### Original Research Article

# The effect of music learning on language music processing and its mechanism

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*Abstract:* Language and music are two more important communication systems in human life, and they have certain similarities in both acoustic elements and structural organization. Existing studies have found that both have shared cognitive and neural mechanisms during processing. Therefore, some scholars have proposed whether music learning can improve the language processing ability across the field. Combined on the research results of music learning and language rhythm processing in recent years, this paper systematically discusses the influence of music learning on language rhythm processing and its action mechanism, in order to promote the applied research of the relationship between music and language.Drawing on recent findings related to music learning and language rhythm processing, this paper systematically examines the impact of music education on language rhythm processing as well as its underlying mechanisms. The aim is to advance applied research concerning the interrelationship between music and language.

Keywords: Music; Learning; Language and music; Processing mechanism

#### 1. Introduction

This article systematically explores the impact of music learning on language prosody processing and its underlying mechanisms, drawing on recent research findings from scholars both domestically and internationally. The aim is to advance the applied research concerning the relationship between music and language.

#### 2. Music learning promotes language rhythm processing

When studying language prosody, scholars usually explore the influence of music learning on various rhythmic characteristics. Among them, intonation, as a kind of short phenomenon characterized by the change of oral contour, some scholars found that children receiving four years of music learning and children receiving 24 weeks of longitudinal music learning can show similar effects to adults; pitch as an important symbol of words, some scholars found that musicians are more likely than non-musicians and more confident in the classification result; stress refers to the prominent pronunciation of a syllable in the connected syllables, which belongs to the basic component of musical rhythm. Some scholars have found that musicians have more advantages than non-musicians in both fixed stress and free stress languages, and can process stress patterns from different perspectives. From the perspective of overall research, music learning can promote the language rhythm processing of normal people to a certain extent, which is not only reflected in many aspects such as pronunciation and intonation, but also can improve people's ability to recognize various types of emotional rhythm from different angles.

#### 3. Music learning promotes the improvement of disorders

Existing studies have proved that music learning can promote language prosody processing in normal people, 120. Therefore, some scholars have shifted their attention to people with language processing disorders, trying to clarify whether music learning can improve the language prosody ability of impaired groups. Some

scholars have found that music learning can strengthen the language processing ability of cochlear implant patients, which is reflected in the tone change, and the tone perception ability of such population has a directly proportional relationship to the perception ability of music pitch. After two or six months of music perception and instrument recognition training, the tone perception and judgment ability of the artificial electronic cochlear implants will become stronger and stronger, and the perception of external things will improve. Some scholars have found that guiding the artificial electronic cochlear implants to participate in the six-month piano training or group music training, which includes vocal emotion, singing, rhythm perception, which can strengthen the emotional rhythm processing ability of such groups. It should be noted that the corresponding music theory course and online App practice training, strengthen the emotional prosody processing ability has no significant effect. Combined with the teaching content and practical tasks of elementary and high school music shown in **Table 1** below, orderly music learning for the language rhythm processing of impaired groups can provide full clinical language rehabilitation training

Table 1. Structure diagram of musi	c teaching content and practical	tasks of primary and high schools
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Appreciation	Music and Emotion	1-2 Grades (Singing and Listening)
Expression	Music Styles	3-6 Grades (Singing)
Creation	Improvisation	7-9 Grades (Singing)
	Music and Imagery	
Connection	Music and Society	
	Music and Other Disciplines	

### 4. Music learning affects language rhythm processing

now, Some scholars have put forward two hypotheses for music learning to promote language processing: one is that music learning promotes music and language, Improved the sensitivity of general acoustic cue processing; The other is that music learning improves the general cognitive processing ability, It includes auditory working memory and auditory attention ability; Some scholars have explored the two possible mechanisms of music promoting language processing, The experiment chose to divide the young children into three small groups, Six months of piano training, reading training, no training, Three groups of pitch discrimination, vocabulary discrimination and general cognitive ability were tested before and after training. The final experimental results found that the piano training significantly improved children's pitch, vocabulary and tone processing ability, and the three groups of children had no general cognitive ability before and after the training, which proved that music learning can enhance the general auditory processing ability, rather than using cognitive ability to promote language processing; some scholars discussed the role of general cognitive ability in rhythm processing, based on the analysis of six months of music learning, whether it can promote the language rhythm processing, but the experimental results showed that children's general cognitive ability, such as intelligence and memory did not change, and the processing ability increased accordingly. This proves that the role of music learning in promoting prosodic processing is not derived from the general ability, and it is likely to have two mechanisms, one refers to the general auditory processing ability, the other refers to the general cognitive ability, but the former has been proved by experimental studies, and the latter still needs to be explored in combination with cases. See Table 2 for details

Course	Evaluation Item	Evaluation Content and Requirements	Weight	Evaluation Grades and Scores		
Learning	Have clear learning objectives, be good at self-adjustment, willing to accept new knowledge, good at summarizing experience, and willing to cooperate in learning.	10	A	В	С	D
Content Arrangement	Be able to use the knowledge learned to solve practical problems, have a positive learning attitude, be willing to participate in classroom discussions, and enjoy exploring.	6	А	В	С	D
Content Arrangement	Be able to arrange study time reasonably, study according to plan, complete homework independently, and consciously review and consolidate learned knowledge.	6	А	В	С	D
Learning Methods	Be able to participate actively in classroom discussions, enjoy expressing their own opinions, cooperate with classmates in learning, and enjoy sharing learning experiences.	6	А	В	С	D
Learning Methods	Be able to use various learning methods, be good at using online resources, actively look up materials, and enjoy exploring new knowledge.	6	А	В	С	D
Basic Learning Style	Be able to follow classroom discipline, respect teachers and classmates, listen attentively, and actively participate in classroom activities.	15	А	В	С	D

#### Table 2. Assessment content of music learning.

# 5. Conclusion

To sum up, existing studies have proved that music learning can actively promote language prosody processing, significantly improve individuals' perception and application of language prosody, and provide favorable support for practical language teaching and rehabilitation training, which deserves more scholars to participate in the research and discussion.

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