

The Role of Music in Japanese Vocabulary Acquisition and Pronunciation Skills in Preschool Children

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Abstract

The present study examines the effects of a music-based learning approach on vocabulary acquisition and pronunciation skills in Japanese language education for preschool children. It has been established that music significantly boosts preschool children's pronunciation and vocabulary development when learning a foreign language. Using an experimental design, forty preschool children aged five to six were equally assigned to the experimental and control groups. The experimental group received instruction in vocabulary and pronunciation through a music-based learning approach, while the control group followed a conventional method. Data collection involved administering a vocabulary test and a pronunciation assessment, which were analysed using SPSS software. The results showed that the children instructed through the music-based learning approach significantly outperformed those in the conventional group on both vocabulary and pronunciation assessment. These findings suggest that preschool children exposed to the music-based learning approach demonstrated enhanced learning outcomes, as evidenced by their higher scores on both the vocabulary test and pronunciation assessment in the context of Japanese language acquisition. These outcomes highlight the efficacy of music as a promising tool in foreign language learning, highlighting the practical value for educators seeking to design engaging and developmentally appropriate instructional strategies in preschool language education.

Keywords: music-based learning, vocabulary acquisition, pronunciation skills, Japanese language

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Introduction

The integration of music into educational practices has garnered substantial attention for its profound effects on various aspects of learning, including language acquisition. Music, characterised by its rhythmic patterns, melodic structures, and repetitive elements, has been identified as a powerful tool for enhancing language learning, reinforcing vocabulary, facilitating memory retention and engaging multiple areas of the brain critical for cognitive processes, which later enhances their overall learning experience (Grimm, 2020; Vila, 2021). Research shows that musical elements, such as rhythm and intonation, serve as foundational in helping preschool children imitate and memorise foreign-language sounds, thereby supporting early language development (Rieb & Cohen, 2020). The benefits of integrating music into language learning can also be explained through cross-modal memory transfer, as proposed by the Dual Coding Theory (DCT) (Clark & Paivio, 1991). Shams and Seitz (2008) stated that our human brain is trained to learn in natural environments, where information is integrated across multiple senses. Similarly, adding music to language learning provides an auditory stimulus alongside a visual stimulus. Music can therefore positively influence multiple aspects of language learning, including the development of phonological skills and vocabulary acquisition (Degrave, 2019).

Grimm (2020) underscores the notion that music, as a universal form of emotional communication, has a profound impact on various aspects of daily life, including language development. This impact is particularly evident in the early stages of language acquisition, where music's role as a protolanguage becomes crucial. From the earliest stages, children are exposed to the melodic contours of their mother tongue through the intonation patterns used by their caregivers. This early exposure to the musical aspects of language helps establish a critical foundation for future language development (Rose, 2018). The concept of “musical apprenticeship,” where children learn to recognise and reproduce the melodic elements of their language, is fundamental to their linguistic growth.

Amin and Soh (2020) and Grimm (2020) note that the role of music in education is diverse, encompassing not only enhancing motivation but also supporting cognitive and linguistic development. It can also be incorporated into teaching strategies either as supplementary activities or as central instructional methods. The structural and functional similarities

between music and language, such as their reliance on auditory comprehension and elements like pitch and rhythm, further highlight music's potential in supporting language learning (Engh, 2013; Grimm, 2020; Israel, 2013). Music not only aids in the development of speaking, writing, listening, and reading skills but also plays a crucial role in strengthening literacy (Grimm, 2020; DiEdwardo, 2004). For instance, pop music, with its slower conversational pace and repetitive lyrics, provides an accessible and contextually rich medium for vocabulary acquisition, enhancing learners' ability to engage in natural conversations (Murphey, 1992).

Recent literature underscores the critical role of music in early language development. Musical properties, such as rhythm and melody, have been shown to influence various aspects of language acquisition, including semantic processing, grammar, and phonological awareness (Pino et al., 2023). These musical elements support language comprehension from the earliest stages of life, providing compelling evidence for the cognitive overlap between music and language. This theoretical foundation is essential for understanding how music-based learning can enhance vocabulary and pronunciation in young children.

A study of 121 preschools in Japan revealed that, while music is an integral part of preschool education, the current approach is mainly limited to listening, memorising and producing songs (Adachi, 2012). The study also found that the only music activity that involves creative expression is free movement to music, which tends to prioritise physical movement over musical creativity. This gap in instructional approach presents an opportunity to explore how music could be more effectively integrated into language learning, particularly for vocabulary and pronunciation development.

The benefits of music extend beyond vocabulary acquisition to encompass pronunciation and memory retention. The rhythmic and melodic elements inherent in music play a key role in improving these skills (Brandt et al., 2012; Culp, 2017). Music's ability to aid long-term memory storage and comprehension underscores its value in language-learning contexts (Grimm, 2020; Salcedo, 2010). Neuroimaging studies have revealed that musical and linguistic processing engage similar brain regions and cognitive mechanisms, demonstrating shared neural pathways across both domains (Piri, 2018; Engh, 2013). This shared processing involves both cerebral hemispheres and is facilitated by the corpus callosum, emphasising the neural basis for music's effectiveness in language learning (Grimm, 2020; Lems, 2005).

Additionally, music contributes to a positive learning environment by reducing anxiety and increasing student engagement, aligning with Krashen's affective filter theory, which posits that lower anxiety levels enhance language learning by improving learners' ability to absorb new language input (Grimm, 2020; Rieb & Cohen, 2020; Kumar et al., 2022).

In preschool settings, music is frequently employed as a motivational tool that significantly enhances vocabulary and pronunciation development (Amin & Soh, 2020). The incorporation of music-based activities provides a natural and enjoyable method for young children to learn a new language. Grimm (2020) highlights the similarity between songs and everyday conversational language in the target language, which reinforces linguistic memory retrieval. Despite the recognised benefits of music in education, most existing research has focused on primary and secondary education, particularly within the context of English as a Foreign Language (EFL) (Piri, 2018; Vila, 2021). This focus has left a notable gap in understanding the impact of music on preschool children's language learning, other than English.

This study, therefore, focuses on Japanese, a language that differs from English in phonology, pitch accent, and syllabic structure, aligning closely with the rhythmic and melodic components of music. To address the gap identified in existing research, this study aims to explore how music-based learning approaches can specifically enhance vocabulary and pronunciation skills among preschool children learning Japanese, a language and population context that remains under-researched. By investigating these aspects, the research seeks to provide valuable insights into the cross-linguistic applicability and pedagogical potential of music in early language education. This exploration will help fill the knowledge gap by examining the effectiveness of music in language acquisition for younger learners and in languages beyond English. Such an understanding could lead to the development of more effective and engaging teaching strategies, ultimately enhancing early language education for preschool children. Figure 1 illustrates the conceptual model of the present study.

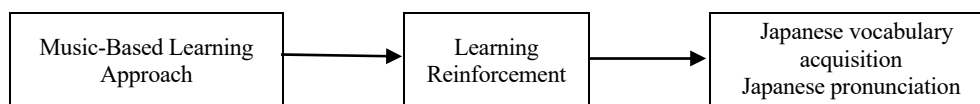


Figure 1. Conceptual Model of the Research

The following are the research objectives of the study:

1. To compare the mean scores of Japanese vocabulary acquisition between the control group and the experimental group after the implementation of a music-based learning approach.
2. To compare the mean scores of Japanese pronunciation between the control group and the experimental group after the implementation of the music-based learning approach.

Methods

Participants

The study involved 40 preschool children from a local private school, selected purposively. Following the approach adopted in previous early childhood language learning studies (Eisenberg & Guo, 2015), this sample size was considered appropriate, as this study employed comparable participant numbers and achieved meaningful outcomes. Purposive sampling, a non-probability method, allowed researchers to recruit participants based on predefined inclusion criteria. The inclusion criteria for individual participants were: being aged 5 or 6 years, having no prior knowledge of Japanese, and being able to count from 1 to 10 in English, as confirmed by the kindergarten head during pre-screening.

Research Design

This study employed an experimental research design in which the independent variable was manipulated, and its effects on the dependent variable were measured. Participants were equally assigned to either an experimental group or a control group. The experimental group engaged in a music-based learning approach, while the control group received conventional instruction without music. The control group served as a baseline, providing a comparison against the outcomes of the experimental group.

Materials

In the study phase, distinct materials were utilised for each group. Participants in the experimental group used YouTube videos featuring songs to learn Japanese numerical vocabulary (numbers 1-10). These videos were selected for their musical elements, including melody and rhythm, which were intended to enhance vocabulary retention and pronunciation. In contrast, the control group learned the same vocabulary using teacher-led instruction. Each displayed Japanese word is accompanied by its English translation and was used with teacher assistance, without any musical content.

For the test phase, both groups were evaluated using the same materials. The vocabulary test consisted of ten questions designed to assess participants' recognition and recall of the Japanese words they had learned. This test followed the procedures outlined by Piri (2018), with each question carrying one mark. Additionally, in the pronunciation assessment, participants read aloud a list of ten Japanese numerical vocabulary words. Their pronunciation was recorded and evaluated using a rubric adapted from Koren (1995), with ratings on a five-point Likert scale, where 1 indicated a very heavy non-native pronunciation and 5 represented native-like pronunciation.

Regarding instrument reliability, both the vocabulary and pronunciation assessments were adapted from previously validated instruments (Piri, 2018; Koren, 1995) and were considered appropriate for use with preschool children. Although formal reliability analyses, such as internal consistency or inter-rater checks, were not conducted, the instruments adhered to established criteria and were applied consistently throughout the study.

Procedure

Before data collection commenced, written consent was obtained from the parents of all participants, who approved their preschool children's participation in the study. Once consent was secured, participants were briefed on the procedures and expectations for the experiment. The intervention lasted two weeks, consisting of two 45-minute sessions per week, for a total of four instructional sessions per group. During the experimental manipulation, participants in the experimental group learned basic Japanese numerical vocabulary (numbers 1-10) through songs, utilising YouTube videos as a learning tool. The control group, on the other

hand, learned the numerical vocabulary using flashcards with assistance from the teacher, and without the use of music.

Following the learning phase, both groups proceeded to the test phase. Participants completed a vocabulary test and a pronunciation assessment. The vocabulary test consisted of 10 questions on Japanese vocabulary. For the pronunciation assessment, participants read aloud a list of 10 Japanese words, and their pronunciation was evaluated using prepared rubrics. Each participant's pronunciation was recorded and rated on a five-point Likert scale, where 1 indicated a very heavy non-native pronunciation, and 5 represented native-like pronunciation. Both the vocabulary test and pronunciation assessment took approximately 20 minutes to complete. After the test phase, a debriefing session was conducted to address any questions or concerns and to ensure that participants were fully informed before concluding their involvement in the study.

Results

Prior to conducting independent-samples t-tests, the assumptions of normality and homogeneity of variance were examined. Shapiro–Wilk tests indicated that vocabulary and pronunciation scores were approximately normally distributed in both groups ($p > .05$). Levene's test revealed unequal variances for vocabulary scores, so Welch's t-test was applied, showing a statistically significant difference, $t(21.4) = 4.237$, $p < .001$, $d = 1.34$, indicating a large effect size. For pronunciation scores, Levene's test indicated equal variances, allowing the standard independent-samples t-test to be used. This analysis also revealed a statistically significant difference, $t(38) = 3.434$, $p = .001$, $d = 1.09$, indicating a large effect size.

Descriptive statistics (Table 1) show that the music-based learning group scored higher on both assessments. Their mean vocabulary score exceeded that of the conventional learning group by 3.10 points, with a lower standard deviation, suggesting more consistent performance. The mean pronunciation score was 1.10 points higher, although the standard deviation was slightly greater, reflecting a broader range of individual outcomes. These results indicate that the music-based learning approach is more effective than the conventional approach in enhancing Japanese language skills in preschool children.

Table 1. Mean and standard deviations of vocabulary acquisition scores and pronunciation skills scores

Assessment	Group	M	SD
Vocabulary Acquisition	Control group	6.20	3.172
	Experimental group	9.30	.801
Pronunciations Skills	Control group	2.30	.865
	Experimental group	3.40	1.142

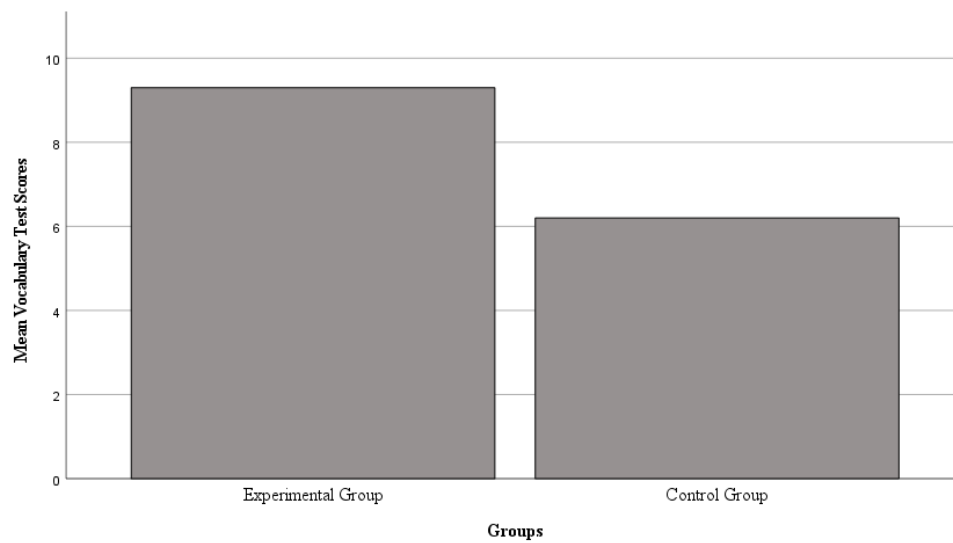


Figure 2. Comparison of mean vocabulary test scores between the experimental and control groups

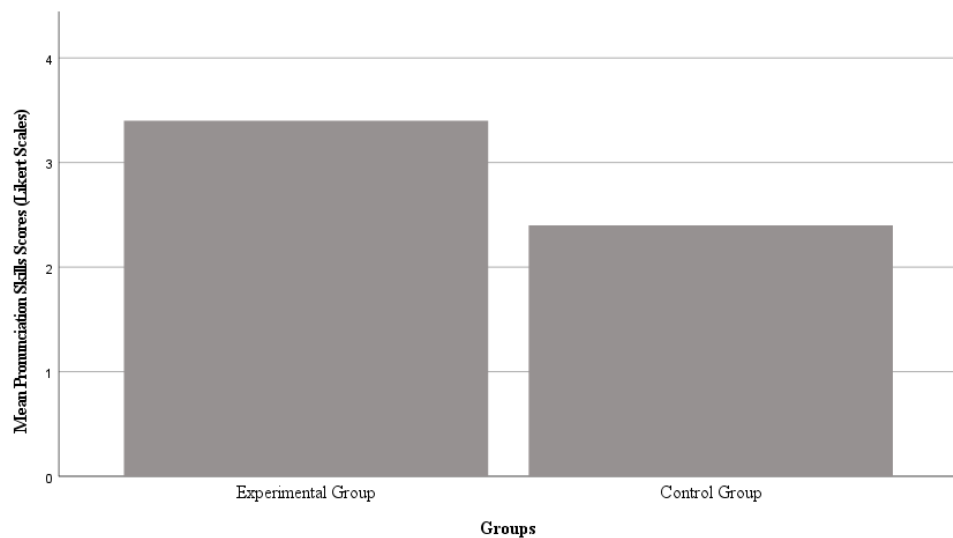


Figure 3. Comparison of mean pronunciation evaluation scores between the experimental and control groups

Discussion

This study examined the effectiveness of a music-based instructional method compared to traditional approaches for improving preschool children's acquisition of Japanese vocabulary and pronunciation skills. The results showed that children in the music-based group achieved significantly better outcomes in both vocabulary tests and pronunciation assessments than those in the traditional group. Music's rhythmic and melodic elements functioned as mnemonic devices, enhancing both memorisation and recall of new vocabulary and pronunciation (Caro & Mendinueta, 2017). Music reduces cognitive load in preschool children by structuring language input into predictable rhythmic and melodic patterns, thereby facilitating language acquisition. The repetitive auditory stimulation provided by music facilitates implicit learning, making it more effective in guiding preschool children toward accurate recognition and recall than traditional methods that rely heavily on rote memorisation (De et al., 2020). The superior performance of the music-based learning approach group suggests that the rhythmic and repetitive elements of music activate preschoolers' language acquisition mechanisms, aligning with the concept that innate repetition facilitates vocabulary retention. Chomsky's Language Acquisition Device theory again supports these findings by suggesting that cognitive mechanisms facilitate language acquisition through automatic repetition (Krashen, 1982). Music's rhythmic and melodic patterns also aid in imitating prosodic elements of language, enhancing pronunciation skills (Zhao, 2024). Thus, the music-based approach provides a natural and enjoyable way to practise prosodic elements, leading to superior pronunciation skills compared to conventional methods.

Neurocognitive evidence supports these interpretations. There are shared cognitive and auditory mechanisms between language and music, contributing to a standard structure in the auditory information that people can identify (Piri, 2018). While the left hemisphere is primarily responsible for language acquisition, the right hemisphere is associated with creativity and music. An optimal language acquisition process involves the activation of both cerebral hemispheres. The corpus callosum connects the left and right hemispheres, enabling communication between them (Grimm, 2020). This neural overlap explained why rhythm and melody in songs enhance both vocabulary retention and accurate pronunciation in

preschool children.

The study's findings are consistent with theoretical perspectives on lexical competence and cognitive problem-solving (De et al., 2020). Music facilitated connections between unfamiliar Japanese words and previously taught English vocabulary, reflecting Henriksen's concept of moving from partial to precise knowledge (De et al., 2020). By associating new words with the emotions conveyed through song melodies, children were better able to understand the meanings and pronunciations of words (Choudhury, 2015). Additionally, music's ability to alleviate anxiety and enhance engagement contributes to its effectiveness (Fengyu, 2023). Emotional connections formed through music improve memory and retention of new knowledge (Jäncke, 2008). Music's effect on the "paraconscious" mind, elevation of alpha brain waves, and reduction of physiological stress responses further support language acquisition (Larsen-Freeman, 2000; Amin & Soh, 2020). These findings also align with Krashen's Affective Filter Hypothesis, a foundational concept in second language acquisition, which posits that affective variables, such as anxiety, motivation, and self-confidence, can either facilitate or hinder the processing of language input (Cimolin, 2020). In the context of this study, music appears to have lowered learners' affective filters by creating a relaxed and engaging learning environment, thereby reducing anxiety and increasing motivation. This reduction in affective barriers allowed learners to process and retain new vocabulary more effectively. Similar to Cimolin (2020), who highlights the role of emotional and psychological factors in language learning, the music-based intervention in this study demonstrates that fostering positive emotional experiences can enhance lexical competence and cognitive engagement. Music, as a pedagogical tool, reduces learner inhibition and promotes interest and engagement, further supporting effective learning.

From a cognitive perspective, dual coding theory (Paivio, 1986) explains this effect. Music engages both verbal and non-verbal channels: words are processed alongside melodies and rhythms, creating dual representations in memory. This multimodal encoding enhances both recognition and recall of vocabulary, making it easier for learners to retrieve the words later. Additionally, the findings suggest that the rhythmic songs used in the experimental group played a key role in vocabulary retention and pronunciation. According to embodied cognition theory, cognitive processes are linked to sensory and motor systems. Even without explicit movement, the rhythm and melody of the songs likely engaged additional cognitive

pathways, synchronising auditory memory with natural motor responses. This embodied engagement aligns with theories of embodied cognition, which argue that perceptual, sensorimotor, and affective aspects of concepts support language learning and processing.

Furthermore, the rhythmic songs provided a situated context for language learning, which enhances cognitive processing, as language acquisition is situated in real-world environments (Reggin et al., 2023). In contrast, the control group, which learned without music, did not benefit from this embodied engagement. These results suggest that the rhythm in the songs offers a unique cognitive advantage by tapping into the body-brain connection, thereby strengthening memory and pronunciation.

Although the music-based learning group outperformed the conventional learning group on average, the higher variability in pronunciation scores indicates individual differences among the preschool children. This suggests that while the music-based approach can be practical, its impact may vary depending on each child's characteristics. Factors such as prior exposure to music and attention span influence how effectively children benefit from the music-based approach. The slightly greater spread in scores, therefore, highlights that the method may support some learners more strongly than others rather than producing uniform improvement. In this study, the observed variability emphasises the heterogeneous nature of children's responses to the intervention, suggesting that individual differences play an important role in learning outcomes. These findings indicate that future research with larger samples should investigate the factors contributing to this variability—such as prior knowledge, motivation, and learning styles—to tailor interventions more effectively and optimise outcomes for all learners.

It is noted that although the music-based learning group outperformed the conventional learning group on average, the higher variability in pronunciation scores indicates individual differences among the preschool children. Factors such as prior exposure to music and attention span influence how effectively children benefit from the music-based approach. This variability is common in small exploratory studies and reflects the heterogeneous nature of learning outcomes in early childhood interventions.

It is also important to consider that the delivery mode and contextual factors may have influenced the outcomes of these findings. The music-based learning approach group in this study relied strictly on pre-recorded YouTube videos. However, music-based learning is

likely to be more effective when delivered through live interaction, where teachers can provide real-time feedback, model pronunciation, and adjust activities based on children's responses. Such interaction not only supports more accurate language production but also sustains children's attention and motivation. The teacher's interaction style and classroom dynamics may have played a role in shaping how children engaged with the activities, further influencing their learning outcomes. These observations underscore that the success of a music-based approach depends not only on the content but also on how it is delivered within the classroom environment.

From a practical perspective, early childhood educators can strategically integrate music into language lessons through live singing, rhythmic movement, and interactive activities that reinforce vocabulary and pronunciation. While digital resources like YouTube videos can be helpful for supplementing, over-reliance on them may limit engagement and interaction between teachers and children. Therefore, teacher training programs should emphasise the use of music as a multimodal tool to support motivation and implicit learning in preschool classrooms.

This study has several limitations that should be taken into account when interpreting the findings. The vocabulary set was restricted to basic numerical terms, which may limit the generalisability of the results to broader language learning contexts. The sample size was relatively small and drawn from a single preschool, which reduces statistical power and may not accurately reflect the wider population. While pronunciation outcomes were assessed systematically, no additional checks were made to confirm scoring consistency, which may affect the reliability of this measure. The study's duration was also relatively short, and no follow-up testing was conducted to assess the retention of learning outcomes. Future research could incorporate delayed post-tests to examine long-term retention and use a larger, more diverse sample. In terms of pedagogical practice, extending the vocabulary range, embedding music into everyday language activities, and employing interactive, multimodal music-based exercises could enhance learning outcomes. Attention should also be given to tailoring interventions to children's individual characteristics, such as attention span and prior exposure to music. Finally, examining the role of delivery mode—live interaction versus pre-recorded videos—may provide further insight into practical implementation strategies.

In conclusion, this study provides preliminary evidence that a music-based approach can

support vocabulary acquisition and pronunciation in preschool children. The findings highlight the potential of integrating music into early language learning and offer a foundation for developing more tailored and effective educational interventions for young learners.

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