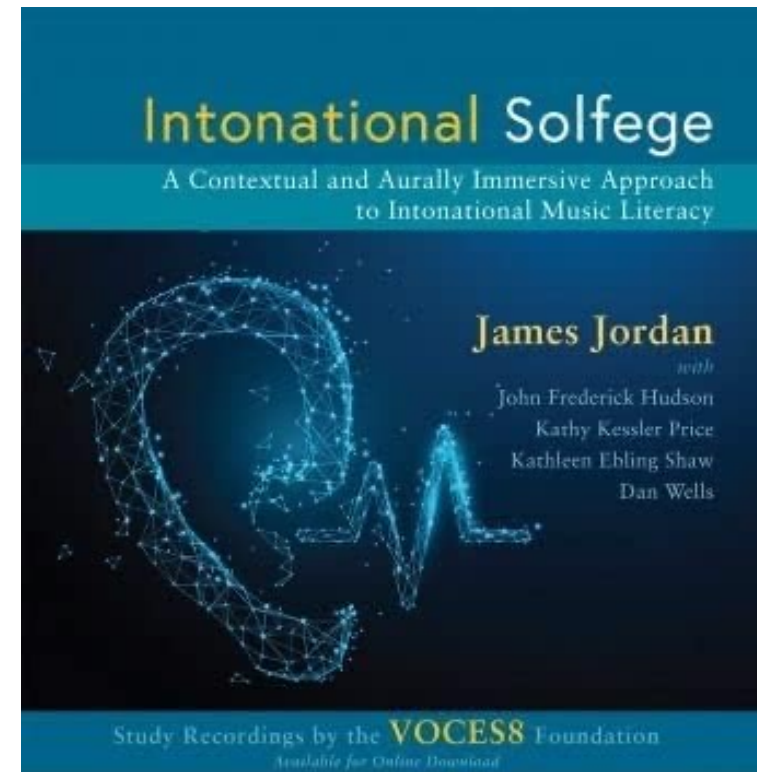
Harmonic context

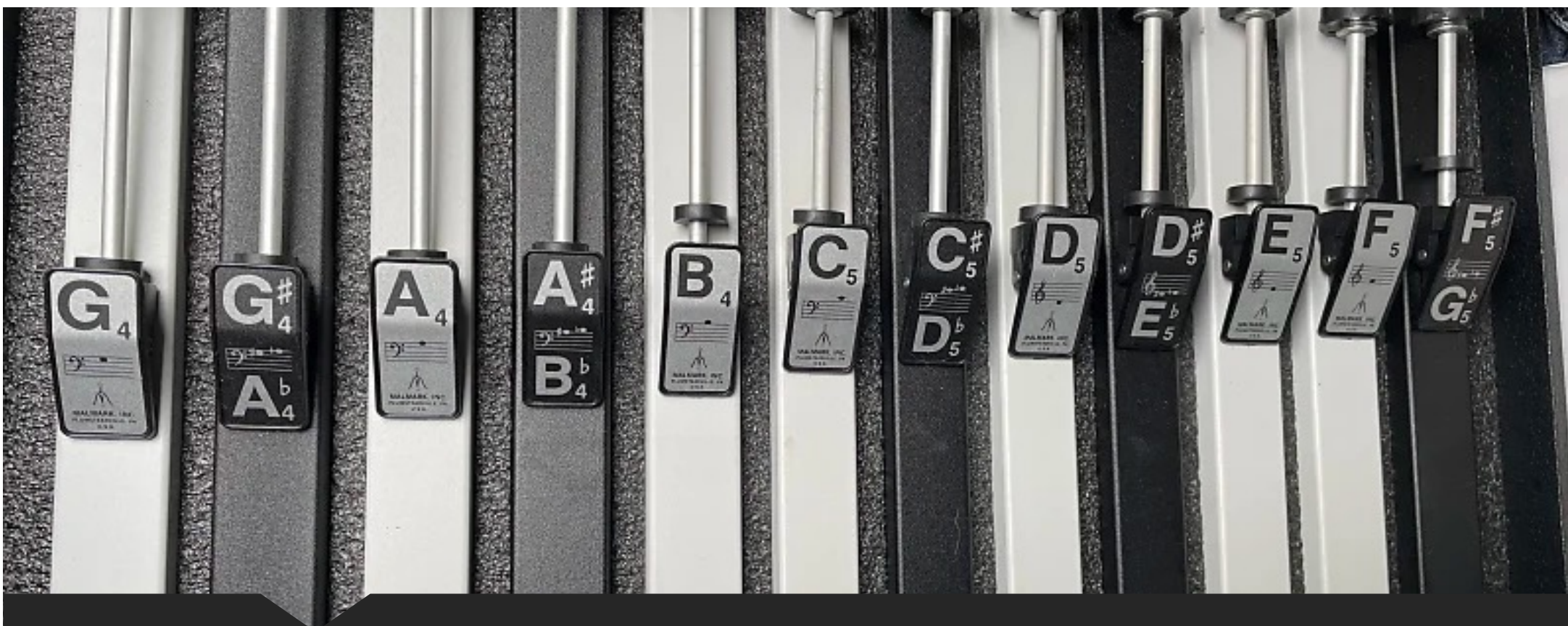
Resources for teaching this approach to audiation

Intonational Solfege

Teaching strategies, exercises and recordings that make use of a repeated dominant in different tonalities

(Jordan *et al*, 2022)





Malmark Choirchimes

Recommended for chiming the dominant

Available from: <https://www.malmark.com/product-category/choirchime-instruments>

Ideas for choral spacing

Close chamber choir spacing:



Lateral chamber choir spacing:



Circumambient chamber choir spacing:



(Daugherty, 2003, p. 51)

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