

**The Impact of Melody on Vocabulary Acquisition in Beginning Adult Foreign
Language Learners: An Investigation into Effective Learning Strategies**

Project Proposal & Report

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Elena Atkinson-Sporle

2029941

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Project Proposal

Project Title

The Impact of Melody on Vocabulary Acquisition in Beginning Adult Foreign Language Learners: An Investigation into Effective Learning Strategies

The context

The researcher has been a singing, music and foreign language teacher for over 7 years, specialising in Content Learning Integrated Language (CLIL) (Nikula et al., 2016), integrating the target language (TL) within musical instruction. The pedagogic style of their practice has been informed both by their educational experience studying music at various academic institutions and a CertTESOL training programme (Certificate for Teaching English for Speakers of Other Languages). The researcher's local market research shows that educational programmes integrating language into music learning are few but growing in number and popularity. Therefore, this researching practitioner aims to expand their knowledge, contribute to the existing body of research and develop effective strategies that enhance learning experience and improve student outcomes.

Music has been used as a pedagogical tool in foreign language education for decades (Sun, et al., 2024), with academic research steadily increasing within the last two decades. These investigations have spanned numerous academic fields, including neuroscience (Patel, 2011), linguistics and psycholinguistics (Chen et al., 2023), psychology (Brandt et al., 2012) and foreign language education (Baills et al., 2021).

Patel's influential OPERA hypothesis (2011), explains from a neurological standpoint, why music may promote language acquisition, emphasising how musical training can drive neural plasticity in ways that are beneficial to speech processing. This work has inspired further investigations directed at determining which aspects of music training coincide with aspects of the language acquisition process and how this could impact pedagogy.

Of particular interest to this study is vocabulary acquisition and the impact melody may have on vocabulary learning and retention, including semantic understanding. Singing and listening to songs has been found to improve lexical development (Davis & Fan, 2016; Fritz et al., 2019; Gaboury et al., 2020; Rukholm et al., 2018). Of particular interest to this study is the emerging research into musical training and vocabulary acquisition, including Chen's (2020) research into familiar melodies and second language (L2) vocabulary learning. Theories regarding working memory (WM) and long-term memory will also be called upon, including research into the overlap in neural resources underlying WM for both verbal and tonal information (Schulze & Koelsch, 2012) and the Biased Competition Framework, that states that shared neural resources may compete for neural representation (Scalf et al., 2013).

The justification

As a foreign language teacher, I strive to improve many facets of my students' learning experiences, as well as aid the development of skills and knowledge in the TL. As an inside observer, I have seen increased learner engagement, improved vocabulary recall and developed listening/speaking skills through the introduction of song into the classroom and 1-1 environments. Many aspects of L2 acquisition can be supported through music, some of which will be investigated in this project. Various strategies for L2 acquisition facilitated by music are implemented by a large number of language teachers (Sun et al., 2024).

Preliminary reading and work in previous modules on this MA programme have revealed that the relationship between music and language learning is currently being studied in a growing body of research. The majority of the available studies focus on children in early childhood (Andrä et al., 2020; Busse et al., 2018; Coyle ^ Gomez, 2014). However, statistics show that the interest in learning a foreign language in adulthood is growing and that learning a second language in adulthood offers many benefits, including the enhancement of one's working memory (Huang et al., 2019). This study will therefore focus on the effect of using melodies in vocabulary acquisition among adults.

Furthermore, much of the available research on music in the L2 learning experience focuses on its effects on pronunciation (Christiner et al., 2022). Less, however, is

available on its potential for vocabulary recall. This project thus aims to fill that gap and study the use of melody in vocabulary learning and the potential impact on long and short-term retention and recall abilities. This study intends to investigate the short-term and long-term effects of various pedagogical strategies – including a synthesised melody-based strategy - on vocabulary recall, with data collection being undertaken immediately after a training session and a follow-up session one week later. This research also intends to add to the small number of longitudinal studies concerning song and L2 learning (Sun et al., 2024).

Previous research has noted the positive effects of using song on student motivation (Dolean, 2016; Gorkaltseva & Rostovtseva, 2018). Through semi-structured interviews, this project will also assess the motivational effects of using the synthesised musical methods compared with more traditional tools for vocabulary learning, for example, learning with mnemonics and rote learning.

Finally, another goal of the research is to pilot, through experimentation, a potential strategy that can be used within my own teaching.

The intended impact

The project aims:

- to develop the researcher's understanding of the cross-domain relationship between foreign language learning and musical training
- to review existing literature on working memory, L2 vocabulary learning, music and melody in the foreign language classroom
- to review existing literature on the effects of melody on working memory and long-term memory
- to collect quantitative and qualitative data on language teachers' usage of and experiences with various vocabulary acquisition strategies
- to synthesise and modify pedagogical tools to be tested rigorously in a quasi-experiment

- compare traditional teaching methods with the synthesised melodic method in a controlled experimental environment
- to collect quantitative data to measure the efficacy of various vocabulary-learning strategies
- to collect qualitative data on learners' experiences with various vocabulary-learning strategies
- to compare results from this study with other similar studies to assess the validity
- to make recommendations for future best practices and further research
- to add to the growing body of research on foreign language educational strategies

The outlined intention

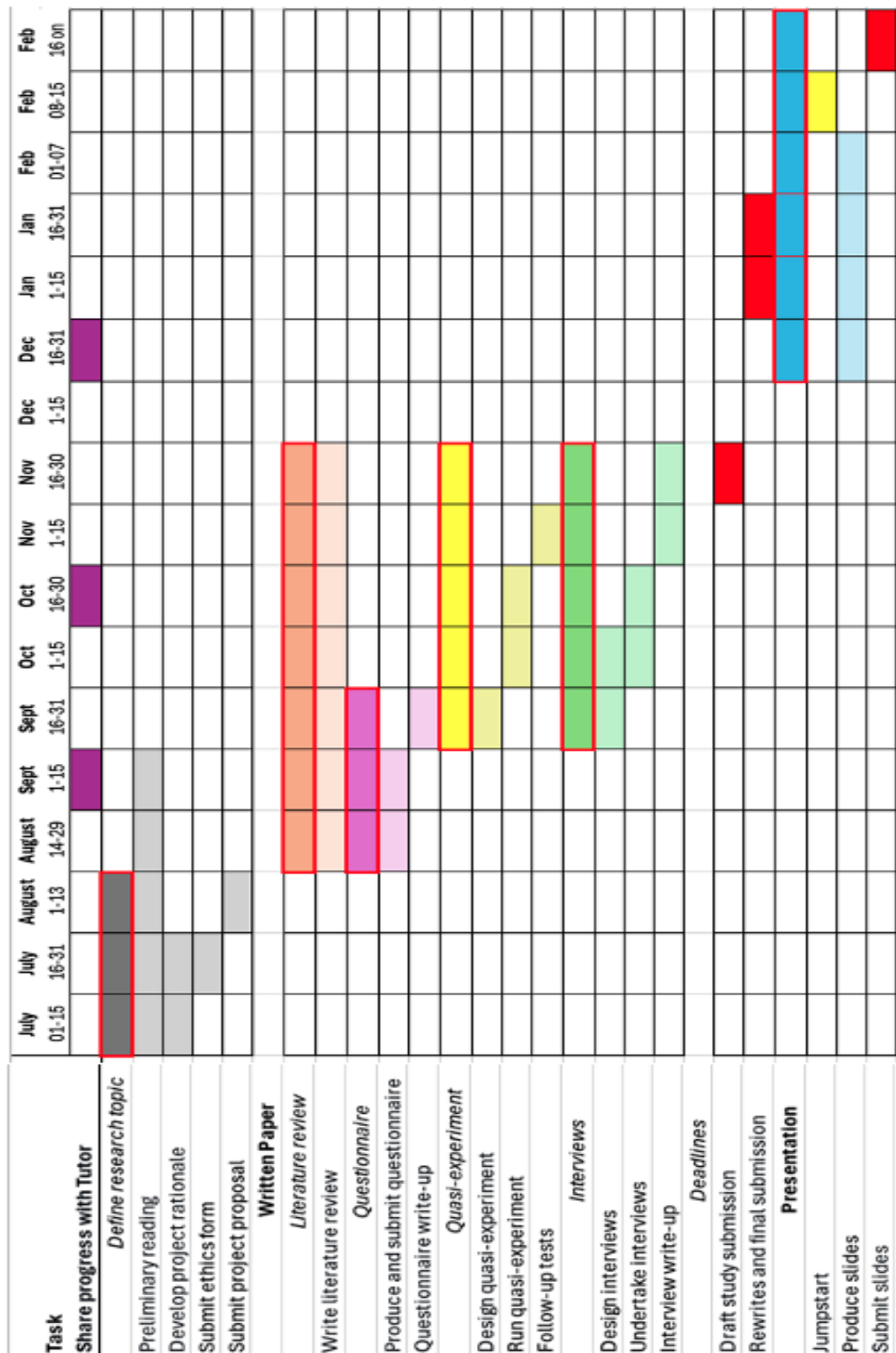
The project will assume a pragmatic paradigm, acknowledging both singular and multiple realities (Feilzer, 2010), placing the 'what' and 'how' of the research problems at the centre (Creswell, 2003). This will involve a sequential mixed methods design, both quantitative and qualitative without a particular bias (Mackenzie & Knipe, 2006).

The research design will consist of the following.

- **A rapid systematic literature review** will clarify the state of existing research and highlight the implications that should be drawn from this (Grant & Booth, 2009).
- **A semi-structured questionnaire** will be submitted on Google Forms and shared in foreign language teacher forums to gather data on current teaching methods and experiences regarding vocabulary recall and novel word learning, which will inform the experimental design and focus.

- **A quasi-experiment** will be designed to test methods of vocabulary training, including both a synthesised musical exercise informed by research and more traditional methods found in the survey and literature review.
 - **A pre-test** will be undertaken in which participants are tested on their prior knowledge of the target vocabulary to be taught in the experiment.
 - **A phonological short-term memory (PSTM) test** will be undertaken to account for the potential influence of PSTM on novel word vocabulary learning.
 - Participants will undertake **training** in which 12 Spanish words will be taught through different instructional modalities: melodic and spoken.
 - Training will be delivered in one session via pre-recorded video to ensure consistency throughout the tests. Training will likely last 15 minutes. The researcher will be virtually present to observe on Zoom.
- **An immediate post-training test** will assess the effectiveness of the strategies. This will involve recollection of the taught vocabulary. The accuracy of the responses will be measured and this data will be collected.
- **A semi-structured interview** will follow the immediate post-test to gain the perspectives of the learners involved in the research experiment. This will include a subjective assessment of their motivation.
- **A follow-up test** will assess the effects of the training methods on long-term memory. This will be undertaken one week after the training session and will be the same test as the immediate post-training test. Accuracy of the responses will be measured and this data will be collected.
- **A descriptive analysis** of the quantitative and qualitative data will be conducted, demonstrating both pre-test and post-test vocabulary knowledge.
- The **data** will be **interpreted**.
- **Various data sets** will be **triangulated**.
- The **data** will be **discussed** in the context of current research and practices.

A GANTT chart is provided below to detail the timeline of the project.



Personal learning outcomes

- I aim to better understand the cross-domain relationship of melody/pitch processing and novel word learning in adults.
- I aim to develop a workable, evidence-based strategy to assist language learners and other foreign language teachers.

Ethics and insider research

As a student of University of Wales Trinity Saint David practising in Vienna, Austria, I must observe the UWTSD codes and guidelines, as well as the Best Practice Guide for Research Integrity and Ethics provided by the Austrian Federal Ministry of Education, Science and Research. Considering these, I anticipate this will be a low-risk project. Volunteers will provide informed consent by signing a consent form. Participant confidentiality and anonymity will be ensured throughout the research process.

For the quasi-experiment, I will use a convenience sample of volunteers amongst my singing groups. As the singing teacher of the participants, I acknowledge the potential influence of this existing relationship on the research (Puchner & Smith, 2008). Participants may feel compelled to share a biased response during the interview segment, especially when asked about motivation/enjoyment. To mitigate these issues, I will refer to an observation journal and cross-reference their responses with my observations. I will also follow up with participants for further clarification to avoid potential misinterpretation (Cohen et al., 2018).

The Impact of Melody on Vocabulary Acquisition in Beginning Adult Foreign Language Learners: An Investigation into Effective Learning Strategies

Introduction

The researcher has been a foreign language instructor and singing teacher for over seven years, currently practising in Vienna, Austria. They hold a Bachelor's degree in Music and a Certificate for Teaching English for Speakers of Other Languages (CertTESOL) qualification. As an inside observer, the researcher has noted improved engagement and language skills following the introduction of songs into language-learning settings. Preliminary reading has shown that research supports the introduction of music into the classroom for various reasons, including memory retention (Baills et al., 2021; Legg, 2009; Medina, 1993) and learner engagement (Sun et al., 2024). The literature, however, reveals gaps in longitudinal studies and studies with adults. The purpose of this study is to investigate the use of melody in vocabulary instruction and discuss ways in which the findings can be applied in pedagogical practices, specifically for adults learners.

Terminology

The terms *foreign language (FL)* and *second language (L2)* are often used interchangeably across academic fields, but there are some notable distinctions, depending on the context. Generally, L2 refers to the non-native language spoken in the learner's current environment - for example, an English native speaker living in France and learning French (L2). In contrast, a foreign language would refer to a language not native to the learner's immediate environment. Alternatively, L2 can also refer to any non-native language learned after the first language (L1). In applied linguistics, these terms are distinguished by their pedagogical approaches: *foreign language learning (FLL)* emphasises structured instruction whereas *second language learning (SLL)* prioritises immersion, exposure and task-based learning (Sato & Storch, 2022).

In this paper, the term *foreign language learning* is used consistently, while insights from literature using varying terminology are incorporated where relevant.

Literature Review

What is Vocabulary?

Vocabulary is fundamental to language proficiency. The renowned linguist and language educator David Wilkins famously asserted, "Without grammar very little can be conveyed, without vocabulary nothing can be conveyed" (1972, p. 111). In linguistic studies, 'vocabulary' encompasses both individual words and multi-word units - (as soon as, make up one's mind, run out of, put up with) – to communicate semantic meaning (Laufer in Hinkel, 2017). Vocabulary provides the basis for learners' performance in the four key language abilities: speaking, reading, writing and listening (Alemi & Tayebi, 2011). Given its central role in communication, vocabulary acquisition is a crucial aspect of foreign language learning. However, acquiring and retaining vocabulary can present challenges, particularly for adults.

The Benefits and Challenges of Foreign Language Acquisition in Adults

There are many benefits to learning a foreign language beyond communication and cultural engagement. Research suggests that learning a new language in adulthood can positively influence cognitive function, especially in aging. Studies indicate that foreign language learning may lower the risk of dementia (Klimova & Kuca, 2015), enhance grey matter structure in the brain (Bellander et al., 2016), and engage a larger brain network than other forms of cognitive training (Antoniou et al., 2013). However, acquiring foreign language (FL) vocabulary presents unique challenges for adults.

Language acquisition mechanisms differ throughout the lifespan. During early childhood, particularly within the critical period - birth until early puberty - phonology, morphology and syntax are acquired through mere exposure. Peak proficiency is typically achieved when exposure to the language begins in very early infancy or childhood (Lenneberg, 1967; Krashen et al., 1982; Newport, 2006). In contrast, adults are less likely to acquire and retain vocabulary passively (Laufer, 2005). This is largely attributed to a decline in neuroplasticity following the critical period, leading to slower and more limited neural adaptation in the learning process (Bubbico et al., 2019; Steber & Rossi, 2021). As a result, foreign language instruction for adults necessitates more deliberate and structured learning methods (Laufer, 2005; Alemi & Tayebi, 2011), with older learners often requiring more time to acquire and retain

new vocabulary (Marcotte & Ansaldo, 2014). Additionally, the learner's success is also influenced by internal and external factors, including **motivation, anxiety levels, cognitive differences**, including metalinguistic awareness and nonverbal intelligence (Brooks et al., 2013), and the **learning context** (Kozaki et al., 2011).

To optimise vocabulary acquisition and retention in adult learners, various instructional strategies have been developed. These include connecting words with physical objects, use of pictures, identifying cognates, incorporating gestures and movements, implementing gamification techniques, rhythmic speaking and use of songs (Mohammed, 2023; Thornbury, 2017, Sun et al., 2024). Research has demonstrated varying efficacy of these techniques. For example, gamification can increase learner motivation and encourage regular practice (Alfadil, 2020) but learner success and educational value relies heavily on the design; poorly designed games can lead to superficial language learning without a deep comprehension of the TL. Gestures and movements can facilitate embodied learning which has been shown to lead to better long-term memory outcomes for novel vocabulary (Fuhrman et al., 2021).

This paper focuses on one such strategy – melody- and its role in supporting acquisition and retention in adult learners. The introduction of melody into vocabulary instruction has been shown to enhance immediate and prolonged learning outcomes in vocabulary acquisition, especially exhibiting benefits in pronunciation and 'language performance' (Christener et al., 2021; Chen, 2020). This study aims to provide a holistic overview of melody in vocabulary instruction, the efficacy of this method to improve acquisition and retention, and uncover how this strategy impacts various factors that influence success in adult FLL.

Music as a pedagogical tool in FLL

Music has long been used as a pedagogical tool in language learning environments. There are many reported benefits of using songs as a teaching method: songs can support the memorisation and retention of L2 words (Chen, 2020; Davis and Fan 2016; Fritz et al., 2019; Rukholm et al., 2018), enhance the pronunciation and prosody (Baills et al., 2021), help to contextualise new vocabulary (Murphey, 1990; Sun et al., 2024; Ruckholm et al., 2018), motivate and engage students (Li & Brand,

2009; Sun et al., 2024), and support the learner's connection to the target culture (Sun et al., 2024).

However, some studies report the use of song as ineffective for certain objectives. For example, Tsang (2020) found songs to strengthen learners' L2 word acquisition but ineffective in improving learners' scores in gap filling exercises. Furthermore, Kumar's (2022) meta-analysis highlights that many of the existing studies are comparative or correlational in nature, so conclusions regarding causation should not be drawn. Kumar suggested that music may only be influencing external factors in the learning environment, such as motivation. Similarly, many of these studies are not longitudinal and do not measure long-term retention of newly acquired vocabulary. Moreover, as the majority of available studies focus on young learner's L2 acquisition, the transferability of many of these benefits to adult learning is not yet clear.

Neuroscientific findings

The benefits of integrating music into language instruction are being investigated through a neuroscientific lens. Recent studies have revealed significant overlaps in the brain regions involved in language and music processing, particularly in auditory and motor pathways (Besson et al., 2011; Patel, 2011; Patel, 2014; Neves et al., 2022; Tervaniemi et al., 2021). Patel's OPERA hypothesis (2011) offers an explanation for these connections and provides a theoretical framework, emphasising how musical training enhances neural plasticity and supports speech processing. According to Patel, the integration of Overlap, Precision, Emotion, Repetition and Attention (OPERA) in musical activities enhances auditory discrimination and motor co-ordination critical for language acquisition (2011). Moreover, neuroscientific studies using neuroimaging techniques such as PET and fMRI found that regions previously considered exclusive to language processing like the Broca and Wernicke's areas are also activated by music and melodic processing (Besson et al., 2011).

Many studies demonstrate that individuals with musical training exhibit advantages in foreign language learning, predominantly regarding pronunciation, supporting the OPERA hypothesis (Coumel et al., 2023; Christener et al., 2022; Delogu and Zheng.,

2020; Ghaffarvand and Werner, 2018; Habib et al., 2016; Liu et al., 2023). Other studies uncovered that the benefits of musical training also extended to spelling (Overy, 2003; Gaboury et al., 2020) and prosody skills (Cason et al., 2020). However, Neves et al. (2022) indicated in their meta-analysis of the available neuroscientific literature that these reported enhancements in learning are riddled with publication bias, limitations of sample size and design quality. They argue that the advantages of music training on foreign language learning have been inflated. Some studies even suggest that certain music and linguistic skills are domain specific and non-transferrable. For instance, Zheng et al., (2022) found in an empirical investigation that music aptitude was only weakly predictive of prosodic aspects of L2 pronunciation proficiency.

Working memory: phonetic and tonal

To understand how melody may affect vocabulary acquisition, it is important to understand how melody and phonemes are processed and stored in short- and long-term memory. Working memory (WM) refers to a memory system that provides temporary storage and manipulation of the information necessary for complex cognitive tasks, including processing new L2 vocabulary and pitch information (Baddeley, 1992). A sub-system called phonological short term memory (PSTM) is integral to the process of learning novel FL vocabulary by forming phonetic categories for FL sounds (Aliaga-Garcia et al., 2011), a key component of initial stage of foreign language learning. Many empirical studies have indicated that there is a strong correlation between an individual's PSTM capacity and foreign language ability (Saito & Uchiyama 2024; O'Brien et al., 2007; Gathercole, 1999; Atkins and Baddeley, 1998; Aliaga-Garcia, 2011). PSTM is also involved in mental rehearsal of words, sounds, and phrases Krashen (1983), a process that activates areas of the brain involved in verbal and tonal processing - premotor cortex, the auditory cortex, the basal ganglia – associated with voluntary movement control – and the cerebellum (Koelsch, 2011).

Another recognised WM model concerning phonological memory is Baddeley and Hitch's (1974) multi-component model in which verbal information is processed by the phonological loop. They theorised that this phonological loop is also responsible for processing tonal information. Research has provided mixed results but shows

that there is considerable overlap in neural resources underlying WM for both verbal and tonal information (Schulze & Koelsch, 2012). According to the Biased Competition Framework, the shared neural resources may compete for neural representation, resulting in reduced or slower capacity to process phonological and tonal information (Scalf et al., 2013). Through tests with verbally impaired participants, Peretz and Zatorre (2005) inferred that both singing and speech are mediated by a language output system distinct from the melodic processing system. These studies may indicate that introducing melody to vocabulary in foreign language instruction would slow or reduce the capacity of an individual to process the information in working memory.

Sweller's Cognitive Load Theory (1988) explains how the brain processes and retains information, emphasising the limitations of working memory (WM). This theory has been developed and refined since its conception but the core concepts remain robust and well-supported by research (Sweller, 2023). According to the Cognitive Load Theory, there are three types of cognitive load that influence learning: the Intrinsic Load, the inherent complexity of the material being learned; the Extraneous Load, the unnecessary mental effort imposed by poor instructional design; and the Germane Load, the mental resources devoted to processing, constructing and automating schemas. A recent study revealed a statistically significant relationship between distraction and cognitive load, indicating the importance of managing cognitive resources in maintaining attention during L2 learning tasks (Costley, 2021). The addition of melody to new L2 vocabulary could reduce the Germane Load by providing a structured, repetitive framework that aids memory consolidation through chunking into units, and providing rhythmic/melodic patterns to help learners anticipate and recall linguistic structures.

Melody and memory

Melody has been used as a mnemonic device to help individuals to remember items and information for centuries, in jingles transmitting stories and learning the laws of physics (Yalch, 1991; Racette & Peretz, 2007; Wallace, 1994). Serafine, et al. (1984, 1986) theorised that the melody and the text of songs are learned together as one integral unit, suggesting that the cognitive load is not necessarily increased when

melody is present. There is evidence to suggest that this may extend to L2 vocabulary learning.

In a study focused on active foreign language vocabulary recall, Legg (2009) assessed the efficacy of song as a tool for 56 secondary school children learning French. The 12-13-year-old participants were divided into two groups, a Non-Music group and a Music group. Both groups were required to learn a text for an assessment. The Non-Music group learned by reciting the text as a poem and playing vocabulary-based games, while the Music group were required to rehearse a simple, predictable musical version of the text. The assessment involved translating phrases from the text from English into French. The post-training test revealed that students in the Music group significantly out-performed the students in the Non-Music group. However, as this was a relatively short study, it was not ascertained whether long-term retention was achieved. It is also unknown whether such benefits transfer to adult-learning.

A similar study by Ludke et al., (2014) compared the efficacy of speaking, rhythmic speaking and singing as methods of training novel vocabulary in an unfamiliar language, in this case Hungarian. Rhythmic speaking was differentiated from speaking as the vocabulary had clear, metrical, musical rhythm and were spoken in time with a metronome. Participants were randomly assigned to one of the three groups for a 15-minute “listen and repeat” training session. The singing group sang the words and phrases to simple set melodies. Their acquisition of the vocabulary was then assessed with five different production, recall, recognition and vocabulary tests for the English-Hungarian pairs. For four out of five tests, the singing group scored highest, where in the recognition test, the speaking and singing group scored equally. This study undermined previous works that had indicated that rhythm was the most supportive element of a musical presentation method for linguistic skills and memory.

A further, longitudinal study by Good et al. (2015) demonstrated that singing passages in a foreign language improved memorisation of text, pronunciation of FL vowels and semantic connections over mere spoken repetition. These benefits extended 6 months beyond initial training.

While many studies indicate that melody can support L2 vocabulary learning and retention, some studies indicate that introducing melody to novel L2 vocabulary could increase extraneous load. This has been studied within the field of psycholinguistics, how the mind processes and produces language. Studies in this field have revealed instances in which melody has been seen to negatively affect the learning of new vocabulary. Racette and Peretz (2007) designed an experiment to test the efficacy of melody as a mnemonic for learning text, specifically song lyrics in the participants' native language. The results revealed that the lyrics were best learned when the melody was ignored, more specifically, the cost of singing was reflected by a 14% word loss. Such observations could be due to an increased cognitive load, the activation of additional brain regions and thus a reduced capacity to process information.

In another study focusing on the effects of song on L2 vocabulary learning, Baills et al. (2021) compared the efficacy of rhythmic speech and singing as delivery methods for new L2 vocabulary. The study consisted of 108 Chinese high-school students learning French. Accentedness ratings of pre-test and post-test recordings revealed that listening to song reduced accentedness significantly more than the rhythmic speech listening group. Recollection of the target vocabulary, however, saw equal improvement in both groups. This study highlights the potential limitations of using melody in L2 vocabulary learning as an aid for pronunciation but not necessarily establishing or strengthening semantic connections.

This study attempts to fill gaps in the current literature by exploring the long-term effects of melody in foreign language instruction, particularly among adults. Given the limited number of longitudinal studies in this area, further research is needed to assess not only the linguistic outcomes - including pronunciation, semantic connection and prosody - but also the broader learner experience, including intrinsic motivation, enjoyment, attention.

Methodology

This research inquiry originated as a result of an improvement agenda through reflection-on-practice (Ghaye, 2010). The project aligns with a pragmatic paradigm, placing the 'what' and 'how' of the research question at the centre, utilising both

quantitative and qualitative methods without a particular bias (Creswell, 2003; Mackenzie & Knipe, 2006; Denscombe, 2014). This will be achieved through a mixed methods study based on Creswell et. al's (2003) Triangulation Design: a literature review, questionnaire, quasi-experiment (with observational journal) and a semi-structured interview with the participants of the experiment. Triangulation of each dataset will be used to improve reliability and credibility (Denscombe, 2014). Triangulation of perspectives will also be used to gain a broader insight of teaching methods in L2 vocabulary learning. This will include collecting data on the experiences of language students and teachers alike.

Insider Research and Ethics

This project can be considered Inside Research as the researcher is a practitioner in the field being studied, a singing and language teacher. The project has materialised as a result of the researcher modelling their practice on Kolb's experiential learning cycle of reflection and action (Akella, 2010; Kolb, 1984). As an Insider Researcher, the researcher must be aware of any tensions that may arise between the personal and professional (Puchner & Smith, 2008). The researcher must approach the study with impartiality and without a vested interest in certain results being achieved (Costley et al., 2010). The researcher must try to be a skilled observer, training themselves through rigorous preparation (Patton, 1999).

This practice-based research study involves insider research. As a convenience sample has been used both for the questionnaire and the experiment, the nature of insider research must be deconstructed to understand the potential implications this has on the study. Insider research can benefit from the researcher possessing a deeper understanding of the phenomenon to be studied and thus being able to draw from a strong foundation of knowledge in each aspect of the project (Saidin & Yaacob, 2017). Working with participants familiar to the researcher can also make participants feel comfortable and allow the researcher to identify nuances in behaviour or response that may be missed by an outsider (Saidin & Yaacob, 2017).

However, insider research can also pose disadvantages. A pre-existing relationship with participants can lead to informant bias and potentially discomfort in performing tasks which may be deemed challenging (Mercer, 2007). In an attempt to remain

impartial and maintain credibility, the researcher will write a hermeneutic, reflective research journal (Schön, 1983).

Questionnaire

The purpose of the questionnaire is to uncover information on effective FL vocabulary training techniques from teachers' perspectives and inform the design of the quasi-experiment. It serves as a primary data collection tool to support the study's investigation into effective FL vocabulary instruction strategies.

The questionnaire consists of three sections covering the efficacy of various instructional methods, the application of melody in vocabulary learning and assessment methods. The questionnaire was developed based on the preliminary literature review. It includes a mix of multiple-choice, numerical scale and open-ended questions to ensure comprehensive data collection. The questionnaire was made available on Google Forms from 21.09.24 – 13.10.24. This self-completion questionnaire facilitated the collection of standardised data from a large sample (Cohen et al., 2018). In an attempt to enhance reliability and validity, the semi-structured questionnaire was disseminated to a convenience sample.

Data Analysis

Responses were analysed using various methods including descriptive statistics, thematic analysis and descriptive coding. Thematic analysis and descriptive coding were used to process responses to open-ended questions and enable identification of patterns and broader themes. This was useful when comparing responses.

Participants

The convenience sample was comprised of 14 teaching professionals, including peers from the University of Wales Trinity St David, as well as active practitioners in the UK, USA, Spain and Austria. These peers were selected based on ease of contact and availability. Although more teachers were invited to participate, time constraints prevented them from completing the questionnaire within the given timeframe. Participants demonstrated a range of practical teaching experience: 42.9% had 1-3 years, 28.6% had 4-6 years, and 28.6% had over 10 years. However, specific details on the nature of their teaching practice were not provided.

Ethical Considerations

The participants had access to an overview of the study. They agreed to participate anonymously and information on their identity was not collected. However, it is important to consider that the participants' relationship with the researcher may have influenced the responses (Mercer, 2007). Participants were informed that they could withdraw at any point and gave their consent before undertaking the survey.

Vocabulary Training

Participants were asked to select the methods that they commonly use in their instruction from a list of 10 vocabulary training techniques. The list was compiled based on relevant literature, including literature on CLIL (Content and Language Integrated Learning) (Nikula et al., 2016; Thornbury, 2017). The study uncovered that the most commonly utilised vocabulary teaching method was *Songs*, with 85.7% of participants reporting that they use this method with their students. The next most commonly utilised teaching methods were *Contextual Learning*, and *Games and Activities*.

Figure 1

Instructional Method	
Songs (e.g. using lyrics to teach vocabulary)	12 (85.7%)
Contextual Learning (e.g. learning vocabulary through reading or conversation)	11 (78.6%)
Games and Activities (e.g. word puzzles, matching games)	10 (71.4%)
Rote Learning (e.g. repetitive drilling of vocabulary)	7 (50%)
Technology (e.g. apps, online quizzes)	6 (42.9%)
Keyword Method (e.g. using a familiar word to remember a new word)	6 (42.9%)
Mnemonics (e.g., associating words with images or stories)	5 (35.7%)
Visuals (e.g. flashcards)	5 (35.7%)
Haptic pronunciation techniques	1 (7.1%)
Other (please specify)	1 (7.1%)

Methods used by the teachers when teaching new vocabulary to adults

A few considerations must be made when analysing this data. Firstly, it is important to note that these techniques are often used in tandem with one another, often to reinforce learning. The collected data does not provide information on this. Secondly, there is a lot of overlap with the methods provided - for instance, *associating words with images* and *visuals* could be considered the same method. Nevertheless, this finding is consistent with literature that suggest that teachers use an eclectic mix of methods when teaching vocabulary (Liu, 2004). The findings are also congruent with the Multimodal Input theory, which can benefit engagement and retention (Li et al., 2022).

Perceptions of efficacy

Teachers were then asked to state one vocabulary instructional method that they perceive to be the **most effective** and explain their reasoning. Despite this being an open question, it is possible that the responses were influenced by the 10-item list in the preceding question, potentially limiting the respondents perceived freedom in their response.

Contextual learning was cited most frequently as the most effective instructional method (n=6). *Contextual learning* is a very broad term and could encompass a variety of teaching methods. This was reflected in the variety of examples participants gave under the heading of *contextual learning*, including “role play”, “conversations based on key vocabulary” and “learning vocabulary within a reading context”. These are all examples of CLIL teaching and learning strategies (Nikula et al., 2016).

The second most frequently cited method was songs and lyrics (n=3). The benefits were reported to be “cultural significance” and “motivation”. These observations are consistent with current literature that states that FL words learned in cultural contexts help learners comprehend and retain the new words (Dias de Oliveira Santos, 2015; Wong and Samudra, 2021). Further research has also noted the benefits of song on adults’ motivation (Dolean, 2016).

The results necessitate further questioning and clarification. Despite songs being reported as the most commonly used method in vocabulary learning in question 1,

they are only reported as the second most effective learning method in question 2. This could be due to many factors. For example, songs could be used by teachers as a warm-up, ice-breaker or rapport-builder. Without further clarification from the respondents, this unfortunately remains unclear.

Incorporating music

The respondents were then asked to provide details on the application of music within their teaching practice. The responses were coded using descriptive coding through an inductive approach (Saldaña, 2016). Three major themes emerged: stress and intonation, memorisation and vocabulary in context.

Stress/intonation

Three respondents referenced using music to help students improve stress and intonation.

“I use [music] for rhythm, stress and intonation where students practice vocabulary...”

The use of music to focus on stress and intonation within vocabulary learning has been supported by recent research. For instance, in an experiment with high school children learning various foreign languages, Baills et al., (2018) found that clapping to the rhythm of the target vocabulary improved accentedness, pronunciation and stress intonation upon production.

Memory

One respondent reported using melody as a mnemonic device.

“Sometimes I make up a song... [to] target vocabulary memorisation”

The efficacy of song as a mnemonic device has long been reported both in memorisation tasks in a speakers L1, for example remembering phone numbers, and learning new FL vocabulary (Yalch, 1991).

Vocabulary in context

Three respondents reported using song for the benefits of hearing vocabulary in context.

“Playing songs with selected vocabulary e.g. listen to radio for numbers”

“Listening to songs using relevant vocabulary to understand the words in context”

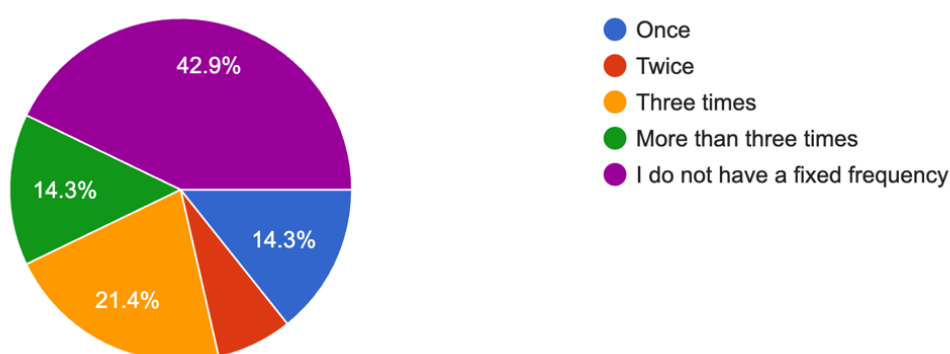
“Contextualise the vocabulary and understand the grammar.”

Hearing target vocabulary in songs can indicate the meaning of new vocabulary and build emotional associations, making the words more memorable (Davis & Fan, 2016; Coyle & Gomez, 2014; Darwin, 2024; Tilwani, 2022). Songs can also demonstrate grammar structures in conjunction with the new vocabulary.

Assessment

The teachers were asked to state the frequency with which they repeat new target vocabulary within a single training session. This would inform the design of the quasi-experiment. The largest group, 42.9%, reported that they do not have a fixed frequency. This was followed by 21.4% of respondents reporting that they repeat target vocabulary three times in a single session. The length of the respondents' training sessions was not provided.

Figure 2



Reported repetition frequency of new vocabulary in a single session.

42.9% of respondents reported that they do not have a fixed frequency with which they repeat target vocabulary within a single session. This could be due to many factors. If the length of the teachers' sessions vary, the repetition frequency is also likely to vary. Without further clarification from the teachers, this remains unclear. However, this is supported by Nation's (2001) comments on multiple exposure, which suggest that the more a learner is exposed to a word, the more likely they are to retain it.

Findings

The findings from the questionnaire reflect a variety of approaches to vocabulary instruction. Song was reported as the most frequently used vocabulary training technique (85.7%), yet contextual learning was perceived as the most effective method. Music appears to be primarily used to support stress/intonation awareness and production, aid memorisation and contextualise vocabulary. The majority of teachers did not follow a fixed repetition frequency for new vocabulary within a given session. The overlap in instructional methods suggests that multiple strategies are often employed together, which the data does not explicitly reflect.

Limitations

While this study collected valuable data, it is important to reflect on the limitations of the study and the credibility of this data. One major limitation is the lack of contextual data about the participants, which restricts the ability to interpret the findings. Certain specifics would have been useful to know as this may influence the methods the teachers are willing/able to use. It would be useful to know if these teachers are affiliated with particular institutions, the size of the groups they work with and the languages they teach. A sample size of 14 is relatively small and may lack generalisability to a larger population of language teachers. Furthermore, the list of teaching strategies in question 1 may have influenced the participants and created response bias. This study focuses on immediate perceptions and practices and does not reveal information on how these strategies impact language retention over time. This study would also have benefited from follow-up interviews to clarify certain issues and provide richer insights.

Discussion

Despite the limitations, the findings are congruent with the literature: Language teachers appear to be using music in the context of adult vocabulary learning for the purposes of enhancing prosody, boosting motivation and supporting memorisation. Additionally, the findings from the questionnaire can be used in the design of the quasi-experiment and to help prepare researcher to be a skilled observer (Patton, 1999).

Quasi-experiment

Method: design overview

The quasi-experiment aimed to investigate the effect of melody on productive vocabulary recall, which refers to the ability to actively retrieve and produce learned vocabulary (Webb, 2009). Participants engaged in a “listen-and-repeat” vocabulary training session, where half of the target foreign words were presented in a spoken format and the other half in a sung format. Participants repeated each word aloud in the mode in which it was delivered. Spanish was selected as the target language because the researcher teaches beginner Spanish, and all participants had little to no prior experience learning the language.

The experiment assumed the following structure:

- **Day 1**
 - **Pre-tests:** PSTM test → Vocabulary assessment
 - **Training:** spoken and sung modality (13 minutes)
 - **Post-test:** immediate recall test
 - **Semi-structured interview**
- **Days 2-7**
 - Participants do not actively practise vocabulary
- **Day 8**
 - **Post-test:** delayed recall test

Participants

The population consisted of a convenience sample of 10 participants, selected through convenience sampling from the researcher’s current and former singing students. The participants ranged in age from 29-69 years. Of these, 8 participants were native English speakers, while 2 were native German speakers with C2 English (advanced) according to the Central European Framework Reference (CEFR). The native German speakers were incorporated as part of the convenience sample, as the researcher is based in Vienna, Austria. Neither German nor English are romance-based languages, reducing the likelihood of L1 interference in the foreign language learning process. Participants had little to no experience with Spanish nor other romance-based languages including Latin, Italian, French, Portuguese and

Romanian. Since musicianship has been shown to correlate with L2 learning abilities, this study also considers the potential influence of musical training.

Participants were divided into two groups based on their musical background:

- **Non-Musicians:** 50% of participants had less than 6 months of formal musical training.
- **Musicians:** 50% of participants had at least 5 years of formal musical training.

Technical considerations

The training and tests were conducted on Zoom video calls between individual participants and the researcher. The quasi-experiment included two live pre-tests, a 13-minute recorded training session, a live post-test and a post-training semi-structured interview. To minimise technical interruptions, efforts were made to reduce lag, by recording locally rather than cloud and disabling HD settings. To ensure consistency across the sessions, each participant wore headphones and accessed the training using the Zoom software.

Pre-tests (Day 1)

Two pre-tests were conducted live by the researcher at the start of the Zoom session. This included a phonological short-term memory (PSTM) test and a Spanish vocabulary assessment.

Phonological short-term memory

With a small sample size of 10 participants, it is important to consider potential factors that may influence the experimental results. Thus, a pre-test was conducted to assess the PSTM capacity of participants. The PSTM pre-test was compared with post-training test results to evaluate whether PSTM acts as a confounding factor in the vocabulary training. The live PSTM test was based on the Gathercole et al. (2001) serial non-word recognition (SNWR) task. The SNWR task involves “recognising whether two otherwise identical meaningless phonological sequences have their constituent elements in the same order” (O’Brien et. al., 2007 pp.563). Example: barm chull goop gardge meep; barm chull gardge goop meep (the second iteration is presented in a different order).

The non-words were one syllable and consisted of consonant-vowel-consonant phonemes. English phonotactic rules were used as all participants have a fluent command of these. Following the Gathercole et al. (2001) design, the researcher read one item approximately every 150 ms. The task consisted of three sections: 6 four-word lists, 6 five-word lists, and 6 six-word lists. The researcher would read a list through twice with the second iteration either in the same order or a different order from the initial pass. The participant reported whether they perceived the second iteration to be the same or different to the first. It must be acknowledged that the SNWR test, however, is not a pure measure of PSTM as it cannot account for non-PSTM factors necessary to complete the task including attention and executive control in decision-making (O'Brien et al., 2007).

Spanish vocabulary assessment

The second test was a Spanish vocabulary test to determine the participants' pre-existing knowledge of the 12 target vocabulary words to be learned in training. The English translations and corresponding pictures were used as prompts for eliciting active production of the language.

Training (Day 1)

Training was presented in a pre-recorded video format to standardise the tests and ensure consistency. The stimuli were recorded by myself, the researcher, a native English speaker with C1 Spanish according to the Central European Framework Reference (CEFR). Digital audio files were recorded into a MacBook Pro with a high-fidelity condenser microphone. These audio files were then paired with the presentation slides. The videos were sent to a native Spanish speaker to verify the researcher's pronunciation and prosody before the experiments were undertaken (see appendix 6 for proof of verification).

Each group was presented with 12 Spanish nouns to learn, 6 of which were in the sung modality, the remaining 6 were spoken. This is a manageable cognitive load according to Sweller's cognitive load theory (1998). Research by Nation (2001) and Schmitt (2008) also indicates that beginners retain vocabulary better when introduced to around 10 new words per session.

Lexical sets were formed with 3 words in each set. For example, ‘bed’ *cama*, ‘pillow’ *almohada*, ‘sleep’ *sueño*, ‘blanket’ *manta*, and ‘mattress’ *colchón* are all semantically associated with sleep.

Figure 3

Sleep	Animals	Love	Places
sueño	pájaro	novio	pueblo
cama	lagarto	cuidado	correos
colchón	caracol	confianza	ayuntamiento

The selected Spanish vocabulary to be learned during the training phase

The nouns have been selected with the following in mind:

- **Phonological difficulty for English and German speakers:** The phonemes apparent in the chosen Spanish vocabulary contain phonemes present within British English and High German, although there are three novel to Spanish: */ɲ/* ("ñ" as in *niño*), */r/* (alveolar tap) and */r̄/* (alveolar trill)
- **Cognate similarity:** English-Spanish and German-Spanish cognates were excluded to avoid confounding variables in the data (Baddeley, 2003).
- **Word length:** The length of the selected vocabulary varies, as research indicates that longer novel words are less easily remembered (Baddeley, 2003).
- **Practical relevance:** Vocabulary selection was informed by the Spanish Ministry of Education and Science’s DELE Spanish “To the Point” book (2021) for A1/A2 learners.

Modality

Each participant was randomly assigned one of two training videos.

Figure 4

spoken	sung			
Training video 1	Love	Places	Sleep	Animals
Training video 2	Sleep	Love	Animals	Places

The lexical sets and their modalities within the training videos

Each lexical set has a different melody. Each lexical set was sung by the researcher with a synthesized drone to provide melodic context and potentially make the melody easier to remember (Boltz et al., 1991). The melodies were composed to be simple and easy to sing, moving largely step-wise with the largest interval being a descending perfect fourth. The melody is consistent for every word within each lexical set, changing only to be reduced or extended depending on the amount of syllables in the target word.

Figure 5

Set one: Sleep



Set two: Animals



Set three: Love



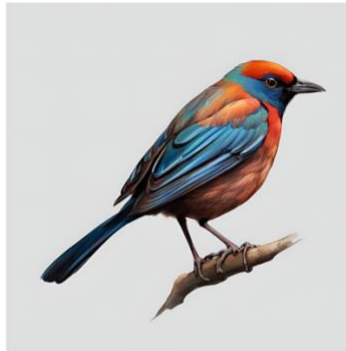
Set four: Places



Melodies assigned to target vocabulary

The remaining two lexical sets were spoken with the prosody and melodic contour found in Castilian Spanish of mainland Spain. This accent is associated with “standard” European Spanish. Each word was repeated three times in its corresponding modality before moving on to the next word. A 5-second pause was left after each repetition of the word for the participant to have time to repeat the word. The entire process cycled four times to reinforce learning (Nation, 2001).

Figure 6



bird

a presentation slide from the training

Informed by the questionnaire and literature review, the training also included a presentation in which the participants could see the corresponding English translation of the word being learned, and a picture generated using artificial intelligence (AI) software. As seen in the questionnaire, teachers widely reported using visuals to support new FL vocabulary learning. The use of pictures is also supported by Paivio's (1986) Dual Coding Theory. Translation was provided taking into consideration the Revised Hierarchical Model which states that in the beginning stages of foreign language learning, much of the learning takes place with L1 support (Kroll & Stewart, 1994). While translating is often criticised as being indirect and detracting from the available lesson time for second language focus, it is quick, simple and easily understood (Nation, 2001).

Post-test (Day 1)

This test was conducted live by the researcher immediately following the completion of the training. The test was designed to assess the immediate gains experienced from the training. The researcher presented one flashcard at a time in a random order while the participants attempt to actively recall the 12 vocabulary items taught in the training. This test was recorded for further analysis by the researcher.

Scoring

The recalled vocabulary was scored according to Legg's scoring system developed for a similar experiment (2009). Three marks were awarded for a perfectly correct answer, two marks for the correct meaning with mostly correct information, one mark for a mostly comprehensible response with major errors and zero for completely incorrect responses or no response.

Semi-structured interview (Day1)

The semi-structured interviews were conducted immediately after the post-test and aimed to gather qualitative insights into the participants' learning experience. The key aspects of the interviews included:

1. Overall experience of the training session
2. Enjoyment level of the different training modalities on a ratings scale of 1-10
3. Mental visualisation/audialisations when actively recalling the vocabulary
4. Effectiveness of the images used in the training
5. Their motivation to continue with the training methods

Delayed post-test (Day 8)

Participants were asked not to speak the vocabulary aloud during the week following the training. On day 8, a post-test was conducted with each participant. This was undertaken on Zoom using the same activities, materials and conditions as the immediate post-training test.

Hypotheses

Informed by the preliminary literature review and the questionnaire, the researcher predicts the following results:

- **H1:** Participants will recall the sung instruction vocabulary more accurately in both the immediate and delayed post-tests compared to the spoken instruction vocabulary.
- **H2:** Musicians will benefit more from the sung condition compared to non-musicians.
- **H3:** Participants with a higher PSTM test score will achieve higher on the vocabulary recall tests regardless of modality.

Findings from the Experiment

Spanish Vocabulary Pre-Test

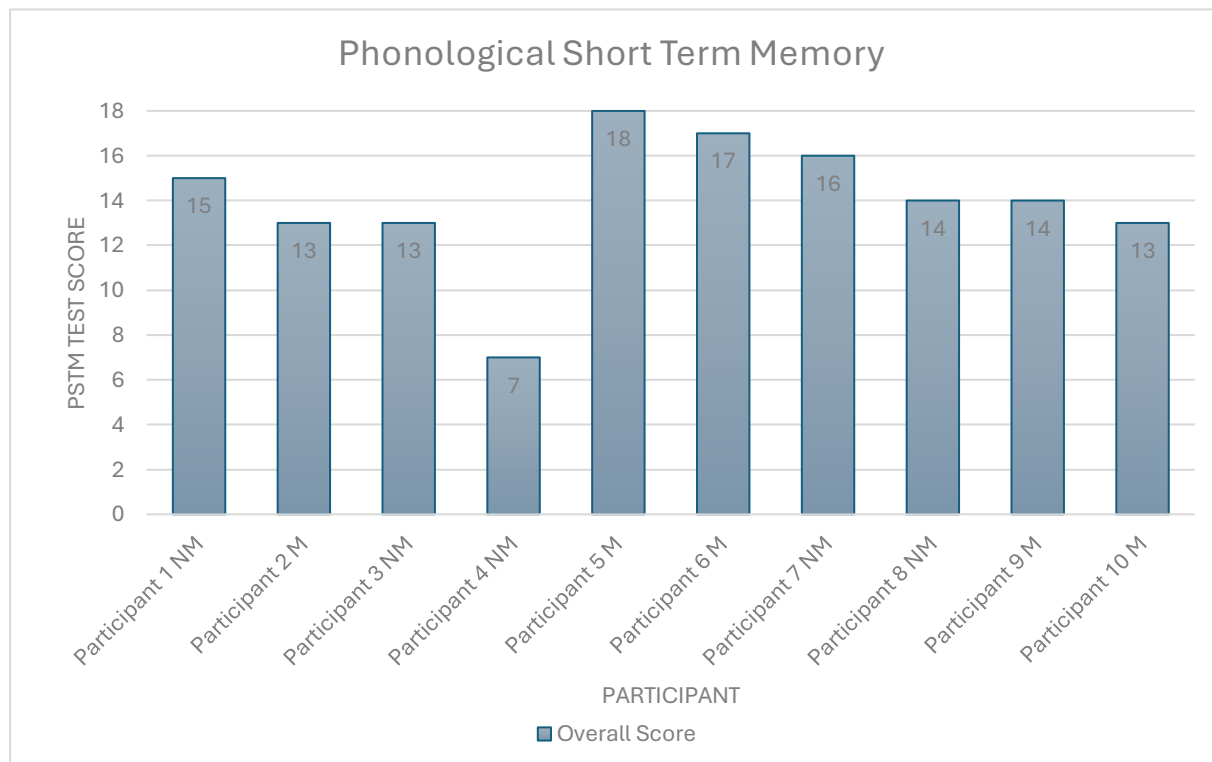
None of the participants were able to translate any of the target vocabulary from English to Spanish.

Phonological short-term memory test

Each participant heard the same non-word series twice and was asked to indicate whether the second iteration was the same or different relative to the first (see Appendix 12). 18 series were read in total. Participants were awarded 1 point for each correct identification.

Seven of ten participants achieved within a narrow band of 13-15 correct answers (above chance), two scored 17-18, and another scored 7 (below chance).

Figure 7



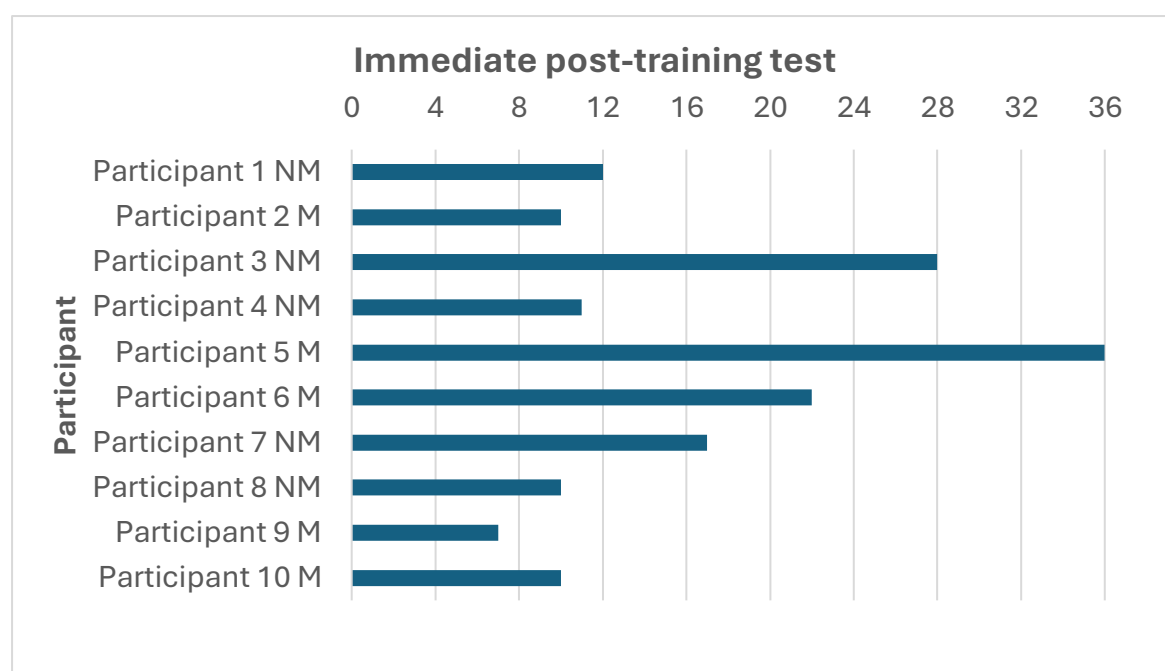
PSTM test scores

Empirical studies have reported that individuals with musical training display an enhanced L2 phonological ability (Slevc & Miyake, 2006). The musicians (M) group has a slightly higher average recall score (15.00) compared to the non-musician (NM) group (14.4), with the outlier excluded. The p-value was calculated using an independent t-test. A p-value of (0.63) indicates that there is no statistically significant difference between the two groups. With such a small sample size, it may not be appropriate to generalise this data.

Post-training tests: Immediate

In the immediate post-training test, participants were shown the flashcards from the training and asked to recall the vocabulary to the best of their ability. They were invited to either sing or say their response.

Figure 8



Immediate post-training test scores

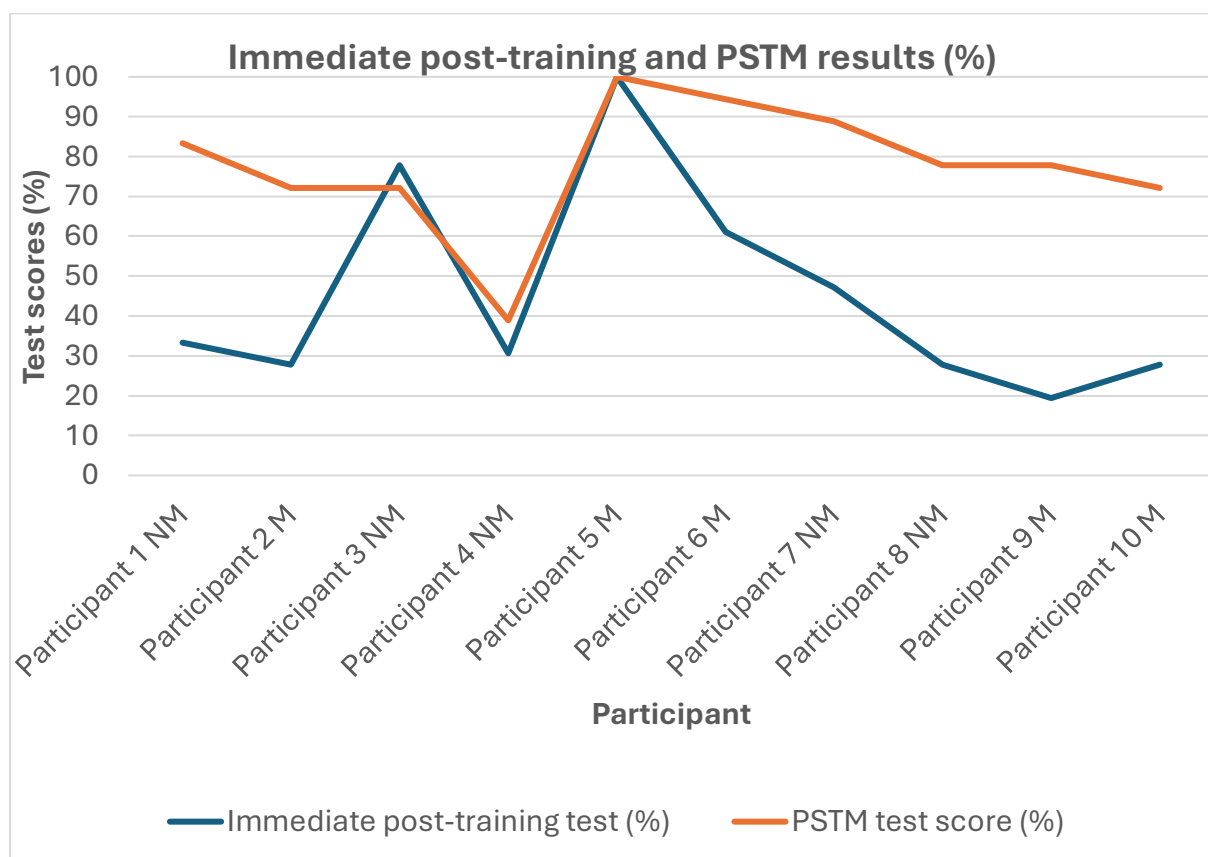
The responses were scored according to Legg's scoring system (2009). There was considerable variation in the results from the immediate post-training test. The highest score was 36 and the lowest score was 7. The median was 11.5. The average scores were 17.0 for the Musicians and 15.6 for the Non-Musicians. The p-value (0.83) indicates no significant difference between the groups.

Observations from the training session

During each training session, the researcher turned off their camera and wrote into an observational journal. The following observations were recorded.

- Two participants (P4, P7) were singing in an uncomfortable part of their range.
- One participant was (P7) unable to accurately repeat the melodies.
- Participants imitated the intonation of spoken words during training.

Figure 9



Immediate post-training test scores and PSTM test scores

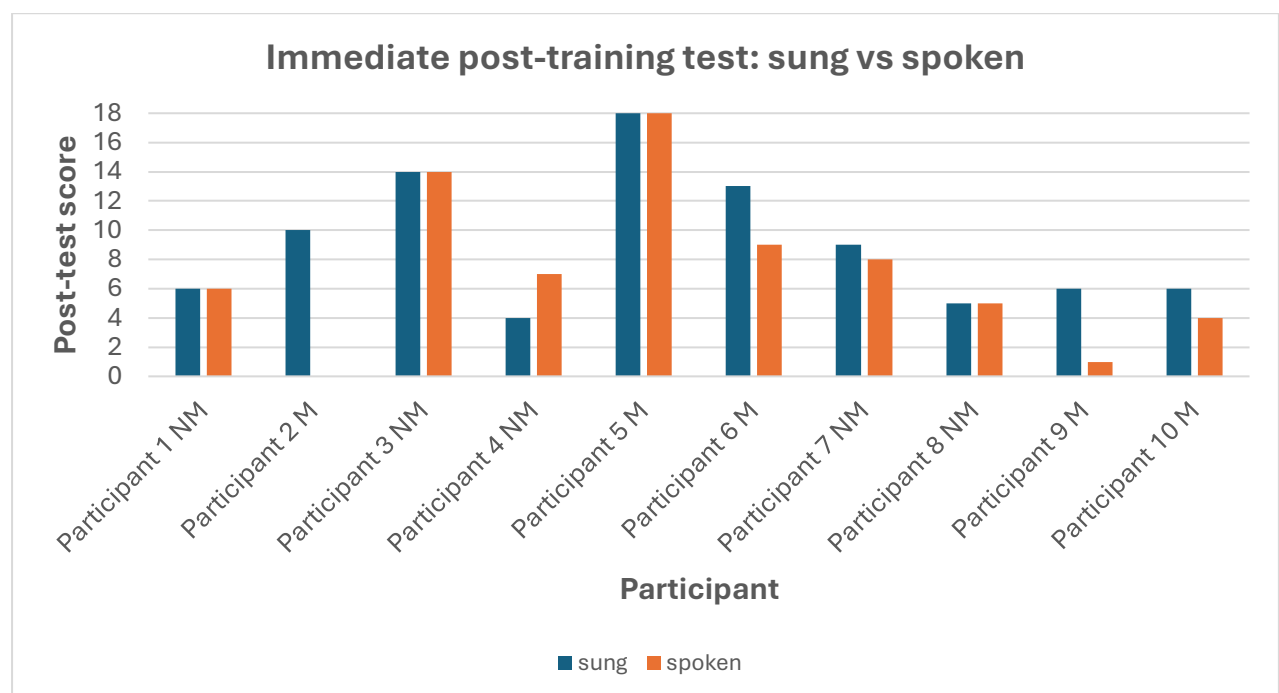
The graph compares immediate post-training test scores (%) with PSTM test scores (%). PSTM scores are generally higher and more stable across participants, with scores ranging from 70% - 90% (excluding the outlier). The results indicate a moderate correlation between PSTM abilities and immediate post-test results (0,46 Pearson's r score). Participants with higher PSTM scores did not always score highly in the immediate post-training test.

There is some alignment between PSTM scores and immediate vocabulary recall ability for certain participants, suggesting that strong PSTM may aid vocabulary retention, a correlation also uncovered in previous studies (Saito & Uchihara, 2024; O'Brien et al., 2007; Gathercole, 1999; Atkins and Baddeley, 1998; Aliaga-Garcia, 2011). The lack of correlation suggests that other factors such as motivation, anxiety, or cognitive flexibility may be more influential than phonological memory.

This relationship, however, is not consistent, indicating that PSTM ability is not the only influencing factor on performance in the vocabulary recall test. Other factors may include, motivation, cognitive load, or individual learning performance.

Mode of delivery: Sung vs spoken in immediate post-test

Figure 10



Immediate post-training test scores comparing sung and spoken instruction

In the immediate post-test, 50% of the participants achieved more points when recalling words that were sung during the training, 10% of the participants scored more points from words that were spoken during the training and 40% scored equally for both modalities of vocabulary training. The data suggests that sung instruction

had a slight advantage over spoken instruction, however the findings are not statistically significant. These findings are congruent with findings from similar studies which indicate that melody can support short-term FL vocabulary acquisition (Chen, 2020; Davis and Fan, 2016).

All musicians scored higher for the sung vocabulary (mean: NM=7.6, M=10.6), however, the difference is not statistically significant (p-value 0.123). The musicians' enhanced performance supports Patel's OPERA hypothesis (2011), which suggests that music and language share overlapping neurological systems. Because the sung vocabulary requires greater engagement with pitch and rhythm, it may reinforce phonological representations, aiding musicians who are more accustomed to processing melody.

While some participants scored higher in the melody-based instruction, others scored higher for spoken instruction. These findings indicate that melody may aid immediate recall for some learners, especially the musicians, but hinder it for others. The non-musician participant who struggled with range issues during the sung vocabulary training (P4) achieved a notably lower score of 4 on the sung vocabulary in the immediate post-test. The participant who struggled to repeat the melody and struggled with range issues (P7) scored similarly with vocabulary in both modalities. This could be explained by the Cognitive Load Theory (Sweller, 1988), which suggests that extraneous tasks - in this instance, the addition of melody - can interfere with learning. This also aligns with the findings from Brooks et al. (2017) and Kozaki and Ross (2011) that underscore the influence of motivation and anxiety on learner success.

Observational findings

After each post-test had been conducted, the researcher replayed the recording of the test and once again entered into an observational journal. The following observations were recorded:

Observation 1: For many of the sung words, participants could recall the melodies but not the phonemes.

This could indicate that the cognitive load was too high and that attention was directed to the melodies over the phonetic information (Sweller, 1998). This could also indicate that the information was not being memorised as chunks (Serafine, et al. 1984, 1986), and that potentially the information was processed in different brain regions (Peretz & Zatorre, 2005).

Observation 2: Participants could often recall the first phonemes of the vocabulary and/or the non-English phonemes within the words.

This observation was true for those who could sing the melody, and those who did not. This could be due to the participant using other mnemonic strategies in an attempt to aid retention. It could also be an indication that the addition of melody was an extraneous load interfering with other important aspects of FLL, in this case, pronunciation and the learning of new phonemes (Sweller, 1988).

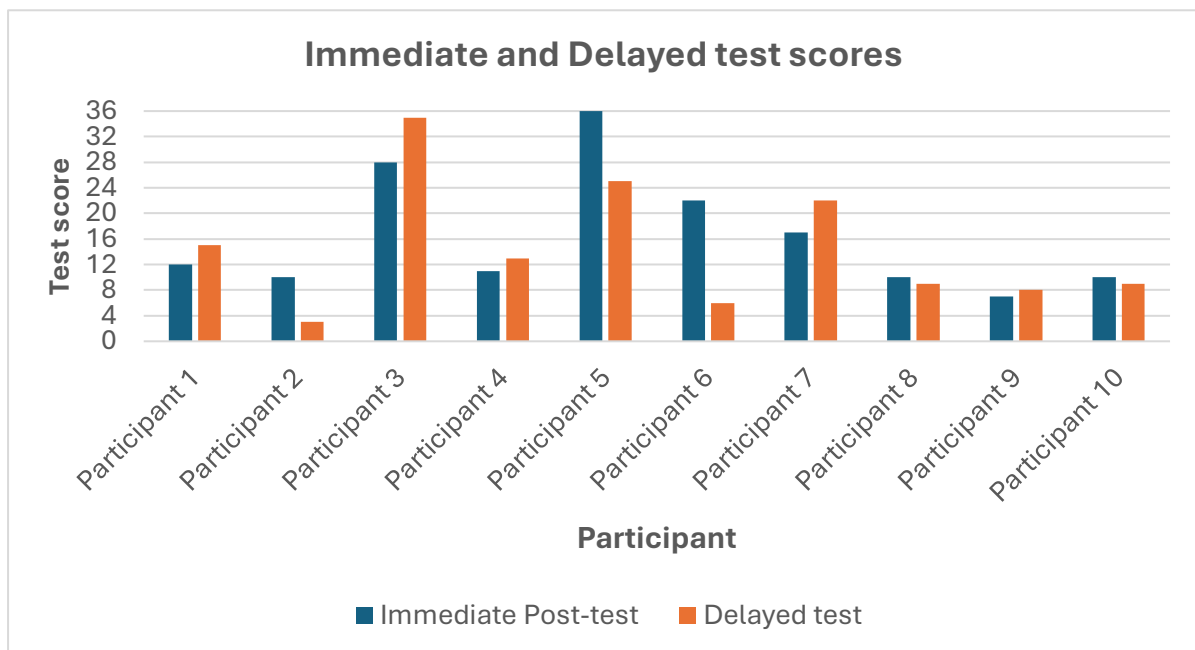
Observation 3: Participants sometimes recalled sung vocabulary with the wrong semantic attachment.

This suggests that while melody may have facilitated surface-level recall, it may not have reinforced semantic encoding effectively. This aligns with Yalch (1991) who found that sung phrases often emphasise phonetic aspects of verbal information over meaning. It also aligns with Baills et al. (2021) study that found that adding melody to target FL vocabulary did not enhance semantic memory.

Mode of delivery: Sung vs spoken in delayed post-test

Participants were asked not to study the target vocabulary after the initial training. They were contacted again one week after their training to participate in a delayed post-training test. They were then shown the same flashcards as those in the immediate post-training test in the same order. They were asked to recall the vocabulary to the best of their abilities, including any phonemes or melodies they could remember.

Figure 11



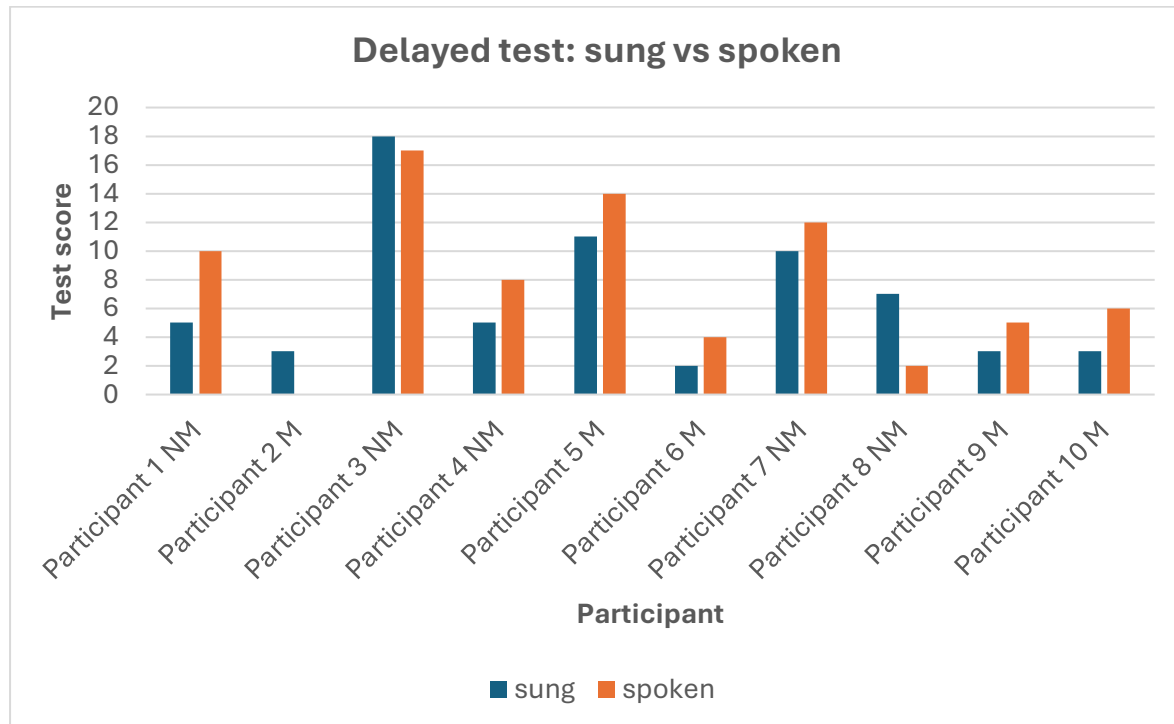
Immediate post-training test scores comparing sung and spoken instruction

This graph compares immediate post-test scores to delayed post-test scores. The goal was to examine how the vocabulary was retained over time. For most participants, delayed test scores were lower than immediate test scores. This observed decline aligns with Ebbinghaus's Forgetting Curve (1885) which describes how memory retention decreases over time without reinforcement efforts (Murre and Dros, 2015).

Some participants achieved higher scores on the delayed post-tests. These participants may have benefitted from memory consolidation, a process where information stabilised and strengthens over time, especially during sleep (Walker and Stickgold, 2010).

Post-test: mode of delivery

Figure 12



Delayed post-training test scores comparing sung and spoken instruction

This chart shows the scores of the delayed test for both spoken and sung instruction modalities. In the delayed post-test, the opposite results were observed: 30% of the participants scored higher on words that were sung in the training and 70% of participants scored higher on words that were spoken. Despite spoken vocabulary presenting a slight advantage, the difference is not large enough to be meaningful (Cohen's $d = 0.21$). There is more variance in results across the sung scores. Observational findings indicated that the majority of participants could recall the melody of the words from the sung instruction, even when they could not recall the phonemic content. Again this aligns with the theory that phonetic and tonal information are processed differently in both working memory and long-term memory (Peretz & Zatorre, 2005). This could be due to shared neural pathways for both tonal and phonetic information in memory. This could also be due to Biased Competition Framework where the melody was remembered in favour of the phonemic information (Scalf et al., 2013).

Semi-structured interviews

Following each training session, semi-structured interviews were conducted by the researcher. This focused on the subjective experience of the participant with regards to enjoyment, concentration and perceived success. The interviews were transcribed and coded using descriptive coding. These codes were then reduced down to 5 categories: **enjoyment and motivation, melody and memory, concentration and attention, mnemonics** and **pronunciation**. The data from this experiment was cross-corroborated with the data collected in the questionnaire to provide method and perspective triangulation. Theories from existing studies have also been used to further discuss the findings in context.

Enjoyment/motivation

Participants were asked to score how much they enjoyed each delivery method – sung and spoken - on a ratings scale of 1 to 10. The following data was collected.

Figure 13

Participant	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
M/NM	NM	M	NM	NM	M	M	NM	NM	M	M
Spoken	5	8	8	8	8	8	8	8	8	7
Sung	8	9	7	6	8	10	5	8	10	9

Participant ratings – preferred instructional modality

The variance of the “spoken” modality are closely clustered around the mean with a variance of $\sigma^2=0.84$. In comparison, the “sung” modality demonstrated a higher variance of $\sigma^2=2.4$. This suggests that the spoken modality, while enjoyed less overall, was more consistently enjoyed. These results demonstrate learner preference and the importance of considering the individual learner profile. Many participants reported a positive learning experience, particularly in the sung modality. Singing was perceived as enjoyable, with participants describing the experience as “fun” (P1,P10). Enjoyment was linked to a pre-existing interest in music and languages, indicating that learner preferences play a role in motivation.

Several participants indicated a willingness to continue using melody and singing as a long-term learning strategy (P1, P3, P6), with some stating that the rhythm and melody helped to reinforce vocabulary recall (P4, P8). These findings align with much of the literature that advocates for music in FLL due to increased enjoyability and engagement (Kumar, 2020; Sun et al., 2024).

In each instance where the spoken modality was preferred, the participant was a non-musician. Some responses indicated that personal discomfort with singing negatively influenced participants' experience. One participant noted that the initial discomfort subsided after repetition, allowing them to focus on vocabulary (P3). Similarly, another participant reported that the stress of singing interfered with recall (P7). These findings highlight the influence of learner preferences and learning styles in vocabulary learning (Brooks et al., 2017; Kozaki et al., 2011).

Perceived impact of melody on vocabulary recall

Responses were mixed regarding the effectiveness of melody in facilitating recall. Some participants noted that they could recall melodies more easily than words (P2, P10). Another noted that the visualising the shape of the melody (rise and fall) helped to recall the sung vocabulary (P1). Others found that melodic structure helped with chunking and word segmentation (P3, P9). This supports the dual coding theory that multi-modal learning enhances recall (Paivio, 1986).

However, a self-described visual learner (P7) reported difficulty processing both the melody and meaning simultaneously. This aligns with the Biased Competition Framework (Scaif et al., 2013) which suggests that phonological and tonal information, if processed by overlapping neural resources (Schulze & Koelsch, 2012), may compete for neural representation. This observation also aligns with Sweller's Cognitive Load Theory (1988), which suggests that additional cognitive demands could either aid or hinder retention depending on individual cognitive resources.

Pronunciation

Participants expressed varied perceptions of their performance with regards to pronunciation. Some participants reported struggling with certain novel Spanish

phonemes (P1, P8). One participant noted difficulty distinguishing similar sounds (e.g., “b” vs. “v”). These observations were also recorded by the researcher during the training and test periods for many participants. This suggests that melody alone may not support phonemic differentiation. These findings also counter findings by Baills et al (2021) who found that sung exercises helped reduce accentedness. This experiment, however, appeared to be conducted with participants who had had slightly more pre-training exposure to the target foreign language than the participants in this study.

Concentration and cognitive demand

A few participants highlighted cognitive effort as a factor in their learning experience. One participant found 15 minutes of training to be mentally demanding (P2), while another noted that background music was “mesmerizing” but could either aid or hinder focus (P9). This indicates the importance of managing cognitive resources to help learner’s maintain attention during L2 learning tasks (Hughes et al., 2021).

Other mnemonic strategies

Some participants reported engaging in visualisation techniques, such as imagining how the vocabulary might be written in Spanish (P5, P7). Several participants explicitly expressed a preference for written reinforcement, stating that access to written translations may have help improve retention (P1, P2, P8). Participants also reported employing other mnemonic strategies, such as linking words to familiar concepts (e.g., “pájaro” as “parrot”) (P3), and segmenting the words into syllables (P4, P7). These findings reinforce the effectiveness of **the Keyword Method** and **semantic association techniques** (Morin & Goebel, 2001).

Repetition and learning retention

A key finding was the importance of repetition in reinforcing the vocabulary. One participant suggested that additional repetitions would likely have improved their retention (P8), supporting Nation’s (2001) research which states that learners require multiple exposures to new vocabulary to consolidate memory.

Discussion

Summary of key findings with relation to hypotheses

1. **H1:** Participants will recall the sung instruction vocabulary more accurately in both the immediate and delayed post-tests compared to the spoken instruction vocabulary.

The majority of participants (70%) experienced enhanced recall in the sung vocabulary compared to the spoken vocabulary in the immediate post-test. The results, however, were statistically insignificant.

Conversely, the spoken vocabulary was recalled more accurately in the delayed post-test by 70% of participants. This suggests that using melody in instruction enhances short-term retention but not long-term retention. Again, the results were statistically insignificant.

2. **H2:** Musicians will benefit more from the sung condition compared to non-musicians.

The findings from this study indicate that sung instruction vocabulary was recalled more accurately by musicians in the immediate post-test. These benefits were found both in the success of vocabulary retention and in motivational and enjoyment levels.

3. **H3:** Participants with a higher PSTM test score will achieve higher on the vocabulary recall tests regardless of modality.

PSTM scores were a moderate indicator of success in the immediate post-test. Participants who scored highly on the PSTM test did not consistently score high on the post tests.

Individual differences in learner profiles

Some participants found melody to be an extraneous load or a distraction that interfered with vocabulary retention (Sweller, 1988). For others, it reinforced the short-term retention perhaps through dual encoding (Paivio, 1986), or for other motivational or attentional reasons. Musicians generally performed better with melody-based instruction, highlighting the potential role of pre-existing auditory skills, or, in the case of Biased Competition Framework, they simply did not need to spend as many neural resources to process the melody (Scalf et al., 2013).

During the interviews, the participants reported mixed opinions on both their perceived success with the sung instruction method and their enjoyment levels. This indicates the significance of learner preference. This was also apparent in the participants feedback regarding memorisation strategies and mnemonics. This emphasises the need for adaptive FL instruction. Gardner's (1999) Multiple Intelligence Theory proposes that individuals possess different types of intelligence which influence how they best learn. Multimodal approaches such as adding gestures or rhythmic activities could have supported embodied cognition and reinforced learning further.

Confounding factors

It was expected that the older participants score lower in the PSTM test due to potential decline in hearing acuity and declining cognitive function in neural architecture supporting the phonological processing systems (Eguz, 2019; Diaz et al., 2019). However, the tests scores showed that age and PSTM exhibited no significant correlation. Similarly, it was also expected that multi-linguists outperform the monolingualists given that multilingualists were found to have enhanced WM (Huang, 2022). In this study, they did not significantly outperform their monolingualist peers although low levels of anxiety were observed (Botes, 2020).

Study limitations

As qualitative research has been criticized for its lack of rigour (Creswell, 2003), steps have been taken to maximise the **validity** of this study. This study follows Guba and Lincoln's (1994) seminal format for dealing with qualitative data based on the positivist paradigm. This includes: persistent observation; methods, theory and perspective triangulation measures.

However, given the small sample size in both the questionnaire and quasi-experiment stages of this study, the findings are not generalisable. Instead, further research should include larger sample sizes of adults with similar ages and backgrounds to conduct a more controlled study with higher validity. Other factors could also have been accounted for such as mood, as it was in similar studies (Ludke et al., 2014).

The ecological validity of this study can also be questioned. The training materials took a several hours for the researcher to prepare, which is not necessarily practical for most foreign language teachers. However, if sung vocabulary instruction proves a reliable method for groups of language learners, AI-technology could be developed to generate suitable, personalised melodies for vocabulary instruction. The use of translation in FL learning environments is also controversial. While translating is often criticised as being indirect and detracting from the available lesson time for second language focus, it is quick, simple and easily understood (Nation, 2001). Teachers should consider this before introducing translations into their instructional methods.

As this was an insider researcher study, there is also the possibility that participants were biased in their responses or attentional distribution. Future research should take a sample population and the researcher should remain an outsider researcher. The scoring system used within the test phases is not a standardised system. This scoring system was developed for written responses (Legg, 2009). Had the researcher had more resources, a board of native speakers would have been consulted to give feedback on pronunciation and comprehensibility.

It also remains unclear what role Dual Coding played in the quasi-experiment with regards to melody as a multimodal tool. Should the experiment be repeated, it would be useful to change the pictures in the test phase to test how important the visual cues are and to what degree this influences retention. With more participants, one group could be tested without images to support the learning. This way the influence of melody could be assessed in a more controlled setting.

Method and perspective triangulation

This study employed methodological triangulation (Denscombe, 2014) by integrating three research methods:

1. Questionnaire – provided insights into pedagogical strategies and teacher perceptions of music and melody in FL vocabulary instruction
2. Quasi-experiment – allowed for direct measurement of the impact of melody on vocabulary retention

3. Semi-structured interviews – recorded subjective experiences, motivational aspects and cognitive processing/memorisation strategies.

Triangulation of methods allowed for cross-validation and the reduction of limitations with each individual study. For example, the quasi-experiment suggested only a weak advantage for melody in immediate recall, however the interview data suggested that motivation and learner preference played a critical role in the effectiveness of melody-based training. Furthermore, teacher responses in the questionnaire aligned with interview data that suggested that music is useful for engagement.

However, discrepancies emerged across the data. While most teachers reported using music and song in their FL sessions, some participants in the study indicated a general discomfort with singing. These findings suggest that teachers should be aware of learner profiles when determining which vocabulary instruction strategies to implement.

Pedagogical Implications

Given the mixed findings, melody-based instruction should not be seen as a method that can be used successfully with all learner. Instead, it may serve as a valuable supplementary tool for musician foreign language learners to increase engagement, motivation and short-term vocabulary retention. This could be applied to non-musicians also but learner discomfort should be assessed.

In larger group sizes, singing in a group could increase or reduce anxiety in language learners. Previous studies have indicated that this often boosts general morale and could result in increased engagement (Sun et al., 2014). Melodic instruction could be used as a warm-up to engage learners, especially those who are musically-intelligent (Gardner, 1999).

Considerations for future research

Research could be done to investigate the addition of physical movement (embodied cognition) to melody-based vocabulary learning and its impact on long-term retention. This combination of multimodal approaches could reinforce learning

(Gardner, 1999; Baills et al., 2021). Further works could also investigate the influence of melody in tonal language instruction. Melody in instruction could also be combined with the Testing Effect which promotes spaced repetition to enhance retrieval-based learning (Roediger and Karpicke, 2006).

Conclusion

This study aimed to investigate the impact of melody on vocabulary acquisition in beginning foreign language learners, with the goal of determining whether melodic instruction enhances short- and long-term recall, pronunciation and motivation. Through a mixed methods approach and methodological triangulation – combining a quasi-experiment, questionnaire and semi-structured interviews – this study explored the efficacy of melody-based vocabulary training compared with other training methods, specifically traditional spoken instruction.

The findings revealed mixed results, with some evidence suggesting melody-based training supports short-term vocabulary recall, particularly with learners who have a musical background. This aligns with Patel's OPERA hypothesis that suggests musical training can enhance FLL. However, melodic instruction did not significantly enhance long-term retention, suggesting that while melody may enhance initial encoding and retrieval cues, it does not necessarily lead to consolidation of vocabulary in long-term memory. These findings align with the Cognitive Load Theory (Sweller, 1988), where melodic complexity may be acting as an extraneous load for some learners, thereby interfering with the capacity for vocabulary acquisition. Additionally, the Biased Competition Framework (Scalf et al., 2013) provides a possible explanation for why phonological and tonal memory systems may compete for neural resources, rather than complementing one another.

This study underscored the impact of individual learning differences, particularly musical training, on learning success. Musicians generally outperformed non-musicians on melody-based vocabulary recall, supporting Patel's OPERA hypothesis (2011) which suggests that musical training enhances auditory and linguistic processing, leading to cross-domain development. Additionally, phonological short term memory (PSTM) showed a moderate correlation with recall ability in short-term recall. PSTM was not the sole determining factor of post-test performance, indicating

that other factors were also influential, including motivation, cognitive flexibility, learner preferences and comfortability.

Regarding the study's original aims, the research successfully:

- Examined the cross-domain relationship between music and foreign language-learning, contributing to the growing body of research in musical-linguistic pedagogy.
- Compared traditional and melodic training strategies in FL vocabulary learning within a controlled environment.
- Collected and interpreted data on learner experience and motivation.
- Proposed pedagogical recommendations, emphasising the need for adaptive multimodal teaching strategies that account for learner preferences and comfortability.

In my own practice, I will consider using melody-based instruction in 1-1 sessions for students with a musical background to target short-term retention for new novel vocabulary. Considering the feedback in the semi-structured interviews with participants, I will also experiment with adding the TL vocabulary translation to support the learner.

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