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Singing and Pronunciation: A Review of the Literature

Kassidy Joyner
University of Arkansas, Fayetteville

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Singing and Pronunciation:
A Review of the Literature

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Kassidy Joyner
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_____
Freddie Bowles, Ph.D.
Thesis Director

_____
Tatsuya Fukushima, Ph.D.
Committee Member

_____
Alissa Blair, Ph.D.
Committee Member

Abstract

Observed differences exist in the pronunciation abilities of individual language learners, especially adult learners. Musical ability and experience are possible factors that have been attributed to language pronunciation abilities. Although there has been a large amount of research concerning the effects of general musical ability and training on language abilities, very few studies have investigated the musical sub-category of singing. Research on the use of songs in the language classroom has largely tested the effects of song on vocabulary acquisition, while very few studies have explored the effects of song on pronunciation. Given that singing and pronunciation both use similar productive systems, the relationship between singing and pronunciation merits investigation. This review looks critically at the current research on singing and pronunciation abilities. Evidence from the current research shows that both singers and instrumental musicians perform better than non-musicians on language imitation tasks, and in some cases higher singing ability has a stronger effect on pronunciation performance than musicality alone. There is also evidence that singing and songs support sound memory and the verbatim recall of words when associated with simple melodies. The studies also indicate that working memory plays a large role in pronunciation performance, but this may be due to the studies' experimental setups which use working memory heavy tasks. Rhythmic perception abilities and the use of distinct pitches for syllables may contribute to better word segmentation. Researchers' conclusions concerning the relationship between singing and pronunciation abilities address the multi-dimensional nature of pronunciation ability, similarities between song and infant-directed language input, and the neurological overlap of language, music, singing, and memory. The limitations of current research are that most of the studies relied on languages unfamiliar to subjects to test pronunciation, which could disproportionately represent the

importance of working memory as a factor in pronunciation. Research on the benefits of song on pronunciation is promising, but because the current pool of research on singing and pronunciation is very limited, more research is needed.

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Introduction

In recent years, given shifting attitudes about World Englishes and the role of varied pronunciations, less attention has been given to pronunciation in the language classroom. While it is certainly true that it is important to learn and respect the validity of various accents in growing global communications, the fact remains that pronunciation is important to comprehensibility and thus has an impact on the ease with which second or other language (L2) speakers are able to communicate. Additionally, pronunciation skills are valued highly by many language learners. Although learners who start at a young age tend to more easily acquire native-like pronunciation, this is not the case for most adult learners (Granena, 2012). However, between different adult learners there exists a considerable range of abilities, with gifted or high-ability learners even able to achieve native-like pronunciation (Abu-Rabia, 2004). Because the origin of these individual differences is still not well understood, it is important to investigate these differences to help determine effective language practices and promote communication skills and motivation, as well as to help guide learners through their language learning.

Individual Factors in Pronunciation Ability

The stark difference between the acquisition of language and pronunciation abilities of younger versus older learners points to the potential presence of important insights into not only neurological functions and structural changes of the brain, but also to insights into our internal language learning devices and how we may navigate their workings to maximize our language learning potential. In order to ascertain these insights, it will be helpful to first examine factors that contribute to the differences in language and pronunciation abilities between individual language learners.

Some case studies have explored individual differences in pronunciation to various degrees. Sturm's (2018) longitudinal case study examined the rate of instance of mispronounced syllables

in speech samples from different students over each semester of beginning to intermediate level French classes. The student participants started off at different levels of ability within the same class and improved at different rates, with some students starting off at and maintaining a high level, some beginning at a lower level but improving drastically, and others starting off at a low level with a much lower rate of improvement. This study is very valuable in demonstrating substantial individual differences in learners' pronunciation abilities over a beginner to intermediate span. However, this study was limited to purely data, and failed to explore any possible factors that may have contributed to these differences.

Saito et al.'s (2019) longitudinal case study more closely examined individual differences in pronunciation improvement, and found that classroom exposure, memory, phonemic coding, and sound sequence recognition were the strongest indicators of pronunciation achievement. However, this study only gathered data limited to these specific factors within the context of a language classroom. Abu-Rabia's (2004) case study looked at a wider variety of possible factors in adult learners with high pronunciation abilities. This study found that adult learners' time spent using their L2 versus their native language (L1) and factors such as work and motivation represent high indicators of ability. The study results also indicated that most high-ability subjects had musical talent and background.

Musicality and Language Abilities

There have been many studies investigating the potential links and beneficial transfer effects between music and language. Research in neurology points to the potential overlap of the areas in the brain dedicated to music, speech, and auditory processing (Milovanov & Tervaniemi, 2011). Music training has been shown to help speech processing, reading, and the ability to decipher speech in noisy environments (Strait & Kraus, 2011). Interventions for children with

autism and stroke patients show that music and songs help memory, vocabulary recall, and speaking ability (Slevc, 2013).

For second and foreign language learning, musical training and musicality, or musical ability, has been shown to be related to increased gains in vocabulary, perception, and pronunciation skills. Studies have looked at the academic progress of young students in music, L1, L2, and other academic subjects, with those in music training experiencing higher rates of achievement in L2 class (Yang, 2014). Musical expertise has been shown to benefit speech perception, production, and second language acquisition (Chobert & Besson, 2013). While there has been a significant amount of research on the use of music and songs in the classroom, studies focusing on listening and vocabulary effects are generally much greater in number than those concerning pronunciation and speaking (Davis, 2017).

Recently, there have been several research articles focusing on the specific musical subcategory of singing (Christiner & Reiterer, 2013, 2015, 2018a, 2018b; Ludke et al., 2014; Coumel et al., 2019; Baills et al., 2021). Studies on singing, rather than general musicality, have been extremely few in number. Therefore, the goal of this literature review is to highlight the research on singing and L2 pronunciation, as well as to point out the need for more of this kind of research.

Previous Literature Reviews and Studies

Previous literature reviews have focused on music and language in the context of neurological composition and classroom use. Zeromskaite (2014) reviewed the literature on musicality as it relates to perceptive, productive, and reading abilities. However, there have been no literature reviews that distinguish singing and vocalists from instrumentalists, nor any literature reviews that focus exclusively on pronunciation. Therefore, this review will focus on

singing ability specifically as it relates to pronunciation abilities. A review of research on these specific categories is important because, in addition to possessing the musical aspects that previous literature has shown to be helpful in language perception and speaking, the act of singing utilizes similar mechanics as speaking. It is therefore critical to look at singing separately from instrumental music to understand if these productive aspects have a distinct impact on pronunciation skills.

Methodology

This literature review was conducted first by surveying published research articles related to singing or songs and second or foreign language pronunciation. I searched the ERIC (EBSCO), ProQuest Central, Google Scholar, and Web of Science databases using combinations of keywords related to singing, songs, pronunciation, and second language. The initial search was conducted in January 2021, with additional searches made in February and again in March. Articles were additionally found by looking at articles listed under "related" and "cited by", as well as sources in the works cited section of the articles. The parameters for inclusion in this review were that singing abilities or treatments and L2 pronunciation were directly tested or examined in the research. While there were classroom research articles about songs in the language classroom, if they did not provide data related to pronunciation and singing I deemed them unfit for inclusion. This resulted in a total of 7 studies for inclusion.

This research is conducted to address the following research questions: (RQ1) What does the research show about the relationship between singing ability or strategies and L2 pronunciation ability or acquisition? (RQ2) What strategies using songs prove effective in pronunciation acquisition?

Table 1: Summary of Research Articles Reviewed

Article	Measured	Sample size (age)	Language	Musical, Language, and Working Memory Measurements	Findings
Christiner and Reiterer (2013)	English reading task, spontaneous speech imitation rated, rated song learning, rated singing of happy birthday	41 singers beginning to advanced (age avg=35, SD=11; 34 female)	• L1 German (all multi-lingual) • unfamiliar language Hindi	• all had received formal singing lessons • most sang regularly, some choir or band vocalists • half attended singing lessons >3 years • musicality test Advanced Measures of Music Audiation (AMMA) • working memory tests • musical expertise, singing experience, training, instruments, L2 proficiency and onset and number, education background questionnaire	Singing performance is a better indicator of the ability to imitate speech than the playing of a musical instrument. Singers' sense of rhythm and quality of voice explain 66% of imitation variance in unfamiliar language.
Ludke et al. (2014)	taught 20 phrases, 15-minute listen-and-repeat procedure; treatments: 1) speaking, 2) rhythmic speaking, 3) singing; followed by production/recall/vocab tests	60 (university students)	• L1 English • unfamiliar language Hungarian	• phonological working memory test • PANAS mood questionnaire • modern language aptitude test • language learning experience questionnaire • musical ability test • musical training/experience questionnaire	Singing treatment significantly outperformed on verbatim production and delayed recall conversation tests.
Christiner and Reiterer (2015)	tested ability to imitate 4 sentences in Hindi	27 instrumentalists, 33 vocalists, 36 non-musicians (20-59 yrs.; 67 female, 29 male)	• L1 German (multilingual) • L2 English • unfamiliar language Hindi	• musicality test AMMA • singing rated by advanced or professional singers	Instrumentalists and vocalists both have higher ability to imitate speech and foreign accents; vocalists outperformed instrumentalists.
Christiner and Reiterer (2018a)	repeat 3 language phrases from 4 different languages	35 (pre-school students 5-6 yrs.)	• L1 German (monolingual) • Turkish, Tagalog, Russian, Chinese	• singing ability rated by music teacher • singing behavior teacher rated intuitive/intrinsic motivated singing • parents asked weekly children singing hours, if play musical instrument • musicality test PMMA • working memory tests	Speech imitation significantly correlated with PMMA musicality score, working memory, and singing behavior.

Table 1 (Cont.)

Article	Measured	Sample size (age)	Language	Musical, Language, and Working Memory Measurements	Findings
Christiner and Reiterer (2018b)	repeat 15 phrases in Tagalog and Chinese	30 (primary school students 9-10 yrs.)	• L1 German, Turkish, Serbian, Bosnian, Macedonian • L2 English • unfamiliar languages Mandarin, Tagalog	• musicality test IMMA • language aptitude test LLAMA • working memory tests • IQ test CFT20-R	Children with high working memory, high ability for singing and discriminating tonal differences imitate tonal language of Mandarin faster. Children with high working memory and rhythmical music perception imitate Tagalog best.
Coumel et al. (2019)	subjects read one German sentence with a French accent, were rated as sounding a) German, b) French, or c) Other by L1 French speakers	25 (university students)	• L1 German (bilingual-trilingual) • French accented German	• musicality test AMMA • singing abilities self-assessed • working memory tests	Ability to fake "L2" French accent in L1 correlates with singing ability and musical perceptual abilities, not working memory capacities.
Baills et al. (2021)	battery of pre/post tests, training tasks; short training session with sung or spoken input in group 1, listening or listening and singing in group 2	2 groups of 54 (high school students)	• L1 Chinese and regional dialect • L2 English • unfamiliar language French	• language and musical experience questionnaire • musical ability test PROMS • speech imitation test • phonological short-term working memory	Song is better than spoken input for pronunciation, but not word memory. Listening and singing both have same positive effect on pronunciation and word memory. Working memory and speech imitation ability significant predictors for both pronunciation and vocabulary tasks. Neither musical experience nor aptitude had predictive effect.

Findings

Evidence from the Research

Musicians and Singers Outperform Non-Musicians on Speech Imitation Tasks

Christiner and Reiterer's (2015) literature review section includes eight studies where "musicians always outperformed non-musicians in language imitation tasks." In their previous research, Christiner and Reiterer (2013) found that speech imitation ability was strongly connected to musicality, and within musicality singing was a strong indicator of ability. They found that vocalists outperformed instrumentalists on speech imitation of unfamiliar L2 tasks, and instrumentalists and vocalists both outperformed non-musicians or non-singers (Christiner & Reiterer, 2015). They also found that within a group of trained singers of varying proficiency levels, singing ability was a higher indicator of speech imitation ability than musicality (Christiner & Reiterer, 2013).

In Christiner and Reiterer's (2018a, 2018b) studies with pre-school and elementary aged students, musicality was again linked with imitation performance of different unfamiliar languages. However, in these studies the students' musicality was a stronger indicator than their singing abilities. Coumel et al.'s (2019) study with adults also found that musicality was a strong indicator of ability to fake an L2 accent, but singing ability was at the same level of significance as musicality. However, this study did not use professional singers, and participants rated their own singing ability.

Singing and Songs Assist (Sound) Memory and Verbatim Recall

Studies show that listening to or singing songs assists memory (Ludke et al., 2014; Baills et al., 2021). In particular, songs help with phonological aspects of memory. Subjects who listen to or sing songs are able to recall the sounds associated with the lyrics of the song. They may not remember the meaning of what they are singing, but they can recall the sounds or pronunciation of the lyrics verbatim. This supports that songs are helpful in pronunciation aspects of language learning, even if the students are not singers or musically trained. It can help students with the first stage of remembering the sounds of the words, which would then free up more cognitive resources for them to learn the meaning.

Ludke et al.'s (2014) results showed singing improved verbatim recall. Baills et al. (2021) had similar results. Ludke et al. (2014) suggest that "pitch information provides an extra, musical cue… which can support retrieval and recall". Christiner and Reiterer (2015) and Coumel et al. (2019) suggest that the oro-motor system is linked to memory for speech sounds. Coumel et al. (2019) also supports the notion that musical expertise and higher memory capacities are linked.

The Importance of Working Memory

Working memory was the largest determining factor in subject speech imitation performance results for many of the studies (Christiner & Reiterer, 2013, 2018a, 2018b; Baills et al., 2021). Higher working memory capacity allows learners to remember more at a given time about the input they hear, leading to more accurate reproductions. It also opens up more resources for learners to concentrate on other aspects of the language such as specific pronunciations. Christiner and Reiterer (2013) express that working memory is reliant on a

phonological loop, working memory "for phonemes and pitch relies on sensorimotor-related circuits," and musicians have better working memory than non-musicians.

However, the studies in which working memory played a large part all gave subjects the task of imitating sentences in an unfamiliar L2. Due to the nature of this task, working memory would be necessary to even remember the sequence of sounds in the target sentences. In Coumel et al.'s (2019) study, subjects imitated a familiar L2 accent in their own native language. The results for this study suggest that working memory is not a significant factor when the subjects are already familiar with the language and phonology. Their interpretation of these results is that working memory along with musical and singing abilities that enhance perceptive and productive abilities enable learners at beginning stages to more easily learn the pronunciation of the language, while musical abilities effect the ability to more efficiently recall the sounds that they have already learned. In other words, while working memory may play a large role in the level of ease in which students are able to learn a language, musical and singing abilities are what ultimately effects pronunciation attainment.

The Role of Rhythm Perception in Helping Speakers Detect Language Segmentation

Musical perception abilities help pronunciation abilities because they allow musicians to notice changes in pitch and rhythm. Christiner and Reiterer (2013) found that the singing criterion of rhythm related to performances on a Hindi imitation task and suggest that vocalists are more sensitive to detecting the rhythmic structures of language.

Christiner and Reiterer (2018b) also tested children with differing musical abilities on their ability to imitate two different languages: Mandarin and Tagalog. Subjects with higher singing abilities performed better imitating the tone language Mandarin, while subjects with higher rhythmic perception abilities performed better imitating Tagalog. While ability to notice

and recreate pitch would be important for tone-dependent languages, in other languages in which pitch is not essential to meaning, other aspects of pronunciation such as prosody could be more important in comprehensibility (Christiner & Reiterer, 2018b). This could also indicate that language learners with certain abilities could be more adept at imitating certain languages. More research on specific aspects of music and language abilities as well as different types of languages is necessary to further understand the relationship and transfer effects between music and language abilities.

In regard to the combination of pitch and rhythm for detecting word segmentation, Ludke et al.'s (2014) results indicate that pairing syllables with distinct pitches could lead to learners' being able to detect word segmentation in a sound stream at a faster rate.

Discussion

Summary

The findings of these experimental studies provide evidence showing that not only are musicians and singers better able to imitate foreign language pronunciation, but also that the use of singing and songs can help most language learners learn and remember L2 phonetics. Researchers theorize that factors such as the interaction of perceptive, productive, and memory abilities and the closeness of these neurological structures in the brain may contribute to transfer effects between music and language. The similarities of song to the L1 input directed towards infants could also play a role in improved acquisition. (RQ1)

Strategies used in the learning experiments included repeated listen-and-sing with phrases and listening to or singing to a vocabulary-focused song accompanied with a video demonstrating meaning. These strategies were both effective in improving pronunciation accuracy. (RQ2)

Researcher Conclusions and Other Supporting Studies

Pronunciation is Not a Single Ability

The results of many of the studies point to musicality or music training, singing ability, and working memory as the main factors of strong language imitation performance. Working memory was the major factor in many of the studies, but musicality and singing ability were also significantly correlated. In Coumel et al.'s (2019) research, subjects imitated a French accent in their L1, drawing not on working memory but their long-term memory sound associations. Musical ability was a more significant factor of performance than working memory in this study. They suggest that working memory may be important at the learning stage, but sound recall and attainment at later stages is influenced by musical ability. They assert that pronunciation is not a single ability, but the culmination of perceptual and productive abilities in tandem with other cognitive abilities such as working memory. Christiner and Reiterer (2015) also describe phonetic aptitude as a "composition of multiple perceptual cognitive processing strategies and motor abilities rather than a single specific ability".

Christiner and Reiterer's (2015) results showed that, despite instrumentalists and vocalists both scoring at the same level in musical perception, vocalists outperformed instrumentalists on speech imitation tasks. This led them to conclude that it is more than just perception that influences productive abilities.

Through vocal exercises, imitation or learning of new singing styles and techniques, and singing choral pieces in other languages, singers develop their vocal flexibility and sensitivity to different sounds they are able to produce. They gain a knowledge of how to produce different sounds and what parts of the mouth to use to produce them. This could transfer to language imitation. As the same parts are used to sing and produce language, it could be easier for singers

to transfer their skills from singing to pronunciation. Additionally, familiarity with the sounds one is able to produce may result in being able to more easily recognize when others are producing the same or similar sound. Christiner and Reiterer (2015) related this to Liberman and Mattingly's (1985) motor theory of speech perception, where listeners can perceive what sounds speakers are making based on their own experience producing that specific pattern of sound.

Baills et al. (2021) tested for speech imitation ability separately from singing ability and musicality and found that mimicry ability and singing ability were independent of each other, and even unrelated to students' L2 pronunciation results in some cases. This brings up the question of whether special mimicry abilities could be separate from singing abilities, or if the two abilities are still related.

Singing is Similar to Infant-directed L1 Input

The use of songs or singing may benefit all L2 learners because of certain unique aspects. One of these is that singing is slower than regular speech. This could make it easier for listeners to notice certain phonological characteristics, as well as make it easier for learners to sing along.

Another reason songs may be beneficial as L2 input is because of similarities to the L1 input that infants receive. Speech directed to infants is often exaggerated and more melodic than normal speech. Song has been shown to capture infants' attention more than normal speech (Tsang et al., 2017) and could help infants develop their awareness of L1 phonology. Exaggeration increases infants' motor awareness and ability, and singing education is similar in this aspect because it aims to create awareness of learners' vocal apparatus and orofacial motor abilities (Christiner & Reiterer, 2013, 2015). These similarities could result in more accessible forms of input for learners that draw attention to the phonological aspects of their L2.

The Neurological Overlap of Music, Singing, Language, and Working Memory

Neurological research has revealed that the areas in the brain used during music and language processing overlap in short term memory (Schön et al., 2010; Milovanov & Tervaniemi, 2011; Turker et al., 2017). This may also explain why those who have developed their musical abilities see enhanced language abilities—by training that area of the brain, they see transfer effects to language because it is in a similar area (Christiner & Reiterer, 2018b). This also has brought to question whether those who are gifted in music and language are so because of their genetics. More research is needed in this domain. However, since singing and the use of songs has been shown to improve pronunciation regardless of inherent abilities (Ludke et al., 2014), singing and songs in language learning is important, regardless.

Baills et al. (2021) attribute their results of both the listening to songs and the singing treatments having the same amount of effect because it "may be that both listening to songs and singing help to actively engage a brain network that facilitates auditory-motor mapping procedures."

Some research in neurology and psychology has revealed a speech to song effect (Margulis et al., 2015). Listeners unfamiliar with a language are more likely to perceive it as more song-like, especially if it is a language of greater distance from the listener's native language. This may also relate to why unfamiliar languages are easier for musical people to imitate: if they hear a language as more song-like, it could be easier for them to treat it as music—something they are familiar with. More research should be conducted to see if musicality effects persist for less "song-like", phonologically similar languages.

Issues Requiring Further Examination

Age and Musical Aptitude Effects

Two of the studies had children as subjects. In these studies, the effects of musicality were still present, but the effects of singing abilities were not found to be more significant than musicality in speech imitation performance (Christiner & Reiterer, 2018a, 2018b). In light of the "critical age" hypothesis (Patkowski, 1994), it may be that singing ability is not as significant an indicator of potential pronunciation acquisition at a young stage as compared to adults. This could also point to a lack of oro-motor or neurological development in specific areas, perhaps to the effect of there being more room for potential singing growth than there is for potential language pronunciation growth for children at a younger age.

Pro-singers vs. Amateurs

Two of the studies used trained vocalists as subjects (Christiner & Reiterer, 2013, 2015). These studies showed the most significant relationship between singing proficiency and language pronunciation ability. The other study that measured singing ability with adult learners did not feature trained vocalists as subjects, but instead had subjects of varying backgrounds using a self-rating system to measure their singing ability (Coumel et al., 2019). The results of this study did not show singing ability as being more significant an indicator than general musicality. This raises the question of whether the relationship between singing ability and pronunciation ability could be different for amateur singers and trained or professional vocalists. The reliability of self-rating could also require further examination.

Lack of Research in Specific Music and Language Sub-Categories

While there is a good amount of research on the relationship between language and music in general, more specific studies focusing on major musical or language sub-categories such as

singing and pronunciation are very few in number. Most studies have focused on the transfer effects of general musicality or musical training onto general language ability (Chobert & Besson, 2013). Classroom-based research has studied the effects of music and songs in the language classroom on learning, but most have been concerned specifically with vocabulary recall effects (Davis, 2017). There has been research that examines musicality effects on second language pronunciation (Zeromskaite, 2014). However, these studies account for only general musical aptitude or musical training. Research into the effects of singing ability on pronunciation is comparatively rare, resulting in only seven studies being available for this literature review, many of which are by the same researchers.

The broadness of musicality and general language aptitude means that studies that do not limit their topics to sub-categories such as singing or pronunciation are likely to be too broad to sufficiently target specific correlational factors. Most studies have shown that musicality and musical training influence perception abilities that transfer to language. This could potentially have effects on productive language abilities, but the broadness of musicality makes the differences in productive abilities between musicians and non-musicians, and between individual musicians, unclear. Singing is a sub-category of music that shares similar functions and mechanics used in speech production. Therefore, singing ability should have an even closer connection to language ability. Examining singing and pronunciation should make clear whether musicians' advantages in language comes from enhanced perceptive abilities alone, or if practice using the vocal apparatus in singing could lead to enhanced language productive or imitative abilities.

Limitations and Future Research

The studies discussed here represent the beginning forays into research in singing and pronunciation. In fact, most of the studies reviewed here are by the same authors, so it will be important for other researchers to corroborate or dispute their results. More research in this field will be vital to understanding the individual differences between learners' acquisition of pronunciation. Perhaps even more importantly, more research on the effect of singing and songs could lead to solid research-based classroom practices. This is especially important given that pronunciation training in the classroom is often overlooked even though pronunciation is important to learners.

The current studies reviewed are limited because they all, excluding one, used languages unfamiliar to subjects to test pronunciation imitation. It is necessary to conduct similar research with actual language learners at different levels. This could give different insights or even different results than the current research. This may be especially relevant in regard to the importance of working memory, as working memory plays a large role in unfamiliar language imitation tasks.

The next important area for future research to address is the differences in language achievement within singers. It may be that, like in Christiner and Reiterer's study (2018b), learners with different strengths may be more suited to certain languages, or there could be other factors that affect pronunciation acquisition even between those of similar singing or musical abilities. Christiner and Reiterer (2013) showed differences between singers at different levels of abilities with working memory representing the main difference factor. Studies examining singers with similar abilities using a more familiar L2 will be important to determine whether working memory truly represents a distinguishing factor in ability.

Additionally, many of the studies focused on higher-achieving or potentially gifted music or language learners. It would be beneficial to look into the experiences of learners who struggle with music or pronunciation. Research in this area could provide insights on possible differentiation strategies for those students not gifted in music or pronunciation imitation.

Finally, there should be more rigorous classroom-based research using singing or songs for pronunciation learning. The two learning-focused studies reviewed both showed improvements for learners using very short-term interventions. More studies on different intervention types of varying lengths would be helpful in providing an empirical research basis for classroom practices and activities.

Implications for Classroom Practice

All of the research reviewed here and in previous review articles show that singing, songs, and music have largely favorable effects for language learners. While there is still a limited amount of research on specific skills such as pronunciation, it has been shown in these studies that there are positive effects for pronunciation. These studies also show that songs with simple melodies are beneficial for building sound or phonetic memory and are effective for verbatim recall or as mnemonic devices. Songs and singing are relatively easy for any teacher to incorporate in class activities. Possible activities could range from setting conjugation patterns to a simple melody as a mnemonic device, to fill-in-the-blank listening exercises with song lyrics, in-class karaoke, or even introducing nursery rhymes or popular songs and discussing aspects of history or culture significant to the music or lyrics. Significant effects have been seen even using short, informal musical activities (Putkinen et al., 2013). Given the observed enhanced abilities of students with musical or vocal training, teachers should also advocate for more musical training opportunities for students outside of the language class.

Conclusion

Based on the current research, not only have language learners with singing and musical experience and abilities been shown to have higher language imitation abilities, but singing and songs can help all learners remember language sounds. Given the small pool of current research, there is a significant need for more research on singing and pronunciation. The studies reviewed here represent the first steps in validating musical practices and activities that have long been used in the language classroom. Because singing practice is something that can be done relatively easily by anyone in the classroom, it will be beneficial to continue to encourage the incorporation of songs for pronunciation learning, especially at the beginning stages of language study.

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