Musicians Outperform Non- Musicians in English Language Vocabulary Uptake and Listening Comprehension Tasks

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Abstract: Numerous possibilities, that have arisen in the result of globalization and cultural integration, require modern specialists, and musicians in particular, to speak English language fluently. Thus, methods of teaching professionally directed foreign language should develop and heed special abilities of learners to meet their academic and professional needs. Foreign language acquisition is influenced by numerous factors such as deciphering and processing of speech sounds, words segmentation, pronunciation, memory, attention, the ability to associate the sound of the word with its meaning. It is considered that musical abilities have positive impact on these factors. The influence of musical training on foreign language acquisition has been in scope of many scholarly works worldwide. It is considered that music expertise facilitates the development of phonological, listening and vocabulary skills in foreign language learning. Moreover, musicians have abilities to detect subtle pitch deviations in music and language, segment continuous speech, as well as superior auditory abilities, which enable them to hear better even in noise. Therefore, we hypothesize, that listening can be an effective tool in teaching English professionally directed lexical competence to future musicians. In this study we analyse theoretical data relevant to the current research and seek to compare performance of musicians and non-musicians in various vocabulary and listening tasks when learning English lexical competence through listening. Our findings prove that musical expertise enhances listening comprehension skills; listening leads to vocabulary uptake and can be an effective source of English professionally directed lexical competence development in musicians.

Keywords: *music students; vocabulary acquisition; musical abilities; listening skills; foreign language learning;*

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1. Main text

Globalization, cultural integration and professional mobility present numerous opportunities for modern Ukrainian specialists to grow professionally, particularly for musicians, who now can study at different educational institutions, take part in various master classes and give performances around the world. Owing to this, it has become essential for musicians to speak English language fluently to successfully communicate in academic, professional and everyday situations in international context. Therefore, it is becoming necessary for higher institutions educators to develop more effective methods of teaching future musicians English professionally directed lexical competence.

1.1. Literature overview

Foreign language acquisition is influenced by numerous factors such as the starting age of learning, contextual knowledge in native language, proximity between native and foreign language, phonetic inventory, deciphering and processing of speech sounds, words segmentation, pronunciation, the ability to associate the sound of the word with its meaning, motivation, working memory, attention span and, what is more important to us, musical abilities (Birdsong, 2006; Guion, & Pederson, 2007; Majerus, et al., 2008; Martínez-Montes, et al., 2013). The scholarly literature abounds with empirical data supporting the idea that musical abilities facilitate foreign language learning, influence verbal memory, speech perception, IQ scores and listening abilities (Slevc & Miyake, 2006; Parbery-Clark, et al., 2009(a); Patel, 2010; Besson, Chobert & Marie, 2011; Marie, Delogu, Lampis, Belardinelli, & Besson, 2011; Chobert & Besson, 2013).

Numerous studies suggest that there is a strong connection between musical abilities and foreign language proficiency given the fact that music and language auditory signals comprise of similar acoustic parameters, they have complex levels of organization and they “share neural resources for processing prosody” (Patel, 2010; Besson, et al., 2011; Marie, et al., 2011; Chobert & Besson, 2013). Musical abilities enhance phonological and pitch awareness. Musicians are proved to perform better at speech processing. This may be due to the fact that the activated brain areas in musicians overlap when processing speech sounds and acoustic cues (Wang, Jongman, & Sereno, 2001). Works published by Gottfried and J. Alexander show that musicians use their pitch processing abilities to process continuous speech (Gottfried, & Riester, 2000; Gottfried, Staby, & Ziemer, 2004; Alexander, Wong, & Bradlow, 2005). Moreover, it has been found that Broca’s and

Wernicke's language areas are activated when musicians process music. Scientific experiments found connection between musical expertise and foreign language perception among native and foreign tone language users, influence of musical expertise on foreign language perception and production of English phonemes (Alexander, et al., 2005; Patel, 2010; Chobert & Besson, 2013; Martínez-Montes, et al., 2013). Musicians are also able to detect even subtle pitch deviations in languages they do not know. Moreover, musicians' auditory brainstem responses to linguistic pitch encoding are better compared to non-musicians (Alexander, et al., 2005; Marques, Moreno, Luis Castro, & Besson, 2007; Chandrasekaran, Krishnan, & Gandour, 2009; Patel, 2010; Kraus, & Chandrasekaran, 2010; Martínez-Montes, et al., 2013). As judged by the activity at the cortical level musicians show better automatic processing of pitch changes as well as detecting segmental and supra segmental differences (Alexander, et al., 2005). Furthermore, numerous studies show that musical abilities help build abstract phonological representations (Slevc & Miyake, 2006; Degé & Schwarzer, 2011; Ott, Langer, Oechslin, Meyer, & Jancke, 2011).

Some published works demonstrate that musicians are even better at understanding speech in noise than non-musicians. This may be due to the fact that musicians have superior auditory abilities and enhanced auditory attention, verbal memory and auditory working memory (Franklin, et al., 2008; Parbery-Clark, Skoe, & Kraus, 2009a; Parbery-Clark, Skoe, & Kraus, 2009b; Parbery-Clark, et al., 2011; Cohen, Evans, Horowitz, & Wolfe, 2011). Being tested on visual and auditory recognition memory, musicians' auditory abilities proved to be fundamentally different from non-musicians – their auditory memory spreads over musical and non-musical sounds (Cohen, et al., 2011).

Recent findings also suggest that music education enhances auditory attention, which, in turn, contributes to learning, memory development and even academic achievements (Besson, et al., 2011; Marie, et al., 2011; Chobert & Besson, 2013; Strait, Slater, O'Connell, & Kraus, 2015).

Scientists found a positive link between duration of music education and verbal working memory, which is necessary for vocabulary, grammar and pronunciation proficiency in a foreign language, as, according to the conducted tests, same brain areas in musicians are activated during language and music short-memory tasks performance (Slevc & Miyake, 2006; Parbery-Clark, et al., 2009b; Patel, 2010; Besson, et al., 2011; Marie, et al., 2011; Chobert & Besson, 2013).

Moreover, musical activity evokes positive emotions and raises the level of attention and focus, as well as memory, which is essential in musical practice (Marie, et al., 2011; Strait, et al., 2015).

Although, the phenomenon of musical abilities has been widely discussed and researched in academic circles, it is still unclear whether musicians' superior auditory skills help them outperform non-musicians in listening comprehension tasks and enhance development of English professionally directed lexical competence through listening.

Thus, **the purpose of the article** is to analyze and synthesize theoretical data relevant to this study; to prove that musicians perform better in listening comprehension tasks than non-musicians and to verify that listening can be an effective tool in teaching English professionally directed lexical competence to students with musical training.

The **objectives of the research** are to find out to what degree musicians outperform non-musicians in listening comprehension tasks and productive phonological tasks and to verify that listening leads to vocabulary uptake in musicians.

1.2. Research methods

1.2.1. Participants

The participants were 36 students of Yuri Fedkovych Chernivtsi National University, among them pre-service primary school teachers and musicians. They were divided into two groups. Group A was strictly comprised of music students only (with no less than 9 years of continuous music lessons). Group B consisted of pre-service primary school teachers, who were not trained in music. However, five of them attended musical lessons while at school (with no more than 4 years of continuous music lessons).

The participants ranged from 17 to 19 years of age. Prevailing majority of the participants were females. Group A consisted mainly of female participants – 10 piano players (average age of music training 12 years), 1 cello player (13 years of continuous music lessons), 1 bass player (9 years of music training) and 2 singers (age of music training 11 years), and 4 males – 2 violin players, 1 guitarist and 1 trumpet player (average age of music training 12 years). Group B consisted of male and female students with females prevailing by 7.

Although, all of them were speakers of Ukrainian, Russian and/or Romanian language, participants in both groups ranked Ukrainian as their dominant language. Their level of English ranged from A2 to B1 level as

judged by an internal placement test. 30 participants admitted they had never practiced listening comprehension at school.

In our investigation when interpreting the results of the experimental procedure we considered students' scores on the tests and musical education to be dependent variables. The type of musical training, the instrument a participant plays, the format of the listening input and lexical items the passages contained were considered independent variables.

To ensure homogeneity between the experimental groups we used Bespalko's knowledge acquisition index, according to which $K=0,70$ is a sufficient knowledge acquisition index (Bespalko, 1968). We calculated the average index of each group after we measured the knowledge acquisition index of every student in that group with the help of the following formula: $K=Q/n$ (K – index of student's knowledge, Q – gained scores, n – maximum score for the test). The results of the pre-experimental test are depicted in table 1 and show that two groups could be considered homogenous.

Table 1. Knowledge acquisition indexes according to the results of the pre-experimental tests in Group A and Group B

Group	K
Group A	0,4
Group B	0,4

1.2.2. Materials

We chose materials from Career Paths books for developing ESP vocabulary in future preschool teachers suitable for low-proficiency users of English. The topics were: "Student background" and "Traits of kindergarten teachers". For musicians the professionally directed materials were taken from the Internet, the topics were "Wolfgang Mozart" and "Key notions of music".

For general vocabulary we chose materials from Oxford Exam Excellence book "Health" and "Travel" for both groups. However, they were slightly adapted for the purpose of the experiment.

As all of the materials were taken from coursebooks, the Internet and dictionaries, they were authentic, depicted real spoken English, showed real conversations and represented real professional situations. We used different messages of different genres, including video messages.

1.2.3. Procedure

We conducted a mini experiment, which lasted one month. We gave 4 lessons – 2 in general English and 2 in professional English. Students were tested on general vocabulary acquisition, ESP vocabulary acquisition and listening comprehension skills. Each unit contained a listening message (average duration 3,5 minutes), while-listening comprehension questions, post-listening tasks (fill in the gaps, match the dates with the facts, match the sentence halves, complete the sentences, etc.) and tasks for practicing new lexical items.

Every week listening comprehension was followed by the ongoing assessment, both oral and written. At the participants in the groups were asked questions about the content and more specific information. Correct answers indicated that learners listened to the input carefully and understood the main idea of the message. Then they did multiple tasks to check pronunciation and vocabulary understanding. The knowledge of students' level of vocabulary acquisition was measured with various tests to check form recognition, knowledge of the parts of speech, spelling, semantic properties of lexical items etc.

Before the experiment we conducted a survey among the participants to find out whether they are motivated to learn English and what difficulties in listening they face (see table 2 and table 3).

Motivation is a crucial factor in foreign language learning, which boosts language acquisition, lessens anxiety, raises self-efficacy and self-confidence, and also contributes greatly to achievements in learning (Liu, 2007; Liu & Huang, 2011).

Table 2. Responses to question “Why do you learn English at university?”

Reasons for learning English	Positive responses (max 36)
It is a compulsory subject on my curriculum.	4
My parents believe I will need English in future.	2
It is essential for my academic and professional growth.	27
I do not know.	3

As judged by the responses of the respondents in Table 1, we can conclude, that the majority of the participants understand the necessity of foreign language learning and are motivated learners.

Listening proved to be beneficial for the development of other skills (Rost, 2013), yet it is often forgotten in the educational process (Mendelsohn, 2001; LeLoup & Ponterio, 2007) and considered the most difficult skill among learners (Hasan, 2000; Graham 2006; Vandergrift, 2007). Many scholars dedicated their works to understanding difficulties learners experience during foreign language listening including: not recognizing the words, omitting parts of the input, inability to segment the speech, lack of concentration, being unable to evoke mental images of heard information, fast speed of delivery, understanding the words but not the meaning and idea of the input (Anderson & Lynch, 1998; Goh, 2000; Vandergrift, 2007). Understanding difficulties learners encounter helps built strategies for developing listening skills, make listening easier and less stressful. Therefore, we asked the participants to name all the factors that affect their achievements in listening (see Table 2).

Table 3. Responses to question “Name the difficulties you encounter during listening comprehension”

Difficulties in listening	Group A (max 18)	Group B (max 18)
Rate of delivery	18	18
Unfamiliar pronunciation	12	10
Not enough listening	9	6
New vocabulary	9	11
Length of listening	2	2
Listening for gist	1	2
Listening for details	10	13
Quickly forget what is heard	5	7
Concentration span	9	10
Lack of visual support	6	12
Background noise	9	14
Complicated tasks	5	5

Many studies worldwide provide evidence that musical ability enhances speech processing and speech segmentation while listening (Marie, et al, 2011; Perfors & Ong, 2012; Khomskaia, 2012). Some evidence also proves that musicians have higher brainstem plasticity for speech stimuli (Khomskaia, 2012), have superior auditory processing abilities and consequently they are better at performing linguistic tasks involving lexical tones (François, et al, 2012). According to this evidence we expected that musicians will not find unfamiliar pronunciation, background noise and rate of delivery to be the most difficult. Moreover, we expected that the lists of difficulties in Group A and in Group B will be different. However, the survey results demonstrate that both musicians and non-musicians think the same factors complicate their hearing.

1.3. Results

The students' achievements in each task were interpreted according to the formulae $K=Q/n$ (K – index of students' attainments, Q – gained scores, n – maximum score for the test) and after K average was calculated.

1.3.1. Phonological skills

Receptive phonological skills were assessed immediately after listening. The tasks students completed were: to differentiate between words with similar pronunciation; to match the word with its transcription; to underline the mispronounced words while listening to the passage and to write down the missed words.

Productive phonological skills were tested orally in the classroom. Participants were asked to read the words and sentences (affirmatives, negatives, questions) aloud. Table 4 – 7 demonstrate the achievements in General English and ESP in both groups respectively.

Table 4. Receptive phonological skills (General English)

Tasks	Group A	Group B
Differentiating between words with similar pronunciation	0,6	0,4
Matching words with their transcription	0,9	0,8
Writing down missed words	0,7	0,7
Underlining the stressed syllable	0,9	0,8

Table 5. Receptive phonological skills (ESP)

Tasks	Group A	Group B
Differentiating between words with similar pronunciation	0,6	0,4
Matching words with their transcription	0,9	0,9
Writing down missed words	0,8	0,7
Underlining the stressed syllable	0,9	0,9

Table 6. Productive phonological skills (General English)

Tasks	Group A	Group B
Pronouncing words	0,9	0,9
Reading affirmatives	0,8	0,7
Reading negatives	0,8	0,7
Reading questions	0,7	0,7

Table 7. Productive phonological skills (ESP)

Tasks	Group A	Group B
Pronouncing words	0,9	0,9
Reading affirmatives	0,8	0,8
Reading negatives	0,8	0,7
Reading questions	0,7	0,6

1.3.2. Grammar skills

Participants were asked to listen to sentences containing grammar mistakes and check them. Table 8 shows the gained results.

Table 8. Grammar skills indexes

Tasks	Group A	Group B
Find mistakes in General English passages	0,5	0,5
Find mistakes in ESP passages	0,5	0,5

1.3.3. Vocabulary skills.

The level of lexical knowledge was assessed with the use of English task and a vocabulary test in which students had to decide in which sentence of a pair all the words were used correctly. Also, we checked form recognition, knowledge of the parts of speech, spelling and semantic properties of lexical items.

Table 8. Vocabulary skills indexes

Tasks	Group A	Group B
General English vocabulary uptake (immediate test)	0,9	0,8
ESP vocabulary uptake (immediate test)	0,8	0,6
General English vocabulary uptake (delayed test)	0,7	0,7
ESP vocabulary uptake (delayed test)	0,7	0,4

1.3.4. Listening skills.

Participants had to complete several tasks after listening to a passage: choose a correct picture, multiple choice task and true or false task.

Table 9. Listening skills indexes

Tasks	Group A	Group B
General English listening comprehension	0,9	0,7
ESP listening comprehension	0,9	0,6

As tables demonstrate, musicians slightly outperform non-musicians in various tasks. At a phonological, level musicians yielded better results in differentiating between words with similar pronunciation, matching words with their transcription and underlining the stressed syllable tasks. Their productive phonological skills and listening skills are better as well. Here our findings correspond with other scientific results and prove that musicians demonstrate enhancements in foreign language learning, phonological processing, verbal memory, pitch discrimination and sensitivity to prosodic cues (Marie, et al., 2011; Martínez-Montes, et al., 2013; Chobert & Besson, 2013; Strait, et al., 2015). The best results at a phonological level in all tasks among musicians had pianists and violinists. Studies, which compared musicians and non-musicians, have shown that degree of musical abilities

enhancements on language depend on age of continuous musical training, amount of practice and aptitude. Our findings suggest that not only these factors affect foreign language acquisition, but also musical instrument a learner plays. According to vocabulary tests results musicians are better at vocabulary uptake and retention. However, participants in both groups yielded better results in General English vocabulary tasks. This may be due to the fact that vocabulary acquisition depends strongly on the number of encounters (Vidal, 2011), and students are often exposed to General English vocabulary outside classroom. The fact, that both groups performed badly in grammar tasks, means that listening cannot be the main source for teaching grammar.

2. Conclusions

According to the results of the conducted experiment and analyzed scientific works, we can conclude that musicians outperform non-musicians in listening and vocabulary uptake through listening; listening can be an effective tool in teaching English professionally directed lexical competence to students with musical training. We can also say, that foreign language acquisition by music student depends on the age of musical training, musical aptitude and musical instrument, which a learner plays. Prospects for further research we see in developing of new effective methods for teaching future music specialists English professionally directed lexical competence through listening, which will not only meet academic and professional needs of the target group, but also use and develop their abilities.

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