

Quantitative Research Methods (BMDP7009)

What are the
factors that impact
upon choristers'
wellbeing and
lifelong learning?

Huw Morgan (1750078)

Table of Contents

LIST OF FIGURES	2
Abstract	3
Keywords:	4
Word Count:	4
Introduction	5
Literature Review	7
Methodology: Research Design	12
Methodology: Positionality	13
Methodology: SPSS	13
Methodology: Hypotheses	14
Methodology: Analysis	16
Results	18
Hypothesis 1	19
Hypothesis 2	20
Hypothesis 3	21
Hypothesis 4	22
Hypothesis 5	24
Hypothesis 6	27
Hypothesis 7	28
Hypothesis 8	29
Discussion	31
Response Rate and Participant Demographics	31
Age and Motivation to Attend (Hypotheses 2, 6 & 7)	32
Age and Attendance (Hypothesis 3 & 6)	32
Music Reading Ability and Participation (Hypotheses 4, 5 & 8)	33
Limitations	33
Conclusions	37
Recommendations	38
REFERENCE LIST	39
APPENDIX 1: Hypothesis Summary Table	44
APPENDIX 2: SPSS Database Example	45

LIST OF FIGURES

Figure 1: Chorister gender.....	18
Figure 2: Gender Statistics of Age and Population Pyramid Frequency Age by Gender	19
Figure 3: Independent T-Test of Age Differences	20
Figure 4: Association between choristers' age and reason for attendance	20
Figure 5: Chi-Square Test & Cramer's V Result.....	21
Figure 6: One-way ANOVA Test on Age and Rehearsal Attendance.....	22
Figure 7: Notation readers by age	23
Figure 8: ANOVA Test on if reading musical notation is a significant factor	24
Figure 9: Descriptive data of how many additional hours are practiced by notation readers, non-readers and learners.....	25
Figure 10: ANOVA Test and Simple Boxplot of how many Additional Hours are Practiced by Choristers	26
Figure 11: Scatter plot of Choristers age by personal benefits of attending choir	27
Figure 12: ANOVA Test of Age and Personal Benefits	28
Figure 13: Conductors feedback	28
Figure 14: Does Conductors Positive Feedback Help Choristers musical development?	29
Figure 15: One-Way ANOVA of the impact on rehearsals non-notation readers have.....	29

Abstract

This research sought to interrogate data collected from a number of choirs in south-west Wales to help inform their recruitment and retention policies and provide evidence to help their musical directors to be more effective during rehearsal time. The data gathered related to investigating perceived advantages in terms of lifelong learning and wellbeing of being a chorister in these particular community groups and focused on evidencing perceived personal advantages of membership for individuals. The original research included piloting an initial questionnaire and developed further opportunities for quantitative and qualitative data to be collected in the final questionnaire, including the use of some open-ended questions.

However, some of the questionnaire provided the opportunity for choristers to provide information that could be statistically analysed, both descriptively and inferentially, in this assignment. This study explored how gender, age, notation ability, and motivations influence wellbeing and lifelong learning in adult choirs in southwest Wales. Based on responses from 184 participants, findings revealed that choirs mainly comprise older adults, especially retirees, with differing motivations by age. The study underscores the value of inclusive, experiential learning and supportive leadership in adult choral education. Positive feedback from musical directors enhanced learning, highlighting the need for supportive leadership and accessible rehearsal strategies in mixed-ability choirs. Three recommendations were made: to support non-readers with informal tools; to tailor workshops by age; to offer regular positive feedback; that could be shared with any choir committees, music directors and other like-minded groups looking at maximising the wellbeing and lifelong learning benefits that members enjoy. This study may also inform other such amateur music ensembles to develop similar strategies, which may be of interest to governments and funding agencies in Wales and further afield. Future research should explore motivations and wellbeing through mixed methods and long-term studies.

Keywords:

Choristers : Wellbeing : Lifelong Learning : Age : Factors

Word Count:

7688

Introduction

Wales' population is projected to grow by 5.9%, reaching 3.32 million by mid-2032, and by 10.3%, reaching 3.46 million by 2047 (Welsh Government, 2024). This marks a significant increase compared to the 2.0% growth observed in the decade leading up to mid-2022. Within this increase, the amount of people aged sixty-five and above is expected to rise by 17.8%, reaching 784,000. Additionally, those aged seventy-five and over will see a 24.2% increase, reaching 381,000 (ONS, 2022). This increase is mirrored worldwide, with the global population expected to continue rising over the next 50 to 60 years, reaching a peak of approximately 10.3 billion by the mid-2080s (United Nations, 2024). Worldwide, by 2030, one in six people will be 60 years of age or over, meaning a rise from 1 billion in 2020 to 1.4 billion. This figure will double to 2.1 billion by 2050, while the figure of those aged 80 and over is projected to triple, and reach 426 million (United Nations, 2024a). Noto (2023) argues that governments, national and regional arts organisations, and community groups such as choirs, which primarily serve older adults, must take proactive steps to address the needs of an ageing population.

Fang & Sim (2024) state that understanding the literature on lifelong learning and the wellbeing of older adults (Mäki-Opas, 2023) is essential for developing effective and sustainable provision. Research consistently highlights the importance of lifelong learning in promoting cognitive, emotional, and social wellbeing for older adults (Molina & Schettini, 2021), and engaging in educational activities, such as choir participation, can significantly improve mental health by reducing feelings of isolation and enhancing social connections (Hendry, et al., 2022). Choirs provide a unique environment where older adults can continue to develop new skills, engage with their community, and experience the emotional and cognitive benefits of music (Pentikäinen, et al., 2023). Johnson, et al. (2020) note that this is

particularly important as many older individuals face challenges related to mobility, health issues, and loneliness. Furthermore, the structure of choirs, which encourages regular attendance, collaboration, and mutual support, aligns with principles of lifelong learning by fostering a sense of purpose and community (Bonshor, 2020).

This assignment will predominantly explore whether there are lifelong learning and wellbeing benefits associated with choir membership, particularly focusing on how these benefits manifest in older adults. The secondary data set chosen is of particular interest to this researcher due to his dual roles of delivering adult education and being a musical director of a choir. These roles provide valuable insight into how choirs can contribute to cognitive, emotional, and social wellbeing. By integrating the most relevant research on lifelong learning and wellbeing, governments, funding bodies, and community music organisations can develop targeted programmes that effectively address the evolving needs and aspirations of older adults (McQuade & O’Sullivan, 2021). This study will add to the limited literature and provide some additional evidence to ensure that choir-based initiatives remain inclusive, accessible, and impactful, benefiting individuals and communities across Wales. This study aims to answer the research question: what are the factors that impact upon choristers’ wellbeing and lifelong learning?

Literature Review

The relationship between choral singing, lifelong learning, and wellbeing in later life is gaining recognition, yet scholarly attention remains limited. Nevertheless, a growing body of research suggests that community choir participation may offer older adults a rich source of fulfilment, cognitive stimulation, and social connection. Early work by Cohen et al. (2002) pointed to enhanced wellbeing through group singing, while later studies have expanded on this to explore how structured musical engagement can promote healthy ageing. Lehmberg and Fung (2010) identified particularly positive outcomes for older adults in good health, and Hays (2005) challenged gerontologists to take such evidence seriously, suggesting that singing may serve as a powerful but underused wellbeing intervention.

Rather than isolating music as a leisure pursuit, more recent research presents it as an educational experience with deep personal and social significance. Perkins and Williamon (2014) outlined six dimensions through which music learning supports healthy ageing, including not only personal enjoyment but also meaningful participation, social bonding, and a sense of progression and achievement. These themes are echoed in Lamont et al.'s (2018) emphasis on the value of building relationships and deriving purpose from musical engagement. In this light, choral singing becomes more than a pastime; rather, it is a practice of lifelong learning that can help older adults remain cognitively and emotionally active. This concept of active engagement aligns with broader international strategies for healthy ageing. The World Health Organisation (2015) has called for more inclusive approaches to learning later in life, and community-based programmes like choirs are now considered part of a global strategy to combat isolation and promote wellbeing. Governments have taken note. In Wales, policy statements (Welsh Government, 2017a) have reinforced the idea that learning should be accessible throughout the lifespan, identifying adult education as a vital

contributor to health, social participation, and inclusion. Hendry et al. (2022) also connect educational engagement to community wellbeing, suggesting that group learning settings can empower older adults to remain visible and active within society.

Despite these developments, gaps in the literature remain. Although numerous studies explore the impact of music on health, few have specifically examined the long-term benefits of choir participation in community settings. Even less attention has been paid to how gender or age differences shape experiences in mixed choirs. For instance, while Maury & Rickard (2018) noted that female choristers averaged around 65 years of age, Johnson et al. (2020) observed a slightly older demographic across genders. Creech et al. (2013) highlighted the diversity of age groups involved in choral singing, with different levels of engagement across life stages. Other data, such as from the London Welsh Male Voice Choir, shows long-term commitment among older men (Ververis & Marshall, 2018), while Shim and Sim (2020) found that working-age adults frequently dedicate themselves to multiple rehearsals a week, signalling deep dedication across age brackets.

Motivations for joining choirs appear to evolve over time. Older adults often seek emotional nourishment, spiritual meaning (Davidson & Faulkner, 2014) and cognitive stimulation (Kim & Kim, 2024), while those in midlife may be drawn by goals related to self-development or stress relief (Lamont, et al., 2018). Younger singers, by contrast, seem to prioritise peer interaction and creative exploration (Hallam & Creech, 2016). Yet across these age groups, a shared desire for connection, self-expression and growth emerges. Intergenerational choirs, in particular, have proven successful in bringing people together across divides (Jang, 2020), nurturing empathy and mutual respect while contributing to a wider sense of purpose (Kim & Kim, 2024)

In parallel, the educational benefits of choral participation deserve more attention. While choirs are not traditionally framed as learning environments, they foster critical skills ranging from listening and collaboration to pattern recognition and emotional literacy (Clements-Cortes, 2015). For older adults, choral singing has been linked to improved memory and cognitive function (Pentikäinen, et al., 2023), while younger and middle-aged singers may experience enhanced problem-solving and interpersonal awareness. The dynamic, multi-generational structure of many choirs can amplify these effects by creating mutual learning opportunities and supporting diverse learning needs (Jang, 2020).

A key variable in this process is music literacy (Chaddock-Heyman, et al., 2021). Being able to read notation allows choristers to take ownership of their learning, practise independently, and engage more deeply with complex repertoire. Research shows that this skill improves rehearsal efficiency, confidence, and musical interpretation (Carter, 2017). It also strengthens ensemble cohesion and provides a cognitive workout that benefits long-term mental agility (Carlson, 2023). Importantly, notation proficiency also allows choristers to progress at their own pace, fostering autonomy and motivation in group settings (Creech & Hallam, 2015).

The role of choir leaders and musical directors is another factor often underestimated. Bonshor (2017) highlights the power of positive feedback in boosting the confidence of adult learners, especially those without formal training. By recognising individual contributions, musical directors help to create inclusive environments where choristers feel valued and capable. This sense of belonging, as Molińska & Rajchert (2024) note, is vital for emotional wellbeing and continued participation. Tebyani (2024) further suggests that such supportive environments promote psychological safety, making group singing not just a musical but a deeply human experience.

Taken together, these strands of evidence point to the need for deeper exploration. While existing studies show that community choirs can be beneficial for wellbeing and learning, the full scope of their impact, particularly in post-industrial areas with limited social infrastructure, remains under-researched.

This study emerges from a desire to understand how community choir participation can support lifelong learning and wellbeing among older adults in a region shaped by both cultural richness and social change. South-west Wales, once a stronghold of collective life, was historically sustained by institutions that promoted education, fellowship, and cultural engagement (Baggs, 1995). From libraries established by mineworkers to the social clubs and chapels that once formed the backbone of community life, the area was known for its vibrant civic spirit (Nash, et al., 1995). These spaces did more than entertain; they offered residents a sense of belonging, identity, and purpose (Matthews, 2018), all supported by a network of accessible public transport and mutual aid (Johnes, 2013). However, the decline of industry has reshaped the social fabric. Many of these communal spaces have disappeared, chapel attendance has fallen sharply (Jones, et al., 2022), and opportunities for adult learning have narrowed (Higgs, 2017). The consequences are visible: towns across the region now face significant social deprivation (Mason, 2017), with fewer avenues for both formal education and informal social interaction (Cherrington, 2018). Within this shifting context, community choirs may represent a powerful, but overlooked, vehicle for connection, continuity, and growth.

This study focuses specifically on older adults who attend weekly rehearsals in community choirs based in this region. Rather than exploring music education for children or institutional learning contexts, it aims to capture the lived experiences of older participants; individuals

who continue to learn, express, and engage through collective music-making in later life (Jang, 2020). In doing so, the study explores how choir participation operates as a form of informal adult education: one that fosters social bonds, emotional resilience, and personal fulfilment (Davidson & Faulkner, 2010), even in communities where traditional learning spaces have diminished (Kim & Kim, 2024). The research will also consider how the act of group singing extends beyond musical technique (Creech, et al., 2013). It will investigate how choristers interpret their involvement in terms of identity, agency, and wellbeing, and how these experiences intersect with broader social conditions such as ageing, gender, and community decline (Ververis & Marshall, 2018). Through this lens, community choirs are not only cultural practices, but also spaces for renewal, and places where learning, connection (Bonshor, 2020) and self-worth are continuously cultivated (Hendry, et al., 2022). By grounding the research in the everyday experiences of singers in south-west Wales, this study contributes to the growing body of work on creative ageing (Perkins & Williamon, 2014), while offering a localised perspective on a global issue (Pentikäinen, et al., 2023). It builds on evidence that choral music supports cognitive, emotional, and social development across the lifespan (Clements-Cortes, 2015), and responds to the need for research that reflects the lived realities of older adults in post-industrial communities. Ultimately, the project aims to show how music-making, rooted in place and practice, can sustain wellbeing and lifelong learning in an age of uncertainty.

Methodology: Research Design

This assignment requires a quantitative research approach - to quantify data and analyse it statistically in order to identify patterns, relationships, or trends. This method is particularly valuable for testing hypotheses and examining cause-and-effect relationships (Creswell & Creswell, 2017). It allows for large-scale data collection, often through surveys or experiments, enabling generalisation to broader populations (Babbie, et al., 2022). The objectivity of quantitative methods reduces researcher bias as data is analysed numerically, ensuring replicable and reliable results (Khoa, et al., 2023). Additionally, quantitative research facilitates the comparison of groups, measurement of variables, and establishment of correlations, making it ideal for studies that require precision and statistical validation (Schweinsberg, et al., 2023). By focusing on numerical data, it provides a clear, structured approach to research, allowing for the testing of theories and contributing to evidence-based decision-making, which is especially suitable when seeking to measure the extent of phenomena or to generalise findings to larger populations (Bogenschneider & Corbett, 2021).

This study aims to explore the motivations of amateur choristers in South Wales, specifically focusing on the impact of regular choir attendance on their wellbeing and lifelong learning. A survey of over 300 choir members in south Wales was obtained, exploring choristers' motivations for attending choir regularly and its perceived impact on their wellbeing and lifelong learning. The survey included questions about gender, age, length of service, reasons for joining the choir, and preferred learning methods. The survey combined both multiple-choice and open-ended questions, with all responses capable of being quantified for analysis. The data collected provided a robust foundation for identifying key trends in participants' experiences. For example, responses to questions regarding the reasons for joining a choir might shed light on motivations such as social interaction, personal enjoyment, or musical

development. Similarly, data on preferred learning methods (e.g., visual, auditory, or hands-on learning) might reveal how choristers engage with musical content and the factors that support their continued participation.

Methodology: Positionality

This study adopted a post-positivist ontological position (Cohen, et al., 2017), assuming that the benefits of choir participation in relation to wellbeing and lifelong learning exist as observable realities but can only be understood imperfectly (Creswell & Creswell, 2017).

Using quantitative methods such as t-tests, ANOVA, and Chi-Square aligns with a positivist epistemology, where knowledge is gained through measurable evidence and hypothesis testing (Cohen, et al., 2017). The assumption is that participants' self-reported experiences reflect underlying truths that can be objectively analysed (Muijs, 2010). Although statistical methods aim for objectivity, this approach also recognises potential limitations, including sampling bias and imperfect measurement (Bergin, 2018). Quantitative research has proven effective in evaluating musical engagement and wellbeing outcomes (Hallam, et al., 2016) providing a robust foundation for analysing community choir participation through statistical comparison.

Methodology: SPSS

IBM's Statistical Package for the Social Sciences (SPSS) was used in this research due to its specialised statistical analysis capabilities, reliability, and ease of use (Pallant, 2020). While Excel is a versatile spreadsheet tool, SPSS is designed specifically for statistical analysis and offers a wide range of statistical tests such as ANOVA, regression analysis, factor analysis, and non-parametric tests (Pallant, 2020). This researcher, therefore, performed analyses with greater accuracy and efficiency in SPSS, reducing the risk of errors. SPSS enabled efficient data management through its variable view, and data was labelled, coded and defined

accurately. Unlike Excel's overreliance on cell references, Salcedo & McCormick (2020) state that using SPSS reduces the likelihood of inconsistencies. The user-friendly interface SPSS provides simplifies statistical procedures without requiring extensive programming knowledge, vital in this research given the authors unfamiliarity with such a large data set (Mayers, 2013). SPSS output reports have been included and discussed, including tables and charts, ensuring transparency and reproducibility in this research. Excel, in contrast, does not provide the same level of detailed statistical outputs, making it less reliable for complex research studies (Pallant, 2020).

Methodology: Hypotheses

An analysis of the dataset provided was conducted methodically and thoroughly to gain an initial understanding, and a check was undertaken as to whether the choir dataset came with a README file, metadata, or any other documentation that explained the data, its structure, and variables (Naeem, et al., 2023). Each variable needed to be understood as well as what each column represented, the type of data it was (categorical, numerical, time-series, etc.), and whether they related to each other. Whether there were any null values or missing entries in the dataset also needed to be considered (Bergin, 2018). This researcher is familiar with the origin of the dataset - who collected it and for what purpose - which may have been helpful to frame the scope and limitations of the analysis, and Heumann & Shalabh (2024) suggest considering any potential biases or limitations inherent in the dataset that may impact the analysis or conclusions.

Before starting any analysis, the development of several hypotheses that the dataset can answer was necessary to guide the analysis and to ensure that the variables available in the dataset were relevant to the research questions (Naeem, et al., 2023). An Exploratory Data

Analysis was undertaken to obtain a sense of the distribution of data, its range, and any patterns or anomalies. For numerical variables, calculating means, medians and standard deviations enabled the creation of basic visualisations like histograms, boxplots, or scatterplots to identify trends, outliers, and relationships between variables (Imai, et al., 2021). Heumann & Shalabh (2024) state that such activity can identify data quality inconsistencies, such as incorrect values, outliers, duplicates, or missing values. This required the dataset to be cleaned, addressing missing values (e.g., imputation, removal), removing duplicates, and standardising the data, e.g., normalisation. Creating new features from existing data was necessary, including creating categorical variables, combining columns, or transforming variables. A check for data type issues was undertaken, ensuring that each variable was correctly formatted (e.g., that dates were recognised as date types and categorical variables as factors) (Black, 1999).

Eight statistical tests were undertaken (IBM Corp., 2021). Given the dataset's wide and partly superfluous scope, complexity, and differing research objectives, focused hypotheses were set, allowing this researcher to explore different aspects in terms of choral wellbeing (Clements-Cortés, 2014) and life-long learning (Kaynak, 2018) in amateur choirs. To test these hypotheses, t-tests, ANOVA and Chi-squared were employed. An important element for this researcher, unfamiliar to statistical data analysis, was to keep detailed notes on each step, including decisions made about how the data was treated, the reasons behind those particular methods and how the results were interpreted (Pallant, 2020).

To ensure reliability, all results were double-checked for consistency and robustness, ensuring that the findings were interrogated and stable across different methods. When unexpected patterns or issues were uncovered, refining the methods employed was necessary and further

analysis undertaken (Salcedo & McCormick, 2020). When interpreting the results, to contextualise the findings, relating the results back to the research question and also to the existing literature was key. Furthermore, acknowledging the limitations of the dataset and the methods used was of interest, with a consideration of how they may affect any conclusions (Bergin, 2018). When interpreting this third-party dataset, several ethical protocols needed to be observed including ensuring that all data was anonymised by removing any identifying information to protect participants and each choir's privacy (BERA, 2024). This researcher also confirmed that participants in the original study gave informed consent for their data to be used in research. This included understanding how their data would be used, stored, and shared. The data was stored securely, with appropriate encryption and restricted access to prevent unauthorised use (Kitchin, 2024).

Methodology: Analysis

T-tests, ANOVA, and Chi-Square tests were selected to analyse the relationships between choristers' wellbeing, lifelong learning, and demographic factors because these statistical tools are well-suited for interrogating group differences and associations in educational research (Babbie, et al., 2022). T-tests allow comparison of means between two groups (Field, 2024), such as difference in age between females and males, while one-way ANOVA (Pallant, 2020) enables the examination of differences across more than two groups, such as age groups and revealing whether older and younger adults report varying benefits from choir participation. The Chi-Square test helps assess associations between categorical variables (Salcedo & McCormick, 2020), such as age and motivation for joining, providing a non-parametric option for exploring patterns in chorister participation. Together, these tests supported robust hypothesis testing, aligning with quantitative research standards (Creswell &

Creswell, 2017), offering a rigorous foundation for evaluating lifelong learning in musical contexts (Bryman, et al., 2022).

Results

Within the data analysed, there was an unknown response rate given that it was anonymised secondary numerical data relevant to this researcher's field of interest. It was estimated that 300 choristers were invited to complete the questionnaire, with 184 completed. This 61% completion rate follows the gradual rise in the average response rate identified by Holtom et al. (2022), but may also reflect the work of Bryman et al. (2022), where social influences, peer pressure, visibility and the opportunity to complete the survey in rehearsal may have increased the number of participants. It was assumed by this researcher that those choristers who did not complete the questionnaire may have been deterred by its length, lack of perceived benefit or privacy concerns (Babbie, et al., 2022) while, if any questionnaires were incomplete, they may well have been omitted prior to the data set being prepared. The results presented are, it is assumed, an accurate and robust reflection of the participants' views, with the results analysed being based on the responses of n=122 females and n=62 males.

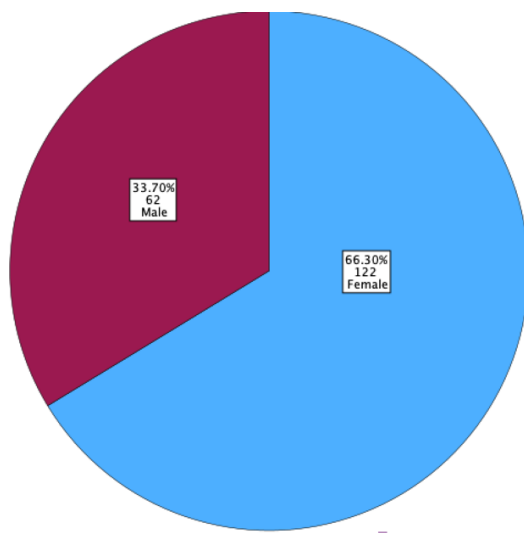


Figure 1: Chorister gender

Hypothesis 1

Pickering (2017) suggests that age may influence behaviour, preference, experience or understanding differences between males and females; thus, capturing this distinction may be useful in deeper analysis. This could be most pertinent in female- or male-only choirs, where different learning and wellbeing opportunities may be apparent (Pentikäinen, et al., 2023).

Therefore, an independent t-test was run on the complete sample of 186 choral participants to determine whether there were differences in age of female members compared to their male counterparts. The following hypothesis was formed:

- Null Hypothesis H_0 : There is *no* significant difference in age between females and males, and any observed difference is due to chance;
- Alternative Hypothesis H_1 : There *is* a significant difference in age between females and males.

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Age	Female	122	62.83	15.420	1.396
	Male	62	66.94	17.228	2.188

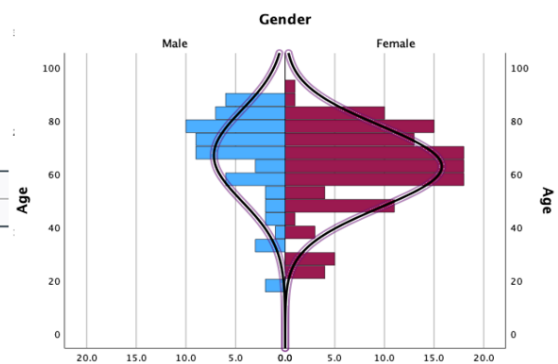


Figure 2: Gender Statistics of Age and Population Pyramid Frequency Age by Gender

The statistics shown in Figure 2 show that female choristers had slightly lower average age ($m=62.83$ yrs) compared to male choristers ($m=66.94$ yrs), indicating a four-year difference between genders. This compares with choir members average ($m=64.21$), with the difference confirmed by the bell curve by gender. The results (Figure 3) indicated a t-value of -1.583 with 111.462 degrees of freedom, and a p-value of 0.116.

		Levene's Test for Equality of Variances				t-test for Equality of Means				95% Confidence Interval of the Difference	
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Age	Equal variances assumed	1.009	.316	-1.641	182	.051	.103	-4.108	2.503	-9.046	.831
	Equal variances not assumed			-1.583	111.462	.058	.116	-4.108	2.595	-9.250	1.035

Figure 3: Independent T-Test of Age Differences

The negative t-statistic also indicates that the mean age of females was lower than the mean age of males in the choirs. The p-value exceeded the conventional threshold of 0.05, so we can conclude that there was no statistically significant difference between the mean ages of females and males in the choir sample at the common significance levels. As a result, we fail to reject the null hypothesis.

Hypothesis 2

Understanding the motivations (Figure 4) behind choir participation, as discussed by Maury, et al. (2022), can provide valuable insights into how different age groups derive personal benefits from this activity.

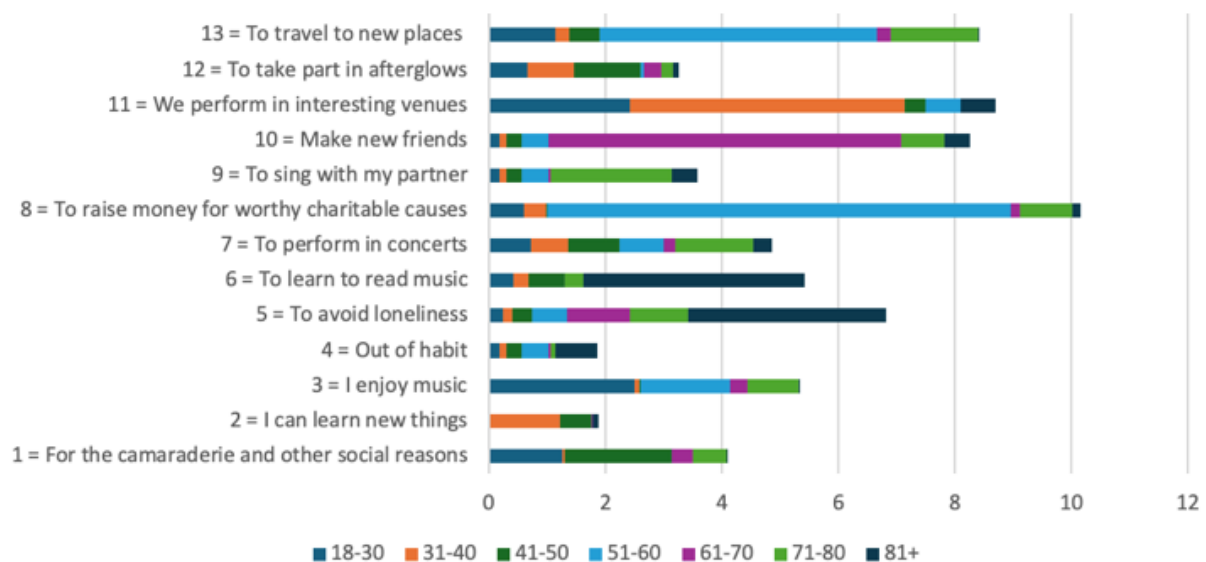


Figure 4: Association between choristers' age and reason for attendance

To explore this relationship, the following hypothesis was formed:

- Null Hypothesis H_0 : There is no association between choir members' reasons for attending and their age group;
- Alternative Hypothesis H_1 : There is an association between choir members' reasons for attending and their age group.

The Chi-Square Statistic (χ^2) was 79.169 with the p-value (Asymptotic Significance) of 0.442 (Figure 5), which is greater than the common significance level ($\alpha = 0.05$), thus failing to

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	79.169 ^a	78	.442
Likelihood Ratio	80.453	78	.402
N of Valid Cases	184		

a. 88 cells (89.8%) have expected count less than 5.
The minimum expected count is .11.

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Phi	.656	.442
	Cramer's V	.268	.442
N of Valid Cases		184	

Figure 5: Chi-Square Test & Cramer's V Result

reject the null hypothesis. There was no strong statistical evidence to suggest that age group and reasons for attending choir are associated and the observed differences in reasons for attending among different age groups could be due to random chance rather than a true relationship. When calculating Cramér's V to measure the strength of association between age group and reasons for attending a choir, the score of 0.268 suggests a weak-to-moderate association between age group and reasons for attending.

Hypothesis 3

Assuming that there is no significant difference in age between females and males, and that any observed difference is due to chance, age-related data was combined for the subsequent hypotheses testing. Rehearsal attendance was considered, looking at eight age groups: 18-30, 31-40, 41-50, 51-60, 61-70, 71-80 and 81+. Using ANOVA to compare attendance levels

across the age groups simultaneously rather than performing multiple t-tests, which increased the risk of Type I errors, the following hypothesis was tested:

- The Null Hypothesis H_0 is: There is *not* a significant difference between participants' age and attending rehearsals;
- The Alternative Hypothesis H_1 is: There *is* a significant difference between participants' age and attending rehearsals.

ANOVA					
Age Group	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10210.599	44	232.059	.863	.708
Within Groups	37358.134	139	268.764		
Total	47568.734	183			

ANOVA Effect Sizes ^{a,b}				
Age Group		Point Estimate	95% Confidence Interval	
			Lower	Upper
	Eta-squared	.215	.000	.091
	Epsilon-squared	-.034	-.317	-.197
	Omega-squared Fixed-effect	-.034	-.314	-.195
	Omega-squared Random-effect	-.001	-.005	-.004

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Figure 6: One-way ANOVA Test on Age and Rehearsal Attendance

The data (Figure 6) indicated that the p-value was 0.708 which indicates the probability that the observed differences occurred by chance as the p-value is greater than 0.05. This suggests that the differences between the groups are not statistically significant at the 5% significance level. The critical value for F at the 5% significance level is .863 and, since the calculated F value is more than the critical value, this researcher fails to reject the null hypothesis.

Hypothesis 4

Davidson & Faulkner (2010) states that the ability to read music notation is a valuable skill for choristers in adult choirs, significantly impacting their musical performance and learning efficiency. Adults who engage in choral singing often experience cognitive benefits, including improved verbal flexibility and enhanced neural processing (Pentikäinen, et al., 2023).

Additionally, the social and emotional benefits of choir participation, such as increased feelings of togetherness and peer support, can further motivate choristers to develop their music reading skills at whatever level they perceive themselves to be (Bonshor, 2020).

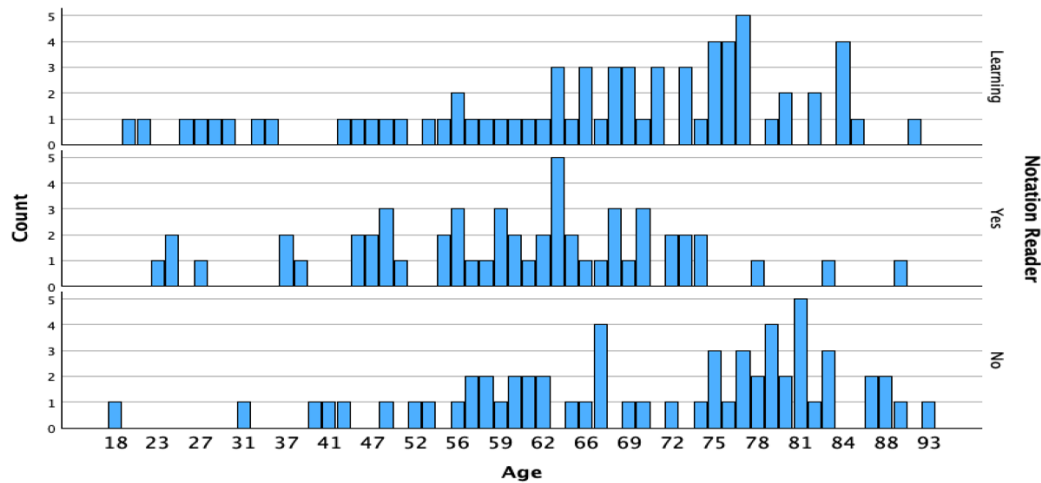


Figure 7: Notation readers by age

Figure 7 shows, by age, the number of participants who could read musical notation, were learning it and those who could not. Understanding this relationship, if learning to read music is a motivating factor to joining a choir or maintaining choir membership, is essential for choir directors, including for this researcher, to tailor their teaching methods and optimise enjoyment levels and learning outcomes for choristers. To establish this relationship:

- The Null Hypothesis (H_0) is: learning to read musical notation is not a significant factor in joining and continuing in a choir;
- The Alternative Hypothesis (H_1) is: learning to read musical notation is a significant factor in joining and continuing in a choir.

A one-way ANOVA test (Figure 8) was conducted to determine whether learning to read musical notation is or is not a significant factor in a chorister joining and continuing in a choir.

ANOVA					
Age	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3282.406	2	1641.203	6.708	.002
Within Groups	44286.327	181	244.676		
Total	47568.734	183			

Figure 8: ANOVA Test on if reading musical notation is a significant factor

The F-value of 6.708 indicated the ratio of the variance between the groups to the variance within the groups, suggesting a greater difference *between* the groups compared to *within* the groups. The significance value (p-value) of .002 is less than the common alpha level of 0.05, indicating that the results are statistically significant. Since the p-value (.002) is less than 0.05, the null hypothesis (H_0) is rejected and we can accept the alternative hypothesis (H_1). This means that learning to read musical notation is a significant factor in joining and continuing in a choir.

Hypothesis 5

The ability to read music is a fundamental skill that can significantly impact a chorister's practice habits (Carlson, 2023), as music reading proficiency allows choristers to interpret and understand musical scores more efficiently, leading to more productive practice sessions. This skill can reduce the time spent on deciphering notes and rhythms enabling choristers to focus on refining their performance and mastering complex pieces (Coffman, 2018). Choristers who can read music may also experience greater confidence and motivation during practice as they can approach new pieces with a clear understanding of the musical structure (Kaynak, 2018). This can lead to increased practice frequency and longer practice durations as they are more likely to engage deeply with the material. Conversely, choristers who do not read music or are still learning may face challenges in interpreting scores, which can hinder their practice efficiency and reduce their motivation to practice regularly. These choristers might spend

more time struggling with basic notation, potentially leading to shorter and less frequent practice sessions (Arthurs & Petrini, 2023). Therefore:

- The null hypothesis (H_0) is: Non-music notation readers do not practice more than those who read music;
- The alternative hypothesis (H_1) is: Non-music notation readers do practice more than those who read music.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
					Lower Bound	Upper Bound			
Learning	69	1.87	1.454	.175	1.52	2.22	0	5	
No	55	2.49	1.386	.187	2.12	2.87	0	5	
Yes	60	.97	.901	.116	.73	1.20	0	4	
Total	184	1.76	1.409	.104	1.56	1.97	0	5	
Model	Fixed Effects		1.278	.094	1.58	1.95			
	Random Effects			.433	-.10	3.62			.530

Figure 9: Descriptive data of how many additional hours are practiced by notation readers, non-readers and learners

Figure 9 shows that the mean practice hours are highest for those who cannot read music (No – 2.49), followed by those who are learning to read music (Learning – 1.87), and lowest for those who can read music (Yes – 0.97). The standard deviation indicates the variability in practice hours within each group. The group learning to read music shows the highest variability (Learning: 1.454), while the group that can read music shows the lowest variability (Yes: 0.901). The confidence intervals provide a range within which the true mean practice hours are likely to fall, with 95% confidence. The intervals for the "No" group are higher (No: 2.12 to 2.87 hours) and do not overlap with the "Yes" group (Yes: 0.73 to 1.20 hours), suggesting a significant difference in practice hours. The range of practice hours shows that some participants in each group do not practice at all, while the maximum practice hours vary slightly among the groups.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	67.973	2	33.987	20.817	<.001
Within Groups	295.505	181	1.633		
Total	363.478	183			

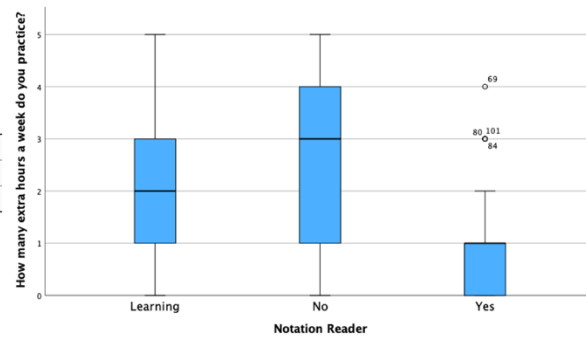


Figure 10: ANOVA Test and Simple Boxplot of how many Additional Hours are Practiced by Choristers

ANOVA was used to compare the means of practice durations among different groups of choir members based on their music reading ability (Figure 10). The table provides the results of the analysis of variance for the number of extra hours choir members practice per week, categorised by their music reading ability (Learning, No, Yes). The between-groups sum of squares ($n=67.973$) represents the variability due to the differences between the groups, while the within-groups sum of squares ($n=295.505$) represents the variability within each group. The between-groups degrees of freedom is ($n=2$), the within-groups degrees of freedom is ($n=181$) and the between-groups mean square ($n=33.987$) is much larger than the within-groups mean square ($n=1.633$). This indicates greater variability between the groups compared to within the groups. The F-value of 20.817 indicates a greater likelihood that the observed differences between group means are statistically significant. The Boxplot illustrates learners practice between 1 and 3 extra hours ($m=2$), non-readers between 1 and four ($m=3$) and notation readers practice between 0 and 1 ($m=1$) extra hours per week. A p-value of less than .001 suggests that the differences between the group means are highly significant. This means that there is strong evidence to reject the null hypothesis.

Hypothesis 6

Hallam & Creech (2016) state that age can play a significant role in the personal benefits that individuals derive from participating in a choir. As people progress through different stages of life, their motivations, needs and experiences evolve, influencing how they perceive and benefit from choir membership. Understanding the link between age and the personal benefits of choir participation Figure 11: Scatter plot of Choristers age by personal benefits of attending choir(Figure 11) can help tailor choir programs to meet the diverse needs of members.

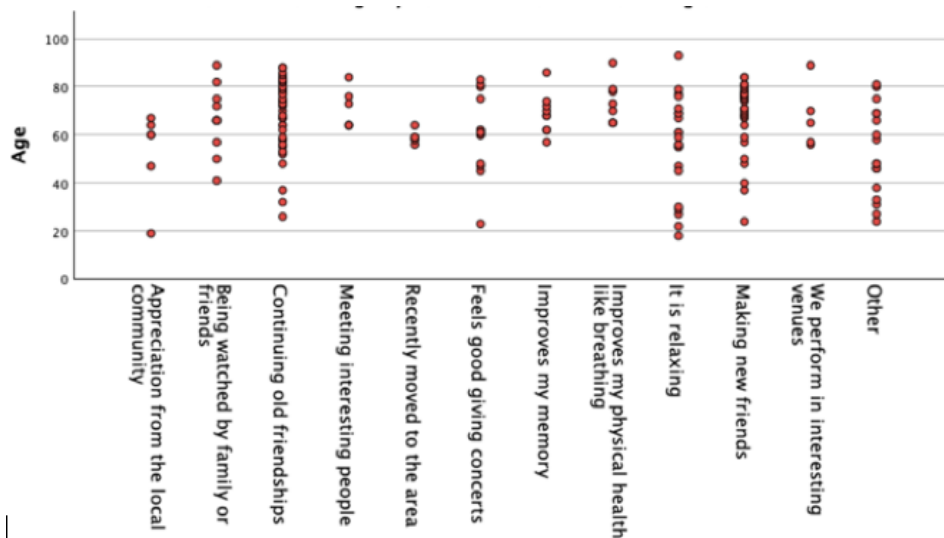


Figure 11: Scatter plot of Choristers age by personal benefits of attending choir

The following hypothesis was formed:

- The Null Hypothesis (H_0) is: Age does not have an impact on the personal benefits derived from participating in a choir;
- The Alternative Hypothesis (H_1) is: Age does have an impact on the personal benefits derived from participating in a choir.

An ANOVA test was carried out (Figure 12), finding that, between groups, the sum of squares (SS) is 7964.419 with 11 degrees of freedom (df). The mean square (MS) is 724.038. Within groups, the sum of squares is 39604.315 with 172 degrees of freedom, with the mean square

being 230.258. The total sum of squares is 47568.734 with 183 degrees of freedom. The F-value is 3.144 and the significance level (Sig.) is less than 0.001, indicating that there is a statistically significant difference between the age groups. Therefore, the null hypothesis (H_0) can be rejected.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7964.419	11	724.038	3.144	<.001
Within Groups	39604.315	172	230.258		
Total	47568.734	183			

Figure 12: ANOVA Test of Age and Personal Benefits

Hypothesis 7

Bonshor (2017) states that positive feedback from a musical director can benefit participants to develop musical understanding. Evaluating this link (Figure 13), may help conductors meet the diverse learning needs of choir members.

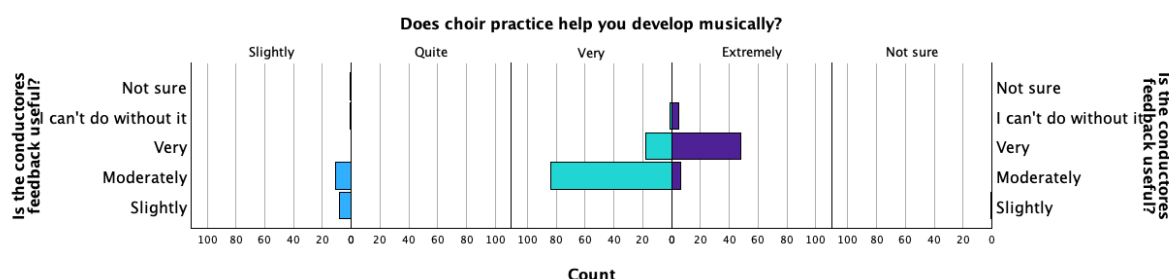


Figure 13: Conductors feedback

The following hypothesis was formed:

- Null Hypothesis (H_0): Positive feedback has *no* impact on the musical development of choristers;
- Alternative Hypothesis (H_1): Positive feedback *has* an impact on the musical development of choristers.

A One-Way ANOVA test was undertaken (Figure 14), finding between groups that the sum of squares was 62.545 with 4 degrees of freedom, the mean square was 15.636, the F-value

was 33.929 and the significance level is less than 0.001, indicating that a statistically significant difference can be seen in the data. Therefore, the null hypothesis (H_0) can be rejected.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	62.545	4	15.636	33.929	<.001
Within Groups	82.493	179	.461		
Total	145.038	183			

Figure 14: Does Conductors Positive Feedback Help Choristers musical development?

Hypothesis 8

Some choir members report their frustration that rehearsal time is often taken up with ‘note-bashing’ for those who cannot read music notation and that more could be achieved if all the choristers could do so (Rosenbaum, 2017). Therefore, the following hypothesis was formed:

- Null Hypothesis (H_0): The ability to read music amongst choristers does not have an impact in reducing rehearsal time to understand and learn the music to be performed;
- Alternative Hypothesis (H_1): The ability to read music amongst choristers does have an impact in reducing rehearsal time to understand and learn the music to be performed.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	70.250	2	35.125	6.879	.001
Within Groups	924.163	181	5.106		
Total	994.413	183			

Figure 15: One-Way ANOVA of the impact on rehearsals non-notation readers have

A One-Way ANOVA (Figure 15) test was undertaken, finding, between groups, that the sum of squares (SS) was 70.250 with 2 degrees of freedom (df). The mean square (MS) was 35.125. Within groups, the sum of squares was 924.163 with 181 degrees of freedom, with the mean square being 5.106. The total sum of squares is 994.413 with 183 degrees of freedom. The F-value was 6.879, and the significance level (Sig.) was 0.001, indicating that a

statistically significant difference can be seen in the data. Therefore, the null hypothesis (H_0) can be rejected and the alternative hypothesis (H_1) accepted.

Discussion

This study sought to explore the impact of gender, age, notation ability, and motivations for participation on any perceived wellbeing improvements and lifelong learning opportunities of choristers in several choirs located within south-west Wales. Drawing upon survey data from 184 participants, the findings, as summarised in Appendix 1, provide some useful insights into the demographic makeup of adult choirs and the ways in which various factors interact to influence participation and experience.

Response Rate and Participant Demographics

The estimated 61% response rate aligns with the work of Holtom et al. (2022) suggesting a reasonable level of engagement with the survey. The setting, where participants were likely given the opportunity to complete the survey during rehearsal, may have increased the rate of completion, a phenomenon discussed in Bryman et al. (2022). Nonetheless, the absence of identifiable data and the use of a pre-existing anonymised dataset limits the ability to assess non-response bias, a factor acknowledged by Gideon (2012) as potentially significant in survey research. Demographically, the data revealed a predominance of older adults (mean age = 64.2 years), supporting the argument that choirs are particularly attractive to retirees or those seeking meaningful later-life engagement. This aligns with the work of both Redman (2016) and Moss (2018), who suggest that lifelong learning and arts engagement in later life can offer cognitive, emotional, and social benefits. The slightly younger average age of female participants may indicate gendered differences in health, social engagement, or retirement patterns, but the lack of statistical significance ($p = .116$) means that no firm conclusions can be drawn on this point.

Age and Motivation to Attend (Hypotheses 2, 6 & 7)

Interestingly, while Cramér's V (.275) suggested a weak-to-moderate association between age group and motivations for choir participation, the chi-square test ($p = .3149$) did not yield statistically significant results. This suggests that motivational factors may be consistent across age groups, reinforcing the idea that communal singing holds a universally appealing set of benefits. However, the ANOVA test in Hypothesis 6 ($p < .001$) demonstrated that the type of personal benefit reported does significantly vary by age, suggesting that, while motivations to attend may be broadly similar, the perceived outcomes differ across life stages. This supports the work of Maury, et al. (2022), who note that younger participants may be more focused on skill development or socialising, whereas older participants may derive greater psychological or health-related benefits. Hypothesis 7 adds an important pedagogical layer by showing a strong association for all ages between positive feedback from musical directors and perceived musical development ($p < .001$), agreeing with the work of Bonshor (2017). This reinforces the literature around adult learning and motivation as articulated by Sobol (2019), underscoring the importance of positive reinforcement in adult music education.

Age and Attendance (Hypothesis 3 & 6)

While the ANOVA results of Hypothesis 3 indicate no significant correlation between choristers' age and their attendance at rehearsals, with a p -value is 0.708, it would seem reasonable to believe that older participants may have more flexible schedules post-retirement, potentially leading to higher attendance rates (Zhan, et al., 2025). A larger sample or longitudinal data may confirm this trend. Hypothesis 6 also adds the suggestion that age has an impact on the personal benefits derived from participating in a choir, inviting further research on the advantages of attendance for participants of all ages.

Music Reading Ability and Participation (Hypotheses 4, 5 & 8)

One of the clearest findings in this study concerns the role of music reading ability.

Hypothesis 4 established that learning to read music is a statistically significant factor in joining and continuing in choir ($p = .002$), which aligns with the work of Garisi (2024). This is further reinforced by the ANOVA results in Hypothesis 5 ($p < .001$), which found that those who cannot read music practice for significantly more hours than proficient readers. This supports conclusions reached by Carlson (2023), who notes that non-readers must compensate with additional effort and may experience more anxiety or preparation stress. Similarly, Hypothesis 8 suggested, like in the work of Rosenbaum (2017), a significant relationship between music reading ability and perceptions of rehearsal efficiency, with those unable to read music contributing to more time spent on ‘note-bashing’. This supports anecdotal feedback and could influence future rehearsal structures devised by music directors and support mechanisms, such as the use of practice tracks or sectional rehearsals (Carter, 2017).

Limitations

Several important challenges that this researcher encountered need to be considered when interpreting the findings. The dataset used in this document may vary in terms of data accuracy, completeness and reliability, possibly containing errors, missing values, or inconsistencies that may affect the analysis and conclusions made (Bergin, 2018). Using anonymised data meant that some contextual or follow-up information (e.g., non-response reasons, chorister experience levels) could not be explored (Bryman, et al., 2022).

Furthermore, the reliance on self-reported data may have introduced bias but, nevertheless, the robust sample size and statistical methods provided a meaningful snapshot of choir

participation and the reasons behind it. Conducting an exploratory data analysis to identify missing data, outliers, or inconsistencies mitigated this somewhat as third-party datasets may come with inadequate documentation or missing data (Rumsey, 2016). This lack of information did cause some difficulties in terms of understanding the way in which the data was collected from the choral participants, and whether all of it was suitable for this research. Perhaps before using a dataset that a researcher has not collected themselves, ensuring access to sufficient documentation is vital or, as an alternative, having the opportunity to clarify issues with the dataset provider would be helpful (Cohen, et al., 2017).

It is acknowledged that the dataset did not align perfectly with the objectives of the research, with much of the data collected for promotional material rather than understanding views about wellbeing and lifelong learning. Evaluating more carefully whether this dataset was appropriate for SPSS testing would align with the work of Salcedo & McCormick (2020). Furthermore, perhaps using data manipulation techniques to adapt the dataset could have been used, but caution would need to be exercised by introducing accidental bias in altering or amending the dataset (Baker & Hawn, 2021). It is unclear whether the dataset included inherent biases or ethical issues based on the way they were collected (BERA, 2024). However, there were no known ethical issues as the data did not include personally identifiable information or other sensitive data (Creswell & Creswell, 2017), nor was it subject to any licensing agreements or copyright restrictions that dictated how the data could be used, shared, or redistributed. While using this dataset, which provided some valuable insight on which to base results and conclusions in terms of wellbeing and lifelong learning amongst choir members, it is acknowledged for future research that it will be essential to address the challenges previously listed to ensure that any analysis is valid, reliable, and ethically sound (Andersson, et al., 2024).

Whilst Panchenko & Samovilova (2020) acknowledge that using secondary data can be an effective way to conduct research, this researcher finds of interest their discussion concerning statistical software. Interrogating the data set with SPSS software proved challenging to this researcher for several reasons. Whilst acknowledging that SPSS is a powerful tool for statistical analysis (Mayers, 2013), its complexity felt overwhelming to this researcher, with very limited quantitative research experience. Aligning with difficulties Field (2024) addresses, issues encountered by this researcher included navigating its user interface; inputting data; trawling menus and choosing correct tests, and interpreting the output was a steep learning curve. While comprehensive, its use felt unintuitive to this researcher who is unfamiliar with statistical software (Pallant, 2020). Additional time was given to double and triple checking data preparation, coding variables or handling missing data, which could have led to inaccurate results. Mastering SPSS will be highly beneficial in future research in this area, as it will provide a wider range of advanced statistical techniques that are essential for many fields of research not undertaken within this research (Salcedo & McCormick, 2020). With additional training, practice and a dataset more suited to statistical analysis, future research by this researcher could be more robust by using SPSS more efficiently and extensively to conduct robust statistical analyses and interpret complex data more effectively.

Furthermore, it is noted that, despite its increasing prevalence and popularity, this researcher preferred the Harvard referencing system for its familiarity. Although the APA referencing style is increasingly used in academic writing, particularly in the social sciences, psychology, and education (APA, 2020), it was thought by this researcher that learning the SPSS programme was enough of a challenge, without adding the additional learning journey required adopting a new referencing system. However, as more institutions and journals adopt the APA style, it is important for this researcher to familiarise themselves with its rules and

guidelines to ensure that future work aligns with current academic standards (Pears & Shields, 2022). Future research in this area could benefit from a mixed-methods approach, incorporating interviews or focus groups to add depth to the statistical findings. Longitudinal studies may also capture changes over time in motivation, wellbeing, or skill development.

Conclusions

This study set out to investigate how gender, age, notation ability, and motivations influence perceived wellbeing and lifelong learning among choristers in south-west Wales.

Demographically, the study confirmed that adult choirs in this region are primarily composed of older participants, particularly retirees, with an average age of 64.2 years. While female participants skewed slightly younger, gender did not significantly influence participation patterns. Motivations to attend rehearsals appeared consistent across age groups, but the perceived benefits varied significantly by age. Younger participants leaned toward social and developmental motivations, while older individuals tended to emphasise wellbeing and emotional fulfilment, aligning with Ververis & Marshall (2018) and Shim & Sim (2020) on adult learning and later-life engagement.

A key contribution of this study was the nuanced understanding of music reading ability. Participants who could not read music invested significantly more hours in practice, highlighting a pedagogical imbalance and the additional burden placed on those with lower levels of formal musical literacy, as discussed by Rosenbaum (2017). Another finding was the importance of musical directors in shaping the learning experience of their choristers. Along with Bonshor (2017), strong associations were found between receiving positive feedback and the perception of musical development, reinforcing the importance of supportive leadership in adult education. Furthermore, perceptions of rehearsal inefficiency linked to music reading difficulties illustrate the need for more accessible rehearsal strategies, particularly in amateur or mixed-ability groups such as the participants in this research (Coffman, 2018).

However, several limitations temper the strength of these conclusions. The use of a third-party anonymised dataset limited the researcher's control over variable selection, data

completeness, and contextual insights (Heumann & Shalabh, 2024). This means that it is difficult to assess and make judgements upon whether the methods used to generate the data were reliable and/or valid. Some variables were originally collected for promotional purposes, potentially misaligning with the study's focus. Additionally, the researcher's limited experience with the statistical analysis tool SPSS may have constrained the depth of analysis (Field, 2024). Nonetheless, the study provides a foundation for further exploration and highlights important pedagogical and policy-related considerations in adult choral engagement.

Recommendations

1. Prioritise Informal Learning in Rehearsals

Choir directors should support non-readers with tools like audio tracks or visuals, reducing “note-bashing” and enhancing inclusivity (Cooper, 2017).

2. Implement Age-Differentiated Support Strategies

Recognising age-related needs, choirs could offer optional workshops on wellbeing for older adults (Trost, 2022) and skill-building for younger singers (Chapman & Morris, 2021), aligning with individual goals and motivations.

3. Strengthen Positive Reinforcement Practices

Musical directors should give regular feedback to boost progress, motivation, and belonging, especially for less confident singers (Bonshor, 2017).

Future research could combine surveys with interviews or focus groups to better understand the motivations and wellbeing impacts of choir participation, with longitudinal studies revealing how these experiences develop over time (Pentikäinen, et al., 2023).

REFERENCE LIST

Andersson, M., Boateng, K. & Abos, P., 2024. *Validity and Reliability: The extent to which your research findings are accurate and consistent*, s.l.: s.n.

APA, 2020. *Publication Manual of the American Psychological Association, Seventh Edition (2020)*.

[Online]

Available at: <https://apastyle.apa.org/products/publication-manual-7th-edition>

[Accessed 20th April 2025].

Arthurs, Y. & Petrini, K., 2023. Musicians' views on the role of reading music in learning, performance, and understanding. *Musicae Scientiae*, 28(1), pp. 3-17.

Babbie, E., Wagner-Huang, W. E. & Zaino, J., 2022. *Adventures in Social Research*. 11th ed. s.l.:SAGE Publications.

Baggs, C. M., 1995. *The Miners' Libraries of South Wales from the 1860s to 1939*. Aberystwyth: University of Wales.

Baker, R. S. & Hawn, A., 2021. Algorithmic Bias in Education. *International Journal of Artificial Intelligence in Education*, Volume 32, p. 1052–1092.

BERA, 2024. *Ethical Guidelines for Educational Research*. 5th ed. s.l.:BERA.

Bergin, T., 2018. *An Introduction to Data Analysis Quantitative, Qualitative and Mixed Methods*. s.l.:SAGE Publications.

Black, T. R., 1999. *Doing Quantitative Research in the Social Sciences*. s.l.:SAGE Publications.

Bogensneider, K. & Corbett, T., 2021. *Evidence-Based Policymaking*. s.l.:Routledge.

Bonshor, M., 2017. Conductor feedback and the amateur singer: The role of criticism and praise in building choral confidence.. *Research Studies in Music Education*, 39(2), pp. 139-160.

Bonshor, M., 2020. Collaborative learning and choral confidence: the role of peer interactions in building confident amateur choirs. *Music Performance Research*, Volume 10, pp. 38-56.

Bryman, A., Bell, E., Reck, J. & Fields, J., 2022. *Social Research Methods*. New York: Oxford University Press.

Carlson, R., 2023. Through the eyes of a professional singer. *The Choral Journal*, 64(4), pp. 57-63.

Carter, N., 2017. *How to Read Music: For Beginners - a Simple and Effective Guide to Understanding and Reading Music With Ease*. s.l.:CreateSpace Independent Publishing Platform.

Chaddock-Heyman, L. et al., 2021. Musical Training and Brain Volume in Older Adults. *Brain Sciences*, 11(1), p. 50.

Chapman, J. L. & Morris, R., 2021. *Singing and Teaching Singing A Holistic Approach to Classical Voice*. 4th ed. s.l.:Plural Publishing, Incorporated.

Cherrington, R., 2018. *Why are we calling time on working men's clubs?*. [Online]

Available at: <https://unherd.com/2018/07/calling-time-working-mens-clubs/>

[Accessed 6th February 2020].

- Clements-Cortés, A., 2014. Choral singing benefits for older adults. *Canadian Journal of Music Therapy*, 20(1), pp. 85-109.
- Clements-Cortés, A., 2015. Clinical effects of choral singing for older adults. *Music and Medicine*, 7(4), pp. 7-12.
- Coffman, D., 2018. Community music practice with adults. In: *The Oxford Handbook of Community Music*. Oxford: Oxford University Press, pp. 693-710.
- Cohen, A., Bailey, B. & Nilsson, T., 2002. The Importance of Music to Seniors. *Psychomusicology*, Volume 18, pp. 89-102.
- Cohen, L., Manion, L. & Morrison, K., 2017. *Research Methods in Education*. 8th ed. s.l.:Taylor & Francis.
- Cooper, N., 2017. Design-based research as an informal learning model for choral conductors. *London Review of Education*, 15(3).
- Creech, A. & Hallam, S., 2015. Critical pedagogy: A framework for facilitating older learners in community music. *London Review of Education*, 13(1), pp. 43-57.
- Creech, A. et al., 2013. The role of musical possible selves in supporting subjective well-being in later life. *Music Education Research*, pp. 1-33.
- Creswell, J. W. & Creswell, J. D., 2017. *Research design: Qualitative, quantitative, and mixed methods approaches*. 5th ed. s.l.:SAGE Publications.
- Davidson, J. & Faulkner, R., 2010. Music and the ageing population.. In: *Music Education in the 21st Century in the United Kingdom: Achievements, Analysis and Aspirations*.. London: University of London, pp. 203-218.
- Davidson, J. W. & Faulkner, R., 2014. Group Singing and Social Identity. In: G. F. Welch, D. M. Howard & J. Nix, eds. *The Oxford Handbook of Singing*. Oxford: Oxford Academic.
- Fang, Z. & Sim, N., 2024. Does lifelong learning matter for the subjective wellbeing of the elderly? A machine learning analysis on Singapore data. *PLoS One*, 19(6).
- Field, A., 2024. *Discovering Statistics Using IBM SPSS Statistics*. s.l.:SAGE Publications,.
- Garisi, E., 2024. The Effectiveness of Musical and Non-Musical Choir Training Processes. *International Journal of Multicultural and Multireligious Understanding*, 11(5), p. 509.
- Gideon, L., 2012. *Handbook of Survey Methodology for the Social Sciences*. New York: Springer.
- Hallam, S. & Creech, A., 2016. Can active music making promote health and well-being in older citizens?. *London Journal of Primary Care*, 8(2), pp. 21-25.
- Hallam, S. et al., 2016. The facilitator of community music-making with older learners: Characteristics, Motivations and challenges. *International Journal of Music Education*, 34(1), pp. 19-31.
- Hays, T., 2005. Well-being in later life through music. *Australasian Journal on Ageing*, 24(1), pp. 28-32.
- Hendry, N., Lynam, D. & Lafarge, C., 2022. Singing for Wellbeing: Formulating a Model for Community Group Singing Interventions.. *Qualitative Health Research*, 32(8-9), pp. 1399-1414.
- Heumann, C. & Shalabh, M. S., 2024. *Introduction to Statistics and Data Analysis With Exercises, Solutions and Applications*. 2nd ed. s.l.:Springer International Publishing.

- Higgs, G. J. S. L. M. & H. J., 2017. Assessing the impacts of changing public service provision on geographical accessibility: An examination of public library provision in Pembrokeshire, South Wales. *Environment and Planning C: Politics and Space*, 36(3), pp. 548-568.
- Holtom, B., Baruch, Y., Aguinis, H. & A Ballinger, G., 2022. Survey response rates: Trends and a validity assessment framework.. *Human Relations*, 75(8), pp. 1560-1584.
- IBM Corp., 2021. *IBM SPSS Statistics for Windows, Version 28.0.* , Armonk: IBM.
- Imai, K., Bougher, L. D. & Hicks, R. P., 2021. *Quantitative Social Science*. s.l.:Princeton University Press.
- Jang, S., 2020. Intergenerational Choir: A Qualitative Exploration of Lived Experiences of Older Adults and Student Music Therapists. *Journal of Music Therapy*, 57(4), p. 406–431.
- Johnes, M., 2013. *Wales since 1939*. Manchester: Manchester University Press.
- Johnson, J. et al., 2020. A Community Choir Intervention to Promote Well-Being Among Diverse Older Adults: Results From the Community of Voices Trial. *Journals of Gerontology: Psychological Sciences*, 75(3), pp. 549-559.
- Jones, D. C., Lewis, B. J., Gray, M. & Morgan, D. D., 2022. *A History of Christianity in Wales*. s.l.:University of Wales Press.
- Kaynak, T., 2018. Chorus Chiefs' Views About Chorists' Lifelong Learning Skills. *Journal of Education and Training Studies*, 6(11a).
- Khoa, B. T., Hung, B. P. & Hejsalem-Brahmi, M., 2023. Qualitative research in social sciences: data collection, data analysis and report writing. *International Journal of Public Sector Performance Management*, 12(1-2), pp. 187-209.
- Kim, J. H. & Kim, A. J., 2024. Beneficial Effects of Community-Based Group Singing Program on Quality of Life, Loneliness, and Depression Among Older Adults Living Alone. *Journal of Music and Human Behavior* , 21(3), pp. 113-133.
- Kitchin, R., 2024. *Critical Data Studies*. s.l.:Polity Press.
- Lamont, A., Murray, M., Hale, R. & Wright-Bevans, K., 2018. Singing in later life: The anatomy of a community choir. *Psychology of Music*, 46(3), pp. 424-439.
- Lehmberg, L. J. & Fung, C. V., 2010. Benefits of Music Participation for Senior Citizens: A Review of the Literature. *Music Education Research International*, Volume 4, pp. 19-30.
- Mäki-Opas, T., 2023. Effective promotion of sustainable wellbeing among older people: the social quality approach. *Eur J Public Health*, 33(2).
- Mason, K. & M. P., 2017. Not Ever Again: A Postcolonial View of Opencast Coal Mining in the South Wales Valleys. *Critical Planning*, Volume 23.
- Matthews, D., 2018. *I Saw the Welsh Revival*. s.l.:Emerald House Group, Incorporated.
- Maury, S. & Rickard, N., 2018. Age-related changes in and the predictive value of emotion regulation, social connectedness, and wellbeing on choral singing.. *Music & Science*, Volume 1, pp. 1-14.
- Maury, S., Vella-Brodrick, D., Davidson, J. & Rickard, N., 2022. Socio-emotional Benefits Associated with Choir Participation for Older Adults Related to Both Activity Characteristics and Motivation Factors. *Music & Science*, Volume 5.

- Mayers, A., 2013. *Introduction to Statistics and SPSS in Psychology*. s.l.:Pearson.
- McQuade, L. & O'Sullivan, R., 2021. *Arts and Creativity in Later Life: Implications for Health and Wellbeing in Older Adults. A Systematic Evidence Review.*, s.l.: Institute of Public Health.
- Molińska, W. & Rajchert, J., 2024. Positive musical performance feedback facilitates general self-efficacy and choice of solo performance. *Psychology of Music*.
- Molina, M. & Schettini, R., 2021. Lifelong Learning and Quality of Life. In: *Handbook of Active Ageing and Quality of Life*. s.l.:Springer,.
- Moss, H., Lynch, J. & O'Donoghue, J., 2018. Exploring the perceived health benefits of singing in a choir: an international cross-sectional mixed-methods study. *Perspectives in Public Health*, May, 138(3), pp. 160-168.
- Muijs, D., 2010. *Doing Quantitative Research in Education with SPSS*. 2nd ed. s.l.:SAGE Publications.
- Naeem, M., Ozuem, W., Howell, K. & Ranfagni, S., 2023. A Step-by-Step Process of Thematic Analysis to Develop a Conceptual Model in Qualitative Research.. *International Journal of Qualitative Methods*, Volume 22.
- Nash, G. D., Davies, T. A. & Thomas, B., 1995. *Workmen's Halls and Institutes: Oakdale Workmen's Institute*. Cardiff: National Museum of Wales.
- Noto, S., 2023. Perspectives on Aging and Quality of Life.. *Healthcare*, 11(15), p. 2131.
- ONS, 2022. *National population projections: 2022-based*, London: ONS.
- Pallant, J., 2020. *SPSS Survival Manual A step by step guide to data analysis using IBM SPSS*. 7th ed. s.l.:Open University Press.
- Panchenko, L. & Samovilova, N., 2020. *Secondary data analysis in educational research: opportunities for PhD students*. Les Ulis, EDP Sciences.
- Pears, R. & Shields, G., 2022. *Cite Them Right: The Essential Referencing Guide (Bloomsbury Study Skills)*. 12th ed. s.l.:Bloomsbury Academic.
- Pentikäinen, E. et al., 2023. Longitudinal effects of choir singing on aging cognition and wellbeing: a two-year follow-up study. *PLoS One*, 16(2).
- Perkins, R. & Williamon, A., 2014. Learning to make music in older adulthood: A mixed-methods exploration of impacts on wellbeing. *Psychology of Music*, 42(4), pp. 550-567.
- Pickering, R., 2017. Describing the participants in a study. *Age and Ageing*, 46(4), pp. 576-581.
- Redman, D. J., 2016. *Motivation of Adult, Auditioned Community Choirs: Implications toward Lifelong Learning*, University of South Florida: University of South Florida.
- Rosenbaum, H., 2017. *A Practical Guide to Choral Conducting*. s.l.:Taylor & Francis.
- Rumsey, D. J., 2016. *Statistics For Dummies*. s.l.:Wiley.
- Salcedo, J. & McCormick, K., 2020. *SPSS Statistics For Dummies*. s.l.:Wiley.
- Schweinsberg, M., Thau, S. & Pillutla, M., 2023. Research-Problem Validity in Primary Research: Precision and Transparency in Characterizing Past Knowledge. *Perspect Psychol Sci.*, 18(5), pp. 1230-1243.

Shim, I. & Sim, I., 2020. A Study of the Experience of Working Adults on Regular Choral Activities: Applying Focus Groups.. *Int. J. Environ. Res. Public Health*, 17(23), p. 8860.

Sobol, N., 2019. Lifelong Learning: Music Adult Education. *Continuing Professional Education*, 58(1).

Tebyani, M., 2024. *Conducting change: the effect of a music director's leadership factors on players' performance within the symphony orchestra*. [Online]
Available at: <https://digitalcommons.pepperdine.edu/cgi/viewcontent.cgi?article=2546&context=etd>
[Accessed 20th April 2025].

Trost, J., 2022. The Aging Voice. *The Choral Journal*, 63(4), pp. 24-33.

United Nations, 2024a. *Population*. [Online]
Available at: <https://www.un.org/en/global-issues/population>

United Nations, 2024. *UN projects world population to peak within this century*. [Online]
Available at: <https://www.un.org/en/UN-projects-world-population-to-peak-within-this-century>
[Accessed 28th January 2025].

Ververis, A. & Marshall, N., 2018. The experience of choral singing amongst elderly participants. *Problems in Music Pedagogy*, 17(2), pp. 81-90.

Welsh Government, 2017a. *Adult Learning in Wales*, Cardiff: Crown.

Welsh Government, 2024. *National population projections: 2021-based*. [Online]
Available at: <https://www.gov.wales/national-population-projections-2021-based-interim-data#:~:text=Main%20points,the%20most%2C%20by%207.9%25>
[Accessed 28th January 2025].

World Health Organization, 2015. *Active Ageing: A Policy Framework*, Geneva: World Health Organization.

Zhan, Y., Ning, H. & Zhang, Y., 2025. From work to community: how social participation and retirement can benefit older adults' depression. *Front Psychiatry*, Volume 16.

APPENDIX 1: Hypothesis Summary Table

Number & Area	Hypothesis	Result	Brief Analysis
1 – Gender Differences in age between participants	Null Hypothesis H₀: There is <i>no</i> significant difference in age between females and males, and any observed difference is due to chance Alternative Hypothesis H₁: There <i>is</i> a significant difference in age between females and males	Fail to reject H ₀	There is <i>not a</i> significant difference in age between females and males.
2 – Wellbeing Understanding the motivations by age	Null Hypothesis H₀: There is not an association between choir members' reasons for attending and their age group Alternative Hypothesis H₁: There is an association between choir members' reasons for attending and their age group	Fail to reject H ₀	There <i>is not</i> an association between choir members' reasons for attending and their age group
3 – Age Rehearsal and concert attendance by age	Null Hypothesis H₀: There is not a significant difference between a participants age and attending rehearsals and concerts Alternative Hypothesis H₁: There is a significant difference between a participants age and attending rehearsals and concerts.	Fail to reject H ₀	There <i>is not</i> a significant difference between a participants age and attending rehearsals and concerts
4 – Lifelong Learning: The importance of music notation	The Null Hypothesis (H₀) is: Learning to read musical notation is not a significant factor in joining and continuing in a choir. The Alternative Hypothesis (H₁) is: learning to read musical notation is a significant factor in joining and continuing in a choir.	H ₁ is accepted	Learning to read musical notation <i>is</i> a significant factor in joining and continuing in a choir.
5 - Lifelong Learning: Music notation impacting practice habits	The null hypothesis (H₀) is: Non-notation music readers do not practice more than those who read music. The alternative hypothesis (H₁) is: Non-notation music readers do practice more than those who read music.	H ₁ is accepted	Choir members who cannot read music <i>do</i> practice more frequently than those who do read musical notation.
6 – Wellbeing: Age being a factor in wellbeing effects of choir membership	The Null Hypothesis (H₀) is: Age does not have an impact on the personal benefits derived from participating in a choir. The Alternative Hypothesis (H₁) is: Age does have an impact on the personal benefits derived from participating in a choir.	H ₁ is accepted	Age <i>does</i> have an impact on the personal benefits derived from participating in a choir.
7 - Lifelong Learning: Positive feedback assisting learners.	The Null Hypothesis (H₀) is: Positive feedback does not impact on the musical development of choristers. The Alternative Hypothesis (H₁) is: Positive feedback does impact on the musical development of choristers.	H ₁ is accepted	Positive feedback <i>does</i> impact on the musical development of choristers.
8 – Lifelong Learning: Notation reading benefits	The Null Hypothesis (H₀) is: The ability to read music amongst choristers does not have an impact in reducing rehearsal time to understand and learn the music to be performed. The Alternative Hypothesis (H₁) is: The ability to read music amongst choristers does have an impact in reducing rehearsal time to understand and learn the music to be performed.	H ₁ is accepted	The ability to read music amongst choristers <i>does</i> have an impact in reducing rehearsal time.

APPENDIX 2: SPSS Database Example

