T.R.
REPUBLIC OF TURKEY
GAZİANTEP UNIVERSITY
GRADUATE SCHOOL OF EDUCATIONAL SCIENCES
DEPARTMENT OF FOREIGN LANGUAGES EDUCATION
ENGLISH LANGUAGE TEACHING PROGRAM

# A STUDY ON THE RELATIONSHIP BETWEEN MUSICAL APTITUDE LEVELS AND PRONUNCIATION SKILLS OF EFL LEARNERS

**MASTER OF ARTS THESIS**

SULTAN BAŞARAN

GAZİANTEP

July 2020

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## APPROVAL OF THE JURY

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**Thesis Title:** A Study on the Relationship between Musical Aptitude Levels and Pronunciation Skills of EFL Learners

**Thesis Date:** 03/07/2020

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Arts.

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It is approved that this thesis has been written in compliance with the formatting rules laid down by the Graduate School of Educational Sciences.

Prof. Dr. Zeynep HAMAMCI

**Director**

# RESEARCH ETHICS DECLARATION

The information contained here is, to the best of my knowledge and belief, accurate. I have read the University's current research ethics guidelines, and accept responsibility for the conduct of the procedures set out in the attached application in accordance with these guidelines, the University's policy on conflict of interest and any other condition laid down by the Gaziantep University Research Ethics Committee or its Sub-Committees. I have attempted to identify all the risks related to this research that may arise in conducting this research, and acknowledge my obligations and the rights of the participants.

I have declared any affiliation or financial interest in this research or its outcomes or any other circumstances which might present a perceived, potential or actual conflict of interest, in accordance with Gaziantep University policy on Conflicts of Interest.

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Date: 03/07/2020

# DEDICATION

***To all people who dream of a better world***

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Finally, I am also pleased to express my thanks to the sophomore students of the English Language Teaching Department at Gaziantep University for their contributions to my study.

# ÖZET

## İNGİLİZCEYİ YABANCI DİL OLARAK ÖĞRENENLERİN MÜZİK YETENEĞİ SEVİYELERİ VE TELAFFUZ BECERİLERİ ARASINDAKİ İLİŞKİ ÜZERİNE BİR ÇALIŞMA

BAŞARAN, Sultan

Yüksek Lisans Tezi, İngiliz Dili Eğitimi ABD

Tez Danışmanı: Dr. Öğr. Üyesi Mehmet KILIÇ

Temmuz-2020, 74 sayfa

Söz konusu çalışmanın temel amacı; müzik yeteneği ve telaffuz performansı arasında herhangi bir ilişkinin olup olmadığını ve AMMA ile ölçülen müzik yeteneğinin İngilizceyi yabancı dil olarak öğrenenlerin telaffuz performanslarının değerlendirilmesini ne ölçüde etkilediğini araştırmaktır.

Bu çalışma Gaziantep Üniversitesi 2019-2020 akademik yılında 51 ikinci sınıf öğrencisi ile İngiliz Dili Eğitimi bölümünde yürütülmüştür. Veriler iki aşama halinde toplanmıştır. İlk olarak, katılımcıların müzik yetenek düzeyleri AMMA ile ölçülmüştür. İkinci olarak, telaffuz verileri katılımcıların sessiz bir film ile ilgili yorumları aracılığıyla toplanmış ve bu veriler bir ses kayıt cihazı ile kaydedilmiştir. Son olarak, ana dili İngilizce olan üç hakem, katılımcıların telaffuz performansını bütünsel olarak değerlendirmiştir. Bu adımda, konuşma rubrikinin bir bileşeni olan TESOL telaffuz rubriki benimsenmiştir.

Mevcut çalışmanın veri analizi betimleyici niteliktedir. Tüm sonuçlar Pearson korelasyon analizi, bağımsız örneklem t-testleri, tek yönlü varyans analizi ile elde edilmiştir. Bu ilişkisel araştırmanın bulguları, katılımcıların müzik yetenekleri ile telaffuz performansları arasında istatistiksel olarak anlamlı orta düzeyde pozitif bir ilişki olduğunu göstermiştir. Ayrıca, müzik becerisinin telaffuzdaki başarıyı açıkladığı ve bunun da dil öğrenme sürecini etkileyen birçok değişken göz önüne alındığında anlamlı olduğu bulunmuştur. Bu sonuç, müzik becerisinin yabancı dil telaffuz yeteneği üzerindeki önemli rolüne dikkat çekmiştir. Bulgular, müzik ve dilin karşılıklı olarak bağımlı olgular olduğu fikrini desteklemiştir. Elde edilen bulgular ışığında, bazı öğretimsel ve araştırmaya yönelik öneriler sunulmuştur.

Anahtar Kelimeler: Müzik yeteneği, Yabancı dil telaffuzu, İngilizceyi yabancı dil olarak öğrenme, Telaffuz performansı

# ABSTRACT


## A STUDY ON THE RELATIONSHIP BETWEEN MUSICAL APTITUDE LEVELS AND PRONUNCIATION SKILLS OF EFL LEARNERS

BAŞARAN, Sultan

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The main purpose of the present study is to investigate if there is any relationship between musical aptitude and pronunciation performance, and to what extent musical aptitude, measured by the AMMA, affects judgments of pronunciation performance of EFL learners.

This study was conducted at Gaziantep University in the department of English Language Teaching with 51 sophomore students in the 2019-2020 academic year. The data were collected in two phases. Firstly, the participants' musical aptitude levels were measured via AMMA. Secondly, the data for pronunciation were collected through comments on a silent film, and these data were recorded via a voice recorder. Finally, three native English raters judged the pronunciation performance of the participants holistically. In this step, TESOL pronunciation rubric, a component of speaking rubric, was adopted.

The current study's data analysis is descriptive in nature. All results were analyzed via Pearson product-moment correlations, independent samples *t*-tests and one-way ANOVAs. The findings of this correlational study showed that there is a statistically significant moderate positive correlation between participants' musical aptitude and their pronunciation performance. Furthermore, it was found out that musical aptitude explains the success in pronunciation, which is meaningful considering many variables affecting the language learning process. This result pointed out the important role of musical aptitude on foreign language pronunciation ability. The findings supported the idea that music and language are mutually dependent phenomena. Implications and suggestions for further research are given based on the obtained findings.


Keywords: Musical aptitude, Foreign language pronunciation, EFL learning, Pronunciation performance

# TABLE OF CONTENT

# LIST OF TABLES

# LIST OF FIGURES

# LIST OF APPENDICES

# LIST OF ABBREVIATIONS

**AMMA:** Advanced Measurement of Musical Audiation

**CANAL-F:** Cognitive Ability for Novelty in Acquisition of Language

**CPH:** Critical Period Hypothesis

**DLT:** Dependency Locality Theory

**EFL:** English as a Foreign Language

**EIL:** English as an International Language

**ELT:** English Language Teaching

**ELF:** English as a Lingua Franca

**ESL:** English as Second Language

**FLA:** Foreign Language Acquisition

**FLL:** Foreign Language Learning

**ID:** Individual Difference

**IMMA:** Intermediate Measures of Music Audiation

**LCDH:** Linguistic Coding Differences Hypothesis

**LFC:** Lingua Franca Core

**LLAMA:** Language Learning Aptitude Measure

**MAP:** Musical Aptitude Profile

**MBTI:** Myers-Briggs Type Indicator

**MEG:** Magneto Encephalography

**MIT:** Multiple Intelligence Theory

**MLAT:** Modern Language Aptitude Test

**MMA:** Measures of Musical Abilities

**OCEAN:** Openness-Conscientiousness-Extroversion-Agreeableness-Neuroticism

**OPERA:** Overlap Precision Emotion Repetition Attention

**PEN:** Psychoticism Extraversion Neuroticism

**PLAB:** Pimsleur Language Aptitude Battery

**PMMA:** Primary Measures of Music Audiation

**RP:** Received Pronunciation

**SLA:** Second Language Acquisition

**SLL:** Second Language Learning / Learner

**TPS:** Tonal Pitch Space

**WM:** Working Memory

# CHAPTER I

# INTRODUCTION

## 1.0. Presentation

This introductory chapter presents the background to the study and the statement of the problem, and the reasons why the researcher needs to investigate the current study in line with the previous studies are introduced. Then, the rationale of the study and the statement of the research questions, and finally, some assumptions and the definitions of the key terms are presented.

## 1.1. Background to the Study

Aptitude is a phenomenon of better understanding, which explains a capacity coming from birth. Musical aptitude similarly is a natural talent that helps make a distinction between the sound patterns of music (Barrett, Ashley, Strait & Kraus, 2013). Every person carries the potential of being successful in music; however, this ability should be discovered up to the age of nine because after nine it fixes (Shuter & Dyson, 1999, Dörnyei, 2004). About the distribution of this natural ability, some studies (Chodkiewicz & Trepczyńska, 2014) informed that people with low and high musical aptitude are not common in communities because people are mostly average; however these musical aptitude levels are also related to musical education and musical background (Gordon, 1990).

Studies on brain (Wertheim & Botez, 1961; Gott, 1973; Marin, 1982, Milovanov & Tervaniemi, 2011) revealed that the right hemisphere of the brain controls the ability of visualization, imagination, and melodic functions, whereas the left part is dominant on logic, linguistic functions. Individuals who have musical aptitude are liable to process music in the left hemisphere just like verbal-linguistic processing and that is why it is possible to theorize that music provides the information of "phonetic coding" in language learning. Moreover, Koelsch, Gunter, Friederici and Schröger (2000) asserted that the right hemisphere helps improve language-learning ability in the earliest stages. There are studies (Pei, Wu, Xiang &

Qian, 2016) confirming the positive influence of music on foreign language phonology. Under the scope of this information, how music affects language learning still begets interest. Moreover, Peretz and Zatorre (2005) stated that the relationship between music and language started many years ago; however, the reactions of Broca's area toward melodic stimulus reopened the case. Moreover, they suggested "clearly, further comparison is needed between music and language in the same experimental setting, using similar tasks that are matched (or manipulated) for attentional resources" (p.105). Milovanov, Pietila, Tervaniemi and Esquef (2010) also indicated the need of similar studies with different tests and participants from different cultures to figure out whether results are distinctive under different circumstances**.**

Although there is an agreement that pronunciation is one of the most significant components of the foreign language (FL) process to produce sounds, utterances properly and speak accurately, it receives the least attention in language classes (Fraser & Perth, 1999). Effective pronunciation instructions indeed contribute to intelligibility even if it is almost impossible to attain a native-like pronunciation performance for a non-native learner after a certain age. There are various points behind implicit pronunciation teaching in English language classes. According to Fraser and Perth (1999), some teachers' appreciation about the importance of teaching pronunciation is still tentative, and this is one of the underlying reasons why pronunciation is still at stake in the FL learning process. It should be borne in mind that it is also possible to come across other problems (Şenel, 2006). Şenel (2006) stated that another reason for the poor pronunciation competency is the mother language interference. For example, in English, there are some sounds like /θ / and /ð/, which do not exist in Turkish, and they cause some pronunciation problems. Furthermore, he stated, "Turkish students have also some problems with stress, intonation, and rhythm which determine the overall rhythm and melody of a language can be transferred from the native language into the target language" (Şenel, 2006, p.113). Despite these difficulties in learning and teaching pronunciation, the age factor should be taken into account because of the reality of the completion of the lateralization process before puberty. The age of onset of learning a language plays a crucial role in acquiring native-like pronunciation (Şenel, 2006).

**1.2. Statement of the Problem**

Even though a great number of aptitude studies about the convergence between music and phonology (Milovanov, 2009; Milovanov, Pietila, Tervaniemi, Esquef, 2010; Dege & Schwarzer, 2011; Loui, Kroog, Zuk, Winner & Schlaug, 2011; Jäncke, 2012; Dolman & Spring, 2014) were conducted in the context of the FL teaching, it is still worth investigating because of conflicting ideas between the two. For instance, Milovanov (2009) conducted a study on elementary school children to find out the adjacency between music and foreign language pronunciation skills by musical training. The results showed that children with better music ear have better scores in pronunciation than children with lower musical aptitude scores. Another study carried out by Milovanov et al. (2010) on non-musical university students, choir members, and English philology students showed that there is a tight relationship between musical aptitude and English pronunciation attainment. Dege and Schwarzer (2011) carried out an experimental study with preschoolers on the effect of music training on phonological awareness. They added 10 minutes music program into children's program. The program lasted 20 weeks and consisted of dancing, singing, rhythmic exercises, listening to songs, and so on. Post-test results demonstrated that participants with musical training have better progress than participants without musical training. Loui, Kroog, Zuk, Winner and Schlaug (2011) administered another study to discover the relationship between pitch awareness and phonemic awareness. Their results demonstrated that there is "a significant positive correlation between pitch perception–production and phonemic awareness, suggesting that the relationship between musical and linguistic sound processing is intimately linked to awareness at the level of pitch and phonemes" (p.1). Jäncke (2012) mentioned about several research studies and reviews in his paper in which the association between music and language is salient. However, a study conducted by Dolman and Spring (2014) who utilized a similar design with Milovanov et al. (2010) found that their hypothesis marginally supports Milovanov et al.'s (2010) results. Similarly, some studies (Purcell & Suter, 1980; Jackendoff, 2009) suggested being cautious about the relation between them, that is why this phenomenon requires more empirical research. Peretz and Zatorre (2005) emphasized "people differ in their musical training or experience, and perhaps also in aptitude or talent; these differences manifest themselves at various levels, and understanding the

interplay between brain processes, environmental inputs, innate factors, and development will be one of the major challenges for our field" (p.107).

### 1.3. Purpose and Significance of the Study

It is quite puzzling that people of the same gender, age and first language (L1) have different proficiency in language learning even if their academic backgrounds are similar; however, there are several reasons for this variability, such as motivation, mother tongue, personality, and so on. Aptitude is one of the subject matter influencing the attainment in language learning and requires more attention. According to Carroll (1990), there is a necessity of further research on aptitude. "Further research in foreign language aptitude would require a more refined analysis of foreign language learning tasks in terms of the different cognitive abilities they call upon. I am not aware that much has been done in this direction" (cited in Robinson, 2005, p.49). Wen, Biedron and Skehan (2017) also stated "as a result of this marginalized interest, knowledge about FL aptitude has not developed very much since it started some 50 years ago. The concept has remained intact" (p.6).

Hence, the main focus of this study is on music aptitude and language and the main concern is to ascertain to what extent varying musical aptitude is associated with the success of Turkish EFL learners in terms of their pronunciation skills. Accordingly, one of the reasons for conducting this study is to obtain meaningful results to contribute to the literature and to make more concrete generalizations for the adjacency between musical aptitude and pronunciation skills. Additionally, the best of my knowledge, no music aptitude study has been conducted in EFL context in Turkey.

### 1.4. Statement of Research Questıons

In line with the introduction of the research concern, this study aims to find answers to the following questions:

**Research question # 1** Do the construct validation and reliability analyses of the data collection tool (Advanced Measure of Musical Audiation) reveal acceptable statistics and coefficients?

**Research question # 2** Is there a relationship between students' musical aptitude levels and holistic judgments of their pronunciation performance?

**Research question # 3** To what extent can participants' musical aptitude predict holistic judgments of their pronunciation performance?

**Research question # 4** Do participants' musical aptitude levels and holistic judgments of their pronunciation performance vary according to their gender?

**Research question # 5** Are participants' musical aptitude levels and holistic judgments of their pronunciation performance correlated with their age?

### 1.5. Assumptions of the Study

**Assumption # 1** The study was conducted in a state university with sophomore students, and all the participants' proficiency levels are assumed to be similar since they passed the same proficiency exam successfully before entering the department.

**Assumption # 2** It is assumed that participants would perform in musical aptitude test sincerely and willingly.

**Assumption # 3** It is assumed that the participants did not experience any communication apprehension during recording of their oral performance.

### 1.6. Definition of Key Terms

**Musical Aptitude:** The term means "the learning potential expressed in individuals in different ways and to different degrees, a multidimensional component, innate but determined by various environmental factors and founded on audiation (Gordon, 1967, p.52).

**Pronunciation Performance:** "A way of speaking a word, especially a way that is accepted or generally understood" (as cited in Otlowski, American Heritage Dictionary, 3rd, 1992).

**Audiation:** It is a term coined by E. Edwin Gordon in 1975 and defined as "audiation is to music what thought is to language" (Gordon, 1999, p.42).

**Musicality:** The term indicates "a sensitivity to, a knowledge of, or a talent for music" (Nardo & Reiterer, 2009, p.213).

# CHAPTER II
# REVIEW OF LITERATURE

## 2.0.Presentation

In this chapter, firstly, the relationship between music and language and their roles on the language learning process, then, the investigations about individual differences, and finally, musical aptitude tests are reviewed.

## 2.1. Language and Music

The roots of human languages and hypotheses about their evolution have created several debates for ages (Pei, Wu, Xiang & Qian, 2016). Pinker and Bloom (1990) claimed that all languages have similar fundamental sort of rules and representations and discussed some assumptions of their evolution (e.g., primate cognition, primate gestural communication, social transformation, and genetic potential). However, among these speculations, the "Bow-Wow Theory", "Pooh-Pooh Theory", "Yo-He-Ho Theory", "Ding- Dong Theory", and the "La- La Theory" are mostly mentioned ones ( as cited in Danesi, 1993). According to the "Bow-Wow Theory", language came from imitating the sounds of nature, onomatopoeia, noises like a bow, baa, and so on. In the "Pooh-Pooh Theory", sounds came from verbal responses to some reactions like fright, rage or surprise. In the "Yo-He-Ho Theory", it is assumed that language started by coordinating muscular activities. In the "Ding-Dong Theory", people learned languages by naming the things around them. In the "La-La Theory", music was the source of all languages. Aitchison (2000) stated that language might have begun with melodies rather than with words. Moreover, French philosopher Rousseau (as cited in Danesi, 1993) supported the idea of languages came from music. On the other hand, Darwin considered language came out first and music evolved out of it (as cited in Besson & Schön, 2006). On the other hand, Vaneechoutte and Skoyler (1998) were strong advocators of the idea that human brain identifies words as a melody from long before birth. Moreover, new-borns can

distinguish their mother language from others, probably due to prosodic structures of each language.

Traditionally, music and language are assumed to be separate abilities because of older theories of lateralization of the right side of the brain for music and the left for linguistic functions. Thanks to improvements in neuropsychology, researchers (Jäncke, 2012) found many commonalities between music and language and how they can benefit mutually.

Musical culture is in human life approximately for 35.000 years (D' Errico, et al., 2003; Conard, Malina & Münzel, 2009) and it is now presumed to be an indispensable component of cognitive, social, or emotional process of mind (Scheirer, 1998). Many studies (Tervaniemi, Ilvonen, Karma, Alho & Näätänen, 1997; Milovanov & Tervaniemi, 2011) revealed valuable information about how brain works. The authors of these studies believe that the way the brain works is similar to the study of music (Peretz & Zatorre, 2005). Patel (1998) investigated the commonalities between music and language in terms of syntactic structure in the brain and discussed that there are similarities between the two and these similarities in the syntactic structure are not at the level of representation. Regarding this issue, syntactic processing in language and music is explained by two theories: Dependency Locality Theory (DLT) and Tonal Pitch Space theory (TPS). The former theory sets that sentence comprehension consists of two specific constituents, each of which devours neural assets. The first part is the structural capacity, which helps follow the anticipated syntactic categories in a sentence (e.g., a verb will come after a noun to form a sentence). The second part is structural integration, which means combining each succeeding word with an earlier word. The latter theory deals with the discernment of pitch in a musical setting. The key idea behind TPS theory is also similar to the structural integration of DLT. Patel (1998) asserted that the link between music and language is stronger than previously believed. Moreover, their commonality can uncover how they interact and clarify how they work in the part of diverse brain regions by accompanying hierarchically ordered sounds. Furthermore, Patel, Peretz, Tramo, and Labreque (1998) conducted a study with two amusic[1] participants to find out the convergence between language and music and the results

[1] Amusia (or tone deafness) is a lifelong impairment that hinders individuals from acquiring basic musical skills (Hyde, Zatorre, Griffiths, Lerch, Peretz, 2006).

showed that processing sometimes follows different pathways in language and music, even so, they are not completely separate domains because right prefrontal cortex and left auditory cortex are crucial to remember and compare "pitch and temporal patterns in both musical and linguistic domains" (p.137). Peretz and Zatorre (2005) specifically indicated that music majors' brains vary from non-music majors functionally and morphologically. Studies done through the MEG (Magneto encephalography) technique showed that musicians' brains react to tones 25% bigger than non-musicians and "the gray matter volume of the anteromedial portion of Heschl's gyrus were more than 100% larger in professional musicians than in non-musician". According to them, these different brain reactions point to musical aptitude, which is innate, and "these findings reopen the debate about whether the observed brain differences between musicians and non-musicians arise from genetic or other predispositions (or talent) as well as from practice and experience" (p.102).

Vaneechoutte (2014) probed "why language is exclusive to our species" and claimed that human language began with "vocal dexterity, vocal mimicking", and close relationship especially with singing animals, such as birds and dolphins (p.3). This relationship led to the imitation of those sounds and improving vocal features, and producing prosodic structures. He also supported that children learn a language randomly because of its intonation, rhythm, and other melodic features. Spiro (2003) stated that language is learned without effort by children and the ability to recognize music also does not require any training. From Spiro's perspective, the influence of music on foreign language learning sounds possible, especially in speaking skills. Cross and Woodruff (2009) also supported the similarity between the two and expressed that people manifest their "communicative intention or attitudinal stances" with music and "these structures can be thought of as having a discourse function similar to prosodic structures in speech: they provide contextual and narrative cues within an interactive framework" (p.10).

Gordon (2011) also indicated the connection between music and language. He reported that linguistic stress and musical meter contribute to the ability to follow "beats" and "lyrics" better. The study conducted by Hoch, Poulin-Charronnat and Tillmann (2011) on the effects of tonal function in music on semantic and syntactic processing showed that music and language fit each other. Upon this relevance,

many descriptions are made for music and language and these definitions are used mutually (Magne, Besson & Schön, 2006). For instance, according to Magne, Besson and Schön (2006), music can be characterized by two criteria. The first one is "rhythm and the temporal ratios". The second one is that all cultures have divided "the sound continuum into discrete pitches" that shapes the melodic scales (p.200). These two criteria are also valid definitions of language. Namely, language is a combination of segmental and suprasegmental features with a specific rhythm and successive occasions, similar to the first criterion. Besides, discrete phonemes create speech, and both language and music are created by sounds, particular to our species, and consist of universal features, indicating the second criterion.

Patel (2011) claimed that language and music are similar in comprising of distinct constituents sorted out into constantly organized orders. According to Patel's (2011) hypothesis, which is "Shared Syntactic Integration Resource Hypothesis", the syntax in language and music is worked concurrently in frontal brain. Besides, Patel (2011) also expressed the essentiality of music on language functions with the theory of "OPERA" which is an acronym of "Overlap, Precision, Emotion, Repetition, and Attention" (p.1).

- Overlap: Anatomical cover in the cerebrum organizes that procedure acoustic highlights utilized in both music and speech
- Precision: Music places higher requests on these common systems than does discourse
- Emotion: The melodic exercises that draw in this system inspire the positive feeling
- Repetition: The melodic exercises that connect with this system are as often as possible rehashed
- Attention: The melodic exercises that draw in this system are related to centered consideration (Patel, 2011, p.1).

Patel (2011) stated that the primary idea behind the OPERA hypothesis is to find out why music affects the sensitivity on the auditory system, which is related to language skills. "Overlap" expresses that there is a shared part of the brain that is used by both music and language. "Precision" represents a process that is predominantly affected by music on that shared part. "Emotion" refers to musical activities that reveal positive emotions on that network. "Repetition" facilitates the activation of the network and repetitions are connected with focused "Attention" (Patel, 2011). He asserted that non-linguistic auditory training affects the speaking skill and "speech processing networks" activate neural plasticity when these five

components of the OPERA hypothesis are completed. These conditions make communication more sensitive than needed (Patel, 2011).

All in all, music and language have several features in common. Both are made as a combination of sounds and they are used to transmit meaning from the speaker to the listener. Moreover, “pitch, stress, tone, rhythm, and pauses” create commonality between music and language. Exposure is another characteristic of both, because the more people get exposed to the language or music, the more they get accustomed to them (Mora, 2000). Azzara (1991) also stated the similarities between music and language.

> You are what you hear. One of the essential elements of music learning theory is the audiation of tonal and rhythm patterns. We learn music similarly to how we learn a language. Language has syntax. In language, we comprehend by organizing words. Music has syntax. We comprehend music when we audiate tonal and rhythm patterns and can combine and sequence them in a larger context (p.106).

### 2.2. Studies on Individual Differences

Equal rights are given to all human beings from birth, but this does not mean that we are equal in terms of our abilities (Gordon, 2006). These different abilities, which make us special, generally emerge during the early ages of childhood. It is important to realize our uniqueness and improve it in line with our needs in second language learning (SLL) or foreign language learning (FLL). The reason for this variety in language learning is sometimes not only due to psychological reasons such as motivation, personality, but also due to some external factors such as age of onset of exposure to foreign/second language or the amount of exposure to the language. A perfect combination of these factors makes language learning perfect; however, it is almost impossible for everybody to reach those optimum conditions. Nevertheless, these reasons do not provide a deeper insight because some studies (Ellis, 1994; Tomlinson, 2001) stated that even if all language learners do not have the same opportunity to reach a goal in the language learning process; however, it is still possible to delineate each person’s particular style of learning by taking biological readiness into account. Marsden, Mitchell and Myles (2013) stated although several studies have been carried out in recent decades, the dilemma of how second or foreign languages are learned still creates curiosity and added “Whence it is substantial to revise the individual differences (IDs) to get a comprehensive view” (p. xiv).

In terms of variables affecting language learning process, firstly, the *age* phenomenon comes in mind. Regarding this, Dörnyei (2009) indicated that it is not necessarily, but one of the important variable in every study. For instance, the Critical Period Hypothesis (CPH), which indicates the importance of age on the FL learning, is one of the subjects of numerous scientific studies (Birdsong, 1999). The reason for this importance is the changes in the brain's cognitive functions because of the age. Namely, the age factor can make easier or more difficult the learning process of an individual. Some studies (Flege, 1987); however, put forward that success in learning an L2 in childhood does not always mean being much better language learners in terms of pronunciation. On the other hand, other studies (Johnson & Newport 1989; Pinker, 1994) revealed that learning L2 before puberty expands its effect on pronunciation. Furthermore, studies on L2 pronunciation skills (Asher & GarcmHa, 1969; Fathman, 1975; Seliger et al., 1975; Suter, 1976; Oyama, 1976; Piper & Cansin, 1988; Flege, 1988; Patkowski, 1990; Thompson, 1991; Flege & Fletcher, 1992; Flege, Munro & MacKay 1995; Flege, Yeni-Komshian & Liu, 1999; Moyer, 1999) showed that the earlier an L2 is learned, the better the individual pronounces. The assumption that accent-free pronunciation can be acquired if L2 is learned before puberty is still controversial from the perspective of some studies and there is not any convincing study about foreign-accented pronunciation of individuals who learn L2 after CPH because of obvious existence of other variables (Piske, MacKey & Flege, 2001). Besides, studies on the age of onset of SLA and bilingualism in naturalistic situations with bilingual children, and even deaf individuals (Ramirez, Lieberman & Mayberry, 2013; Blom & Bosma, 2016; Roesch & Chondrogianni, 2016) demonstrated that the idea of "earlier is better" is not true. Moreover, they stated that learning is still faster in childhood, but it does not mean that children who learn a foreign language after puberty will fail due to start learning late. Muñoz (2010) indicated that young learners start learning slower and they can reach a notable level in the long term; however, adult learners can learn faster in a short period of time.

*Motivation* is another ID variable, originally the Latin word "movere", which is another issue of the language learning process. It is also significant and takes places in several studies (Deci, Vallerand, Pelletier & Ryan, 1991; Stipek, 1993; Zia & Salehi, 2008; Dörnyei & Ushioda, 2013; Dörnyei, 2014) because it is believed that

any long-term goal cannot be accomplished without motivation even by a talented person. Furthermore, high motivation can offset various inadequacies in one's language aptitude and decrease the effect of negative education conditions (Dörnyei & Ryan, 2015*).*

Actually, motivation provides a rapid way to L2 learning and generally supplies a valuable amount of information with other variables in language learning studies (Dörnyei, 2014). Moreover, the effect of motivation in language learning may even abolish the other variables' results (Csizér & Dörnyei, 2005).

*Personality* is also as important as the other variables mentioned above because individual traits play a critical role on educational studies. Because of this importance, several models for personality were contributed to the field. The *PEN* model, which is one of the personality tests, consists of three main personality dimensions: "psychoticism, extraversion, and neuroticism" (Van Dam, Janssens & Bruyn, 2005, p.8). Another model is known the *Big Five,* the components of which are "openness to experience, conscientiousness, extraversion-introversion, agreeableness, neuroticism vs. emotional stability" (Dörnyei, 2006, p.43); that is the acronym *OCEAN*. *Neo-Pi* is an alternative model created by Lewis Goldberg, Paul Costa, and Robert McCare and involves the Big Five's components. The last one, *Myers-Briggs type of Indicator (MBTI),* which was created by a mother and daughter, is the most extensively applied personality self-report questionnaire of all and has 16 personality traits.

*Intelligence* is another prevalent factor, and one of the cognitive variables influencing one's success in FL learning. The concept of intelligence used in both psychology and education has been defined with few theories over the past decades. The "g" factor theorized by Spearman in 1904, indicates that human's cognitive abilities are controlled by a general chief factor. Multiple intelligence theory (MIT), which was offered by Howard Gardner in 1983, presents that human abilities are not ascribed by one single construct; however, by different modalities. Gardner (1999) defines intelligence as "a bio-psychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture" (p.33). He proposed ten intelligence types: musical, visual-spatial, linguistic, logical-mathematical, bodily-kinesthetic, interpersonal, intrapersonal, naturalistic, existential, and moral (Clarken, 2009, p.2).

Every individual is unique and has a special mind, so this causes focusing on the studies of individual differences. One of the studies on personal traits done by Dewaele and Furnham (2000) on 25 Flemish bilingual university students indicated that extravert students are more fluent than in their speech productions and cope with their anxiety more effectively. Obralic and Mulalic (2017) carried out a study on the relationship between personality and the preferences of language learning strategies of FL learning. The results demonstrated that learners' personalities have an impact on the strategy they use. Similarly, the study of Fazeli (2011) on 213 female students found out a significant relationship between two personal qualities and the strategy of language learning use; however, individual traits cannot be a strong predictor of using strategies. Dörnyei (2006) mentioned that there are still some disagreements on the effects of IDs, even though personal traits have an impact on educational studies.

### 2.3. Aptitude

Aptitude is another ID variable that is closely intertwined with the field of education and psychology. In the language learning context, it corresponds to easier learning or comprehension of a foreign language (Csizér & Dörnyei, 2005). Snow (1992) defined aptitude as "apt, appropriate, and suitable" (p.6).

Terms like "aptitude", "ability" and "achievement", are also used synonymously, and should be elucidated (Gardner & Lambert, 1965). Ability is a kind of stable attribute of individuals, and aptitude is a type of ability (Csizér & Dörnyei, 2005). Achievement is another term, which is interpreted with other terms above. Even if Carroll (1993) separated aptitude from achievement, he also implied that they can be interpreted together if they may anticipate success in prospective learning. It is also defined as the learning outcomes after academic experiences (Travers, 1970). Another concept associated with aptitude and achievement is intelligence. Nisbett (2009) defined intelligence as "abstract reasoning, problem-solving ability, and capacity to acquire knowledge" (p.4). Snow (1992) associated the term with different keywords as well. "The concept is especially close to readiness (as in reading readiness), but also to suitability (for a purpose or position), susceptibility (to treatment or to persuasion), and proneness (as in accident proneness)" (p.6). However, Snow (1992) also implied that this concept, unfortunately, was associated with "intelligence" in the 17$^{th}$ and 18$^{th}$ centuries and it

was defined “through a misinterpretation of Darwinian theory to mean a biologically fixed, single rank order of general intellectual fitness for any situation” (p.7).

### 2.3.1. Foreign Language Aptitude

Perpetual capacity to learn a language is called aptitude (Dörnyei & Skehan, 2003). On the other hand, foreign language aptitude is defined as how well a person might accomplish learning in foreign language contexts (Dörnyei, 2005). In the 1920s, prognosis tests, as the first attempt to measure foreign language aptitude were used. In the late 1950s, several tests arose to predict the effect of aptitude on language success. The debates on whether it is hereditary were the starting points of these studies. Recently, Reiterer (2018) also pointed out these studies generally question the innateness of language aptitude.

Modern Language Aptitude Test (MLAT) is the most widely used test ever since (Carroll and Sapon, 1959). Four measurable components of the MLAT are shown in Table 1.

Table 1.

*Carroll’s Four-Factor Aptitude Model (cited in Dörnyei & Skehan, 2003)*

| **Aptitude Components** | **Definitions** |
|---|---|
| Phonetic coding ability | Capacity to code unfamiliar sounds so that it can be retained. |
| Grammatical sensitivity | Capacity to identify the functions that words fulfill in sentences. |
| Inductive language learning ability | Capacity to extrapolate from a given corpus to create new sentences. |
| Associative memory | Capacity to form associative links in memory. |

Briefly, in “phonetic coding ability”, participants are expected to identify the dissimilar sounds that are intentionally added, and “grammatical sensitivity” measures the participants’ knowledge of language rules so that they can evaluate the words according to their grammatical functions, such as adverbs, nouns, verbs, and predicates (Carroll, 1962). ”Inductive language learning ability” is defined as the identification of the “patterns of correspondences and relationships involving either

meaning or grammatical form" (Carroll, 1973, p.8). Last, “associative memory”, mostly known as “rote learning ability”, determines the retention capability of the participants in learning new words (Wesche, Edwards & Wells, 1982).

On the other hand, Wen, Biedron, and Skehan (2017) stated that the empirical studies on FL aptitude have improved after Carroll’s MLAT and have extensively focused on the structure of aptitude and developing an aptitude test. Wen et al. (2017) also claimed that studies about FL aptitude are limited and have not flourished considerably unlike other ID variables, even after 50 years. Some of these studies and tests are explained in Table 2.

Table 2.
*Post-MLAT Aptitude Research (cited in Wen, Biedron, Shekan, 2017)*

| Orientations | Representative studies | Characterizations and implications |
|---|---|---|
| Assessment-oriented | Pimsleur’s PLAB,1966; Peterson and Al-Haik ‘s DLAB,1976; Parry and Child’s VORD,1990; Grigorenko et al.’s CANAL-FT,2000, Meara’s LLAMA Language aptitude test,2005; Doughty et al.’s Hİ-LAB,2010. | Psychometric in nature; Mostly MLAT alternatives or complementary tests; Sometimes associated with military or government initiatives and funding. |
| Component-targeted | Skehan 1982&1986b; Sparks and Ganschow, 1991; Sasaki, 1996; Miyake & Friedman, 1998; Sparks et al., 2001; Ranta, 2002; Winke, 2013. | Concept of factor-components is still viable; Relatively little research has been conducted; Much room for development (particularly with memory). |
| Aptitude and age | Harley&Hart,1997&2002; Bongaert,Mennen &van der Silk,2000; DeKeyser, Alfi-Shabtay & Ravid,2010; Granena &Long,2013. | Younger learners tend to show higher correlations with memory components and older learners with analytical components; Aptitude mitigates putative critical period effects. |
| Aptitude-treatment interaction: Macro Studies | Wesche, 1981; Reves, 1982; Robinson, 1995 & 2002; | Aptitude profiles based on different aptitude components |

| | | |
|---|---|---|
| | Sawyer & Ranta, 2001; Erlam, 2005; Hwu& Sun, 2012. | information have wide-ranging pedagogical implications for L2 learning conditions. |
| Aptitude , Instruction, and Feedback: Micro Studies | Robinson,1995; De Graaf, 1997; Trofimovich, Ammar& Gatbonton,2007; Sheen,2007a,b; Li,2011;Van Patten &Borst,2012a, b; Hwu & Sun,2012;Yılmaz,2013. | Aptitude is associated with greater success in short term studies with focused grammar points. More strongly with explicit than implicit instruction and feedback. |

One of the test batteries developed after MLAT is *Pimsleur Language Aptitude Battery* (PLAB). PLAB, which is designed to measure "verbal intelligence, motivation and auditory ability", and it consists of six parts: "grade point average, interest in foreign language earning, vocabulary, language analysis, sound discrimination, sound-symbol discrimination" (Dörnyei, 2005, pp.38-39).

According to Shekan (1986, 1989), who has studied on the concept of factor-components, FL aptitude has three important components: "auditory, linguistic and memory abilities". Later, Shekan (1998) has proposed "input, central processing, and output skills" to evaluate three factors of Carroll, which are "phonetic coding ability, grammar sensitivity, and working memory". Nevertheless, he has indicated insufficient studies in the area, especially about memory.

Additionally, Sparks and Ganschow (2001) also recreated a foreign language aptitude test by taking the "Linguistic Coding Differences Hypothesis"(LCDH) into consideration. This hypothesis is to use the L1 skills to anticipate foreign language aptitude. In this regard, Shoebottom (2016) states that people who learn a foreign language from the same language family have greater opportunities than those from a different language family.

Grigornko, Sternberg and Ehrman's (2000) "Cognitive Ability for Novelty in Acquisition of Language-Foreign (CANAL-F) "is another important theory, which was designed to find out learners' ability from the cognitive perspective in education" (p.392).

Contemporary models (e.g., CANAL-F and LCDH) are closely linked to the working memory as a component of language aptitude (Sáfár & Kormos, 2008;

DeKeyser & Koeth, 2011). Additionally, "High-Level Language Aptitude Battery" (HI-LAB) is another test that is used to anticipate the success of the highly competent and lower competent individuals. In terms of macro studies on FL aptitude "Aptitude complexes" (Robinson, 2005, p.51) is a framework that enlightens an individual's FL aptitude profile in terms of real-life tasks.

Furthermore, regarding developments in neuroscience, the relationship between FL aptitude and pronunciation has also been investigated. Golestani, Price, and Scott (2011) and Golestani (2014) have conducted several studies on linguists' brain developments and their phonological aptitude, and the results pointed out that phonological working memory may anticipate success in phonological aptitude.

### 2.3.2. Musical Aptitude

The common explanation of musical aptitude is "a product of both innate potential and early environmental experiences. These two factors contribute in unknown proportions to music aptitude" (Gordon, 1999. p.44). The term "Music" corresponds to other terms such as "musicality, musical ability, musical aptitude, musical intelligence, and musical giftedness" (Nardo & Reiterer, 2009, p.213). Nardo and Reiterer (2009) pointed out that the term "musicality" implies "sensitivity to knowledge of, or a talent for music" (p.213). Unlike musical aptitude, musicality is not completely hereditary. It can be enhanced by nurture, whereas musical aptitude is characterized as a part of nature (Nardo & Reiterer, 2009).

Musical aptitude testing, which has held an essential role since the 20th century, has three chronological phases (Gembris, 1997, p.17):

- Phenomenological Approach (1800-1920)
- Psychometric Approach (1980-….)
- Musical Meaning (1980- ….)

During the Phenomenological Age, some authors made contributions to the existing literature (Gembris, 1997). For instance, the authors of the Phenomenological Approach produced an inventory to evaluate one's musicality and introduced various definitions of musical terms. According to Gembris (1997), the most important of them is musical discrimination abilities.

Psychometric age mainly dealt with the standardization of musicality tests, and the most valid and reliable tests emerged in this age. Billroth (1985) stated that the most important characteristic of musicality is to perceive the musical forms.

Hanslick (1986) claimed that music does not hold significance, and the only essential element is "tonally moving forms" (p. 29). Seashore (1919) and Gordon (1989) created their tests to standardize their tests and the others also strived to make the tests culturally independent and unbiased. Gordon contributed the literature with the term "audiation" in 1975.

In the third age, it was believed that musical meaning is particularly about musical culture and it is far from certain musical aesthetic norms (Gembris, 1997). Upon several attempts, musical aptitude studies have gained acceleration and many progresses have been made within the field and these studies are explained below.

**2.3.2.1. The Seashore Measures of Musical Talent**

Carl Seashore, who conducted studies on the musicality of people, is mostly known with *The Seashore Measures of Musical Talents* test. Seashore (1915) focused on three facets of music: "The psychology of individual talent, the psychology of aesthetic feeling in musical appreciation and expression, and the psychology of the pedagogy of music" (p.129). Seashore (1915) states that music sounds have three components: "pitch, time and intensity".

> Pitch is the quality, the essence of a sound. Timbre, usually spoken of as quality, is merely a pitch complex. Consonants, harmony and clang fusions are also pitch-complexes. Rhythm represents the aspects of time and intensity (Seashore, 1915, p.130).

Moreover, Seashore (1915) stated that musical ability cannot be evaluated based on a single aspect, but rather it is a combination of skills.

> The analysis of musical talent aims first to locate the dominant traits and then to determine qualitatively and quantitatively the composition or the characteristics of each group, or hierarchy of traits. The term musical talent is therefore used in a collective sense (Seashore, 1915, p.130).

*The Seashore Measures of Musical Talents* test has six elements to measure. They are *pitch, loudness, rhythm, time, tonal memory* and *consonance* (Seashore, 1919). In 1960, Seashore, Lewis, and Saetveit changed *the consonance* test with timbre. The test approximately takes 30 minutes; however, the whole procedure requires one hour. *The Seashore Measures of Musical Talents* test measures listeners' musical talent by recording answers on a scoring sheet. Only correct answers are calculated (Law, 2012).

**2.3.2.2. The Drake Musical Aptitude Test**

In 1957, Raleigh M. Drake created a musical aptitude test that measures *Musical Memory* and *Rhythm* (Law, 2012, p.37). Drake (1957) proposes that they are

selected as components of a musical aptitude test after administered many times by musically talented people. Drake aims to "provide measures of musical aptitude to predict achievement in musical training" (Drake, 1957, p.2). His test does not calculate an individual's interest in music and it is "limited to a measure of general musical aptitude" (p. 11). The test requires 80 minutes in total and applicable to both children and adults. The *Musical Memory* subtest is administered with a piano and each melody is presented with a couple of changes (Law, 2012). The second test, *Rhythm,* contains two parts with 50 elements. The first part is applied with a metronome in the test environment. For the second part, the process is similar; however, this time the test is administered in a quiet environment with intentional distractions.

#### 2.3.2.3. Bentley's Measures of Musical Abilities

In 1966, Alfred Bentley developed the *Measures of Musical Abilities (MMA),* especially for 7-14-year-old children. The MMA has four elements: "Pitch Discrimination, Tonal Memory, Chord Analysis, and Rhythmic Memory" (Young, 1973, p.74). The test can be administered in almost half an hour. The "Pitch Discrimination" part consists of 20 items, each of which has two pitches. Students are expected to discriminate against the second pitch. The "Tonal Memory" test part consists of 10 items and is presented in tunes and each tune has five different pitches. The participants listen to each tune respectively at first and are expected to find which tune is different in their second listening. The "Chord Analysis" test, which contains 20 items, has two or four groups of pitches, and participants are expected to detect the number of pitches in each chord. The "Rhythmic Memory" test consists of 10 items of four different beats and pulses in each (Young, 1973).

#### 2.3.2.4. Karma's Music Test

Kai Karma (1973) explains musical aptitude as "the ability to structure acoustic material" (p.28). Kai (1984) also criticizes that musical aptitude would not be measured from one perspective, and believes that the ideal test should be "objective and free from the effects of culture and training" (p.28). The basic idea of Karma's test is the repetitions of straightforward 2-6 tone design. The repetitions pursue each other without delays. The participants' are expected to locate the repeated example. The options are "same" or "different". Karma's test is suitable for participants ranging from 7-year-old to adults. A general revision of the musical aptitude instruments mentioned above is presented in Table 3.

Table 3.

*A Review for Musical Aptitude Tests (cited in Law, 2012, pp.25-26)*

| TEST | SAMPLE | RELIABILITY (Music Test) | VALIDITY | FORMAT |
|---|---|---|---|---|
| Seashore (1919b, 1967) | Ages 10 to 16 | Internal Consistency .55 to .84 (Kuder-Richardson Form. 21) Test-Retest: Not reported | Convergent: Yes Criterion: Yes Predictive: Not reported | Single 331/3 rpm Long Playing Recording |
| Drake(1957) | Ages 7 to 23 | Internal Consistency: .91 (Split Half-odd even) | Convergent: Not reported Criterion: Yes Predictive: Not reported | 12-inch 331/3 rpm microgroove phonography |
| Bentley(1966) | Ages 9 to11 | Internal Consistency:.70-90 (Kuder-Richardson) Test-Retest:.84 | Convergent: Yes Criterion: Yes Predictive: Not reported | Ten-inch 33 rpm disc record |
| Karma (1973,1984) | Ages 10 to 18 | Internal Consistency:.68 (Kuder-Richardson Test-Retest: Not Reported | Convergent: Not reported Criterion: Yes Predictive: Not Reported | MP3 |

### 2.3.2.5. Gordon's Advanced Measures of Musical Audiation

Edwin E. Gordon is a researcher and an author who formulated the term "audiation". Gordon made contributions with several musical aptitude tests (e.g., Primary Measure of Music Audiation (PMMA), Intermediate Measures of Music Audiation (IMMA), Musical Aptitude Profile (MAP), Advanced Measures of Musical Audiation (AMMA), Audie…). His first test was "Musical Aptitude Profile" (MAP), which was designed for primary and high school students. In this test, the "Musical Sensitivity" part is criticized because of the influence of western culture on participants. Some researchers (e.g., Schoenoff, 1973; Sell, 1976; Romine, 1973) advocate that MAP is suitable for German, Finnish and American students. Its influence on non-western students is still confusing and requires more examination (Cutietta, 1991). Primary Measures of Music Audiation is another test designed for musically gifted kids. It has two parts: *Tonal* and *Rhythm*. Intermediate Measures of Music Audiation is a developed version of the PMMA and designed for pupils who

can pass the PMMA with a certain score. Audie is a game for 3-4-year-old pupils. It aims to enhance children's melodic development (Comeau, 2013).

The term "Audiation", which means to perceive and understand melody for which the sound does not actually exist was coined by Edward Gordon in 1975 (Gordon, 1989). He also stated that "audiation is fundamental both music aptitude and music achievement, but audiation functions differently in each" (p.9).

> Consider language, speech, and thought. Language is the result of the need to communicate. Speech is the way we communicate. Thought is what we communicate. Music is the result of the need to communicate. Music, performance, and audiation have parallel meanings. Performance is how this communication takes place. Audiation is what we communicate (Gordon, 1999, p.42).

AMMA has "tonal and rhythm" components. Its structure coincides with phonemes in spoken language (Verdis & Sotiriou, 2018). Its aim is "to enable administrators to establish objective and realistic expectations for the music achievement of high school and college/university music and non-music majors" (Gordon, 2001, p.13). Gordon (2007) classifies the term "audiation" into 7 types and 6 stages as shown in Tables 4 and 5, respectively.

Table 4.

*Types of Audiation (Gordon, 2007, p.17).*

| | | |
|---|---|---|
| TYPE 1 | Listening to | Familiar or unfamiliar music |
| TYPE 2 | Reading | Familiar or unfamiliar music |
| TYPE 3 | Writing | Familiar or unfamiliar music from dictation |
| TYPE 4 | Recalling and performing | Familiar music |
| TYPE 5 | Writing | Familiar music from recalling |
| TYPE 6 | Creating and improvising | Unfamiliar music |
| TYPE 7 | Writing | Familiar and Unfamiliar music |

The first type of audiation occurs when listening to familiar or unfamiliar music. During the audiating process, the tonal and rhythmic patterns are connected and ascribed syntactical meaning. A second type audiation occurs during reading the notations in familiar and unfamiliar music. It is called "notational audiation". The other type is the third audiation, which takes place writing from dictation the

notations of familiar and unfamiliar music. It is also named “notational audiation”. A fourth type audiation is remembering and performing the familiar music without notation. A fifth type of audiation happens when writing familiar tonal and rhythmic patterns that it is recalled through audiation. A sixth type of audiation takes place during producing and creating unfamiliar music, and performing the music silently, verbal, or on an instrument. A seventh type of audiation occurs during writing unfamiliar music by utilizing both familiar and unfamiliar patterns. This type is also known as “notational audiation” (Gordon, 1989).

Table 5.

*Stages of Gordon’s Audiation Term (Gordon, 2007, p. 20).*

| | |
|---|---|
| Stage 1 | Momentary retention |
| Stage 2 | Imıtating and audiating tonal and rhythmic patterns and recognizing and identifying tonal centers and macro beats |
| Stage 3 | Establishing objective or subjective tonality and meter |
| Stage 4 | Retaining in audiation tonal and rhythmic patterns that have been organized |
| Stage 5 | Recalling tonal and rhythmic patterns audiated in other pieces of music |
| Stage 6 | Anticipating tonal patterns and rhythmic patterns |

Gordon (1989) stated that stages for audiation are hierarchical and they are not similar “within each type of audiation” (p.12). Each stage is a preparation for the next stage. In the first stage, short musical pitches are presented and in the second stage, it is expected to imitate the previous pitches. In the third stage, it is expected to “establish through audiation” due to the interaction of the musical patterns in relation to tonality and meter. In the fourth stage, all musical patterns are retained in audiation. In the fifth stage, it is necessary to recall the music that was established hours, days, or years ago. In the sixth stage, predicting and performing the musical patterns accurately are significant. If the patterns are not anticipated correctly, engagement can go on with simple changes (Gordon, 1989, p.13).

The AMMA test established on the term “audiation” also has some principles. They are:

> 1. The audiation of music, not imitation, memorization, or the discrimination of musically isolated pitches or durations, should be the integral element of the test.
> 2. Students should not need to be able to read or write music to take the test. *3.* Students should not need to be able to perform vocally or instrumentally to take the test.
> 4. Students should not need to be familiar with the theory of music or the history of music to take the test.
> 5. All music in the tests should be especially composed for the specific purpose of the test. The use of original music prevents giving some students an advantage as a result of their familiarity with existing music.
> 6. All music in the test should be performed by a professional musician.
> 7. Students should enjoy taking the test. The test should provide students with educational listening experiences. A variety of tonalities, keyalities, meters, and tempos should be included in the test.
> 8. The test should be suitable for assessing a wide variety of music aptitudes.
> 9. Test questions should not be arranged from "easy" to "difficult." Rather, item difficulty should vary throughout the test to stimulate and maintain student interest.
> 10. The types of responses needed to answer the test questions should not be as complex as to require abilities extraneous to music aptitude (Gordon, 1989, p.16).

Musical aptitude is a hereditary potential in learning music (Gordon, 2006). It does not only mean singing a song or having a good musical ear, because it also influences some other abilities, e.g., language skills, social skills (Draper & Gayle, 1987). The Spanish music therapist Patxi Del Campo (1997) claimed that 15% of the intended meaning in a dialogue is conveyed through intonation, which is the musical aspect of language. However, the most controversial subject is the influence of musical aptitude on accuracy in pronunciation. Some authors (Thompson, 1991; Dolman & Spring, 2014) emphasized a faint connection, while others (Slevc & Miyake, 2006; Milovanov, 2010) asserted that there is a relationship between them.

Flege et al. (1995) also administered a study upon the internal elements affecting L2 accent; however, musical aptitude was not considered a predictive variable. Moreover, some authors (Załóg-Kociuga, 2015) claimed that the methodology of these studies has some reliability problems because of self-rated questionnaires. Another study carried out by Fish (1984) revealed that the relationship between "pitch discrimination" and "sound discrimination" is not statistically significant. On the other hand, some studies (Milovanov & Tervaniemi, 2011) indicated that musical aptitude is a factor of better pronunciation, and seems to play a significant role in improving language skills. Besson, Schön, Moreno, Santos, and Magne (2007) demonstrated that musical training improves the sensitivity of identifying deliberately given deficit tones during the test. Moreover, Rautenberg (2013) added that music is closely associated with development in reading ability,

and Gordon, Jacob, Schuele, and McAuley (2015) asserted that musical rhythm perception influences grammar skills of children**.** Tierney and Klaus (2013) stated five subcategories to acquire reading ability: "phonological awareness, speech-in-noise perception, rhythm perception, auditory working memory, and the ability to learn sound patterns" (p.209). They claimed that each category can be associated with music. Their longitudinal study on children demonstrated that music enhances children's language skills even if they have any language learning handicap. Tierney, Krizman, Skoe, Johnston and Kraus (2013) administered a longitudinal study on the adolescents about the effect of music on their brain and found out that music education should be integrated into education not only for children but also for the adolescents. According to Tierney et al., musical activities strengthen language abilities.

### 2.4. Pronunciation

Pronunciation is explained as "a way of speaking a word, especially a way that is accepted or generally understood" (as cited in Otlowski, 1988). However, the worldwide use of English has brought about some disagreements regarding a common pronunciation style. Dziubalska-Kołaczyk and Przedlacka (2008) stated that interactions between native and foreign speakers are at an international standard in different platforms; however, some try to speak like native speakers, others use it as a vehicle to improve intelligibility, still which pronunciation model is the most appropriate is conflicting.

> The choice of a pronunciation model for the 21st-century learner has become a major issue of debate among applied linguists concerned with teaching English. The standard pronunciation models have long readily available as written descriptions and a wealth of accompanying audio materials. In Europe, this has traditionally been Received Pronunciation (RP), and (less frequently) the so-called General American. A new proposal is that of a Lingua Franca Core (LFC) or English as a Lingua Franca (ELF), put forward as a didactic priority in teaching English pronunciation to foreigners (Dziubalska-Kołaczyk & Przedlacka, 2008, p.11).

Derwing and Munro (2005) stated that there are several variations in pronunciation in the English speaking world; however, the most substantial goal in communication is "intelligibility". Pronunciation is regarded as a substantial part of FL learning, because speech without proper pronunciation may cause critical perception problems (Callender, 2007).

Since British colonial activities, many terms of pronunciation have come out one of which is "World Englishes" (Jenkins, 2006, p.159). Jenkins (2006) elucidates this phrase in 3 ways: First, a general term that covers all the varieties of English, which is known as *International English*, the second term is narrower and refers to ESL speaking countries. The last term corresponds to English speaking communities, e.g., England, Canada, and the USA.

The use of English as a common language of communication caused the rise of another term "lingua franca". It is clear that English is a *lingua franca* in and out of Europe because of its importance as a medium of communication (Dziubalska-Kołaczyk & Przedlacka 2008). Seidlhofer (2005) describes a lingua franca as a "contact language", and House (1999) describes ELF "as interactions between members of two or more different lingua-cultures in English, none of whom English is the mother tongue" (p.74). Some authors (Seidlhofer, 2005) discussed its role and claim that international use of English causes several varieties in pronunciation.

For FL learners, learning pronunciation is vital to contribute to intelligibility within communication; however, non-native English speakers generally confront some difficulties in oral communication, which are related to two branches of pronunciation: *Intelligibility*, and *Comprehensibility* (Atli & Bergil, 2012; Ali & Segaran, 2013). Derwing (2010) explains intelligibility as "the degree to which a listener understands a speaker" and comprehensibility as "a judgment of how easy or difficult an individual's pronunciation is to understand" (p.29). Celce-Murcia, Brinton, and Goodwin (2010) asserted:

> There is a threshold level of pronunciation for nonnative speakers of English; if they fall behind this threshold level, they will have oral communication problems no matter how excellent and extensive their control of English grammar and vocabulary might be (p.10).

In this regard, an Indian linguist, Kachru (1985) divides countries into three circles in relation to English as a universal language. The first one is the "inner-circle" countries in which people speak English as their native language (e.g., England, Australia, and Canada), the second one is the "outer circle" countries that speak ESL (e.g., Malaysia, Indonesia, India), and the last one is the "expanding circle" of which countries, e.g., China, Russia, Turkey learn English "as an additional, adjunct or foreign language for a wide range of reasons such as trade or access to higher

education" (Holmes & Wilson, 2017, p.80). Figure 1 demonstrates the Kachruvian Circle.

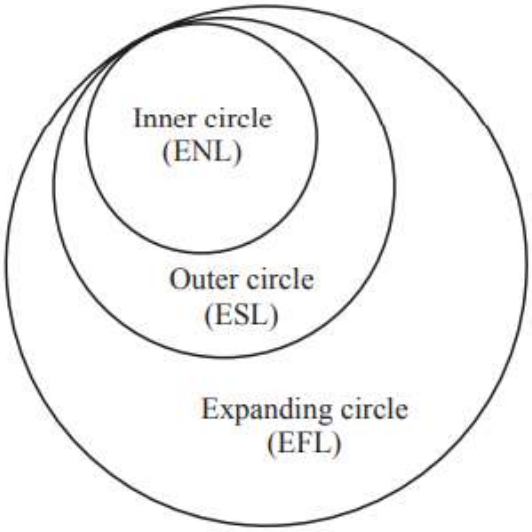


Figure 1. *Kachruvian Concentric Circles (cited in Yano, 2001, p.122)*

However, Yano (2001) criticized Kachru due to inadequacy in defining EFL learners and supported that the expanding circle speakers are half native speakers. He suggested that because of the widespread use of the English language, EFL learners can be considered as semi-native speakers. This commonality is similar to the experiences of ESL learners in the course of language learning.

> It should be added here that it is possible that some EFL speakers can also become functionally ESL speakers (if ESL speakers generally can be termed 'functionally native speakers,' those EFL speakers might be called 'functionally semi-native speakers' perhaps) through the intensive and extensive exposure to and use of English, although Kachru did not refer to these EFL speakers (Yano, 2001, p.123).

Pronunciation consists of segmental and suprasegmental features. Segmental features concern vowels and consonants, while suprasegmentals are acoustic features in speech and have aspects like intonation, stress, and rhythm (Lee & Nusbaum, 1993). Namely, segmental features are essential to pronounce words properly and refer to "phonemes", suprasegmentals are "units which extend over more than one sound in an utterance such as stress and tone" (Sawaengmongkon, 2013, p.572).

Segmental features such as vowels and consonants are easier to monitor because they can be written, while suprasegmentals require special attention and

proficiency (Mirza, 2015). Thus, suprasegmentals have recently gained importance, because of their contribution to intelligibility and mutual understanding (Yates, 2002). However, with globalization, the controversy about which model of pronunciation should be adopted by ESL/EFL speakers may continue (Yano, 2001).

### 2.4.1. Suprasegmental Features of English

Suprasegmental features are important to convey information and considered "the musical aspect of pronunciation" (Thompson & Gaddes, 2005, p.6). Suwartono (2014) stated that both segmental (e.g., vowels, consonants) and main suprasegmental features (e.g., stress, rhythm, intonation) contribute to speech together but suprasegmentals are less identifiable and more challenging than segmental features.

In this regard, rhythm is one of the suprasegmentals and defined as "a form of structure that plays an organizing role in speech. Rhythm consists of two parts: stress-timed and syllable-timed (Ramus, Nespor & Mehler, 1999). Moreover, languages can be categorized according to their rhythmic features and English is classified as a stress-timed language because of systematic intervals, which means intervals can be short or long. However, in syllable-timed languages, like Turkish, intervals are equals and every syllable is pronounced similarly whether it is "tonic or atonic" (Conlen, 2016).

Stress is another suprasegmental feature that can be used to emphasize a particular syllable or a word to differentiate it from others in an utterance (Edward, 1997). It has two main types: word stress and sentence stress. "Every word of two or more syllables, when said alone, has a stress on one of its syllables" is named as word-stress and "some words lose their stresses, especially when we talk quickly, other words keep their stresses and these stressed syllables form" is named sentence-stress (Cai, 2008, p.61). In terms of intelligibility, Solé-Sabater (1991) stated "appropriate stress and rhythmic pattern is more important for intelligibility than the correct pronunciation of isolated segment and, in fact, stress and rhythm determine the pronunciation of segments in English" (p.145).

Intonation is another suprasegmental feature, which covers pitch, tone, and tempo. It is difficult to learn for FL learners because of its complex formations (e.g., falling and rising) (Atoye, 2005). Intonation is "traditionally equated with variations in the perceived pitch of the speaking voice" (Brazil, 1997, p.1). Studies on

intonation (Atoye, 2005; De Bot & Mailfert, 1982) mainly pointed out that perceiving and interpreting intonation is complex; however, its communicative value is significant in yes-no questions, repeated questions, and commands. Stockwell, Bowen, and Silva-Fuenzalida (1956) also pointed out the significance of intonation to prevent miscommunication. Besides, Cason (2019) asserted that rhythm and intonation are challenging and substantial components of pronunciation in the FL and SL learning processes.

# CHAPTER III

# METHODOLOGY

## 3.0. Presentation

This quantitative study examines the relationship between prospective English teachers' musical aptitude and its influence on their pronunciation performance. In this chapter, firstly, the research design is introduced. Next, the characteristics of the research population and sampling are revealed. Lastly, data collection procedures and instruments are presented.

## 3.1. Research Design

Quantitative research design relies on obtaining information from "numerical data" to explain correlations or cause-effect relationships with a breadth insight and it is deductive in nature (Johnson & Christensen, 2004, p.33). The research design of this study is descriptive correlational and it deals with the relationship between musical aptitude levels and pronunciation performance of EFL learners. The aim of correlational research is to define "the relationship among variables rather than to infer cause and effect relationship" (Lappe, 2000, p.81). In descriptive correlational studies, which are clear-cut, researchers do not control the independent variables (Lappe, 2000). "A correlational study describes the degree to which two or more quantitative variables are related, and it does so by using a correlation coefficient" (Fraenkel, Wallen & Hyun, 2011, p. 331).

In correlational studies, there are two variables: "predictor variable", which is used for prediction, and "criterion variable" in which "prediction is made" (Fraenkel et al., 2011, p. 333). In this study, musical aptitude, which influences participants' pronunciation performance, was investigated. In other words, the relationship between these variables was questioned. Musical aptitude was used to predict participants' success in pronunciation, so it is a predictor variable and pronunciation performance is a criterion variable for the current study.

### 3.2. Research Population and Sampling

The participants of this study were composed of 60 sophomore students at Gaziantep University in the department of English Language Teaching, and the data were collected during the fall term of the academic year 2019-2020. The participants were selected via convenience nonrandom sampling because of the need of participants with a certain level of English to measure pronunciation performance. The number of female and male participants was 36 and 15, respectively because of nine withdrawals. All participants had completed the intensive English language program before entering the department and their proficiency levels were over B2. There were not any native speakers of English among the participants, and none of them had hearing problem. Although six participants had a musical background, this was not taken into account, because musical aptitude is granted inherently (Jacobsen & Imhoff, 1974). Before the test, the participants were debriefed that they could stop participating in the study at any time and for any reason. Nine students did not attend the second part of the data collection process. Fraenkel et al. (2011) indicated that the sample size should not be smaller than 30 to obtain meaningful results in correlational studies (p.338). The process was continued with 51 participants that is enough for the current study. The descriptive statistics of the participants were given in Table 6.

Table 6.

*Descriptive Statistics for Gender*

| Gender | Frequency | Percent % |
|---|---|---|
| Female | 36 | 70.58 |
| Male | 15 | 29.41 |
| Total | 51 | 100 |

As can be seen in Table 6, the number of the female participants was 36, which constitutes 70.58% of the total, and the number of male participants was 15, which correlates to 29.41% of the whole sample.

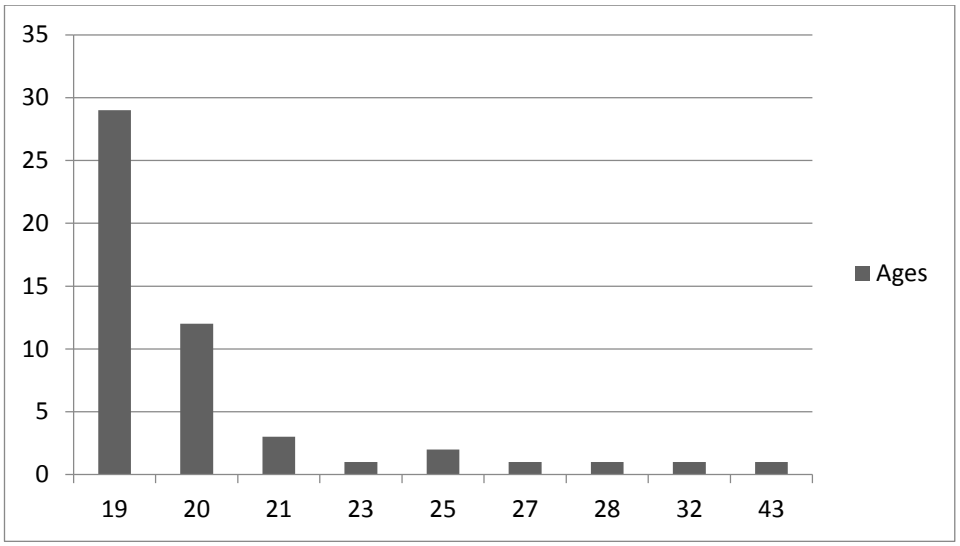


Figure 2. *Descriptive Statistics for Age*

Figure 2 demonstrates participants' ages ranging from 19 to 42 with the mean age of 20.73. The greater number of the participants (96%) was between 19 and 29; the rest of the participants (4%) were from the 30+ age group.

### 3.3. Instruments

In this part, the instruments, related information and their roles in this study are presented with the way they are utilized.

#### 3.3.1. Advanced Measures of Musical Audiation

Several tools to measure musical aptitude were introduced in the previous chapter. The reason of utilizing AMMA in this study is its high correlation with other musical domains and instruments. Reiterer (2018) stated that AMMA correlates "positively and significantly with the number of instruments" and it is "an excellent measure of musical ability" (p.137). Verdis and Sotiriou (2017) affirmed that some music instructors support the 20th century tests to estimate the musical talent; however, they also pointed out that "Gordon's test, however, does not measure music ability directly. His theory is, rather, a theory that parallelizes music and language" (p.81).

In this study, AMMA by Gordon was applied to measure the musical aptitude of the participants. AMMA, which is appropriate for "under-graduate and graduate students in colleges and universities" (Gordon, 1989, p.7), consists of 30 questions and measures two different sub-talents, Tonal and Rhythm, and asks the

participants to choose whether given musical instructions are identical or different in terms of Tonal and Rhythm. AMMA requires about 25 minutes to complete and can be applied to groups or individuals (Gordon, 2001a).

Table 7.

*Reliability Scores for AMMA (cited in Gordon, 1990, p.7).*

| | TONAL | RHYTHM | TOTAL |
|---|---|---|---|
| TONAL | (.80) | .73 | .94 |
| RHYTHM | .73 | (.81) | .92 |
| TOTAL | .94 | .92 | (.83) |

As shown in Table 7, the reliability scores of AMMA, obtained from an investigation on undergraduate and graduate college students by Gordon (1990), reveals that AMMA reliability scores are .80 for Tonal, .81 for Rhythm, and .83 for Total, which indicate acceptable reliability coefficient values. Tavakol and Dennick (2011) stated "there are different reports about the acceptable values of alpha, ranging from 0.70 to 0.95" (p.5).

### 3.3.2. Pronunciation Performance Measure

The data related to pronunciation performance was collected via a short film. Firstly, the participants were instructed to watch the animated silent film and talked about the story whose length changed from 40 seconds to 3 minutes. After collecting the recordings, they were scored by three independent native speakers of English for inter-rater reliability. In this regard, Colton et al. (1997) stated that reliability is necessary in measurement. Brescani, Oakleaf, Kolkhorst, and Nebeker (2009) express that the reason why we need raters is a necessity of interpreting students' performance which are not possible to score objectively. Hallgren (2012) stated that inter-rater reliability is "the degree of agreement between two or more coders who make independent ratings about the features of a set of subjects" (p.23). To reach consistency in the results of the research, reaching accurate results is fundamental (Thomas & Magilvy, 2011).The inter-rater reliability results of the current study were demonstrated in Table 8.

Table 8.

*Inter-rater Reliability*

| | | Rater1 | Rater2 | Rater3 |
|---|---|---|---|---|
| Rater 1 | *R* | 1 | .877** | .905** |
| | p | | .000 | .000 |
| | N | 51 | 51 | 51 |
| Rater 2 | *R* | .877** | 1 | .870** |
| | p | .000 | | .000 |
| | N | 51 | 51 | 51 |
| Rater 3 | *R* | .905** | .870** | 1 |
| | p | .000 | .000 | |
| | N | 51 | 51 | 51 |

** Correlation is significant at the 0.01 level (2-tailed)

The inter-rater reliability of the current study was obtained by utilizing Pearson product-moment correlation. The first rater's correlation coefficient score with the second and third raters were .877 and .905, correspondingly. The second rater's correlation coefficient with the third rater was .870 at the 0.01 level. These scores indicate that the coefficient values are acceptable and there is a strong correlation among the raters' scores because the coefficient values are greater than .70 (Tavakol & Dennick, 2011).

### 3.4. Data Collection

Regarding ethical concerns, firstly the necessary permission was taken from Gaziantep University (See Appendix D), and the participants were informed about the aim of the current study. After the necessary information
about the current study had been elucidated, verbal consent of the participants were received. The study was conducted in the fall term of 2019-2020 academic year at Gaziantep University with sophomore students of English Language Teaching department. At the initial phase, AMMA test consisting of 30 musical statements was administered to 60 students. The test was carried out to the target group at once in a large classroom with a sufficient sound system. Before taking AMMA, no prior musical training was given; however, the participants were provided with three

sample exercises. Nevertheless, prior to the process, students were informed about the terms “tonal” and “rhythm” in music by a music teacher. Instructions were announced automatically by an announcer through the CD. The participants were asked to decide if each musical statement was identical or not; if it was different, then they decided if the difference was tonal or rhythmic. In order to prevent hesitancy, they were asked to leave the options blank if necessary. If a musical statement was identical, they were supposed to mark “Same”(S); if a change was tonal, they were expected to mark in “Tonal” (T); and if there was a rhythm change, then they were supposed to check the “Rhythm”(R) column. The results were calculated by the author, thanks to hand-scorable masks in AMMA Manuel provided by Gia Music Publication (See Appendix A). Each participant’s tonal correct answers were counted with T1 and wrong answers with T2 scoring masks. The same procedure was applied to calculate right and wrong answers for Rhythm using R1 and R2 respectively to gain raw scores. “The highest possible Tonal and Rhythm raw scores are 40 for each. The highest Total raw score is 80” (Gordon, 1989, p.26). Each raw score, which was obtained by computing the correct answers for both tonal and rhythm, also corresponds to a percentile norm. (See Appendix B).

After the withdrawal of nine students, at the second phase, 51 participants watched a silent animated film. Each participant was taken in a private room and was asked to talk about the film. Every participant spoke individually and each speech was recorded via a recording device simultaneously. To assess the pronunciation performance, the inter-rater reliability was calculated based on the scorings by three independent native speakers of English. In this process, “Teaching English to Speakers of Other Languages” (TESOL) pronunciation rubric, which is a part of the speaking rubric, was adopted. (See Appendix C). The raters followed a 5-point scale. The data collection process was not sequential and was completed in three weeks.

### 3.5. Data Analysis

The main aim of the current study is to reveal the connection between musical aptitude and FL pronunciation skills. The collected data were analyzed through SPSS 25 program. For the current study, AMMA’s reliability score, which gave information about internal consistency, was measured by Cronbach’s Alpha coefficient. The reliability coefficient of AMMA was r=.70, which is acceptable (Tavakol & Dennick, 2011). In terms of the second research question, another

Pearson’s product-moment correlation analysis was conducted to find the relationship between musical aptitude levels and holistic judgments of pronunciation performances. After that, to find the extent to which musical aptitude explains success in pronunciation performance, multiple regression analyses were carried out. Finally, concerning the influence of gender and age on musical aptitude and holistic judgments of pronunciation performance, independent samples t-tests and Pearson product-moment correlations were utilized.

# CHAPTER IV
# FINDINGS

## 4.0. Presentation

This current study gives the statistical results, which question the relationship between participants' musical aptitude levels and pronunciation performance. In the first part, descriptive analyses and reliability coefficient results' will be presented. Then, Pearson product-moment correlations between musical aptitude and pronunciation performance scores will be presented. After that, independent samples *t*-tests and one-way analysis of variances (ANOVAs) will enlighten the relationship between demographic features of the participants and total musical aptitude and pronunciation scores.

## 4.1. Descriptive Analyses

The data of the current study was obtained by 51 participants via AMMA. To analyze the distribution, mean, standard deviation, range of maximum and minimum scores and skewness and kurtosis values were presented in this part. The descriptive statistics for AMMA were given in Table 9.

Table 9.

*Descriptive Statistics for AMMA*

| | Statistic | Std. Error |
|---|---|---|
| Mean | 52.71 | |
| Std. Deviation | 6.689 | |
| Minimum | 39 | |
| Maximum | 66 | |
| Skewness | .151 | .333 |
| Kurtosis | -.279 | .656 |

The minimum and maximum scores for AMMA were 39 and 66, respectively. The mean is 52.71 and the standard deviation is 6.689. The skewness and kurtosis values are at acceptable levels because of skewness (.151) and kurtosis (-.279) values, those are between +1 and -1. George and Mallery (2014) stated if skewness and kurtosis values are between +1 and -1, it is "excellent for most psychometric purposes" (p.116).

### 4.2. Inferential Analyses

***Results for Research Question # 1*** **Do the construct validation and reliability analyses of the data collection tool (Advanced Measure of Musical Aptitude Test) reveal acceptable statistics and coefficients?**

Validity and reliability are the fundamental indicators for an efficient tool (Kimberlin & Winterstein, 2008). Colton et al. (1997) define reliability as "an important property in measurement" (p.3). In this study, Cronbach's Alpha was run to obtain a reliability coefficient value. The score is .702 which provides "an acceptable reliability coefficient" (Santos, 1999, p.1). No items were excluded. Reliability coefficient value for AMMA was demonstrated in Table 10.

Table 10.

*Reliability Statistics For AMMA*

| Cronbach's Alpha | N of Items |
|---|---|
| .702 | 2 |

***Results for Research question # 2*** **Is there a relationship between students' musical aptitude levels and holistic judgments of their pronunciation performance?**

To explain the result of this question, Pearson's product-moment correlation was employed. Hatch and Farhady (1981) reveal several assumptions for correlation analysis: "The assumptions are: (1) the two variables are continuous, (2) score on X and Y is independent of each other and (3) the relationship between X and Y is linear" (p.203). These assumptions were met for the relationship between musical aptitude and pronunciation performance. That is why Pearson product-moment

correlation was utilized as a proper technique. Correlations between variables were exhibited in Table 11.

Table 11.

*Correlation Table for Tonal Rhythm and Total Scores with Pronunciation Rating*

| | | |
|---|---|---|
| Tonal | *R* | .356* |
| | p | .010 |
| | N | 51 |
| Rhythm | *R* | .294* |
| | p | .036 |
| | N | 51 |
| Total Score | *R* | .369** |
| | p | .008 |
| | N | 51 |

**Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

As Table 11 shows, there is a statistically significant moderate positive correlation between tonal and holistic judgments of pronunciation scores at 0.05 level ($r=.356$, $p<.05$). In terms of the correlation between rhythm and pronunciation rating, Pearson's correlation analysis has points out that there is a statistically significant moderate correlation at 0.05 level ($r=.294$, $p<.05$). The correlation between total musical aptitude score and pronunciation rating also indicates a statistically significant moderate correlation at 0.01 level ($r= .369$, $p<.01$). Mean and standard deviation values were demonstrated in Table 12.

Table 12.

*Mean and Standard Deviation Scores of Tonal Rhythm and Pronunciation*

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Pronunciation Rating | 2.7124 | 1.10558 | 51 |
| Tonal | 25.71 | 3.607 | 51 |
| Rhythm | 26.55 | 4.002 | 51 |

The mean score of the pronunciation rating was 2.7124 (SD=1.11) and the mean for the Tonal was 25.71 (SD= 3.61). The mean score for rhythm was 26.55 (SD= 4.00).

***Results for Research Question # 3*** **To what extent can participants' musical aptitude predict holistic judgments of their pronunciation performance?**

In order to explain this question, regression analysis was utilized. Regression analysis was used to explain the link between the predictor variables, "tonal and rhythm" and a criterion variable, "pronunciation performance scores". According to Sinharay (2010), "multiple regression is the statistical procedure to predict the values of a response (dependent) variable from a collection of predictor (independent) variable values" (p.7). The results of the multiple regression analysis were presented in Table 13.

Table 13.

*Regression Analysis*

| Model | R | R Square | Adjusted R Square | Std. Error of Estimate |
|---|---|---|---|---|
| 1 | .376[a] | .141 | .105 | 1.04569 |

a. Dependent Variable: Pronunciation Rating

Table 13 indicates that there is a moderate degree of correlation because *R* value is .376. The $R^2$ value is .141 and this means that musical aptitude accounts for 14% of pronunciation performance. In other words, musical aptitude represents 14% of variance. One-way ANOVA analysis' results were presented in Table 14.

Table 14.

*One-way ANOVA for Regression Equation*

| Model | | Sum of Squares | df | Mean Square | F | p. |
|---|---|---|---|---|---|---|
| 1 | Regression | 8.629 | 2 | 4.315 | 3.946 | .026[b] |
| | Residual | 52.486 | 48 | 1.093 | | |
| | Total | 61.115 | 50 | | | |

b. Predictors: (Constant), Rhythm, Tonal

Table 14 confirms that there is a statistically significant difference as determined by one-way ANOVA ($F$ (2, 48) = 3.946, $p < .05$). It estimates the extent to which musical aptitude explains the pronunciation performance of the participants.

Here, p< .026 implies that the regression model statistically significantly anticipates the success in pronunciation since it is less than .05.

***Results for Research Question # 4*** **Do participants' musical aptitude levels and holistic judgments of their pronunciation performance vary according to their gender?**

Independent samples *t*–tests were run in order to answer the question of whether gender affects participants' musical aptitude levels and their pronunciation performance. However, three assumptions must be fulfilled to run an independent samples *t* -test. First, two variables must be independent of each other. In this study, male and female groups were independent. Second, these groups must have equal variance on the dependent variable. The Levene's test was run to check this assumption. Table 15 demonstrated the Levene's test results for AMMA total scores.

Table 15.

*Summary of the Levene's Test for AMMA Total Score*

| | | **F** | **p.** |
|---|---|---|---|
| Total Score | Equal Variances Assumed | .220 | .641 |

The significance value in the Levene's test (p.: .641>.05) revealed that the current data have an equal variance, which fulfills the second assumption. In other words, the result showed that the condition of homogeneity of variance has been satisfied and these two groups are independent in terms of their total aptitude scores. Levene's test for pronunciation rating was presented in Table 16.

Table 16.

*Summary of the Levene's Test for Pronunciation Rating*

| | | F | p. |
|---|---|---|---|
| Pronunciation Rating | Equal Variances Assumed | .176 | .676 |

Table 16 indicates that the significance value in the Levene's test (p.: .676>.05) for the pronunciation rating also met the second assumption. Namely, significance value is greater than .05 and the variability in two conditions is similar, which means two groups are independent from each other in terms of their pronunciation scores.

Finally, the distribution of the dependent variable must be normal, which can be derived from the measures of skewness and a Q-Q plot. According to Huck, Cormier and Bounds (2012), the skewness values between -1.0 and +1.0 are satisfactory. In this study, the skewness coefficient of the participants' musical scores is .151 (See Table 9), which can be interpreted as a normal distribution. The Q-Q plot was presented in Figure 3.

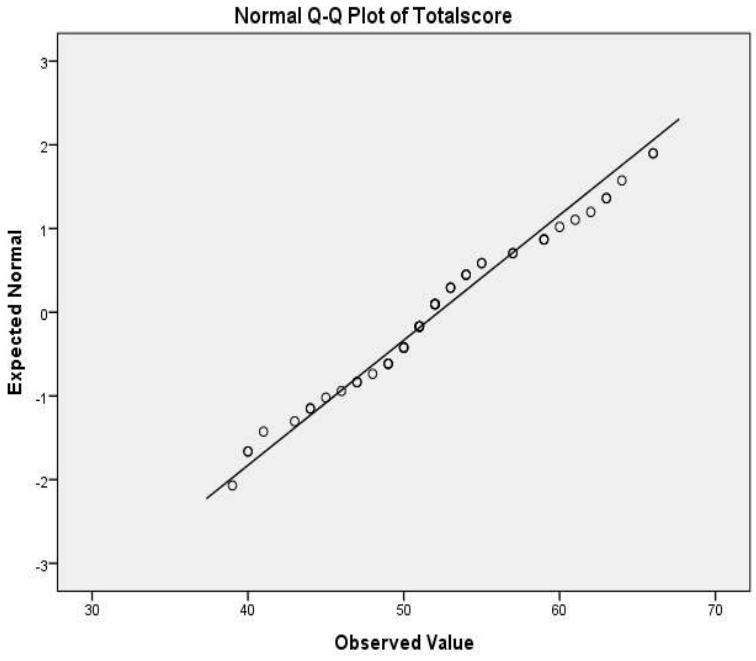


Figure 3. *Normal Q-Q Plot of Total Score*

The Q-Q plot demonstrates that the distribution of score took a position in parallel to the given straight line, which indicated the normal distribution. Since three assumptions were fulfilled, it can be concluded that independent samples t-tests and one-way ANOVA fit for the research design of this study. The findings were presented in Table 17.

Table 17.

*Summary of the Independent Samples* T-*test for AMMA Total Scores and Gender*

| | | Number | Mean | Std. Deviation | Df | t-value | p. (2 t.) |
|---|---|---|---|---|---|---|---|
| Total Score | Male | 15 | 51.60 | 6.868 | 49 | .434 | .666 |
| | Female | 36 | 52.50 | 6.423 | | | |

The results of the *t*-test reveal that there is not a statistically significant difference between males (51, 60 ± 6.50) and females (52.50± 6.90), (t (49) =.434, p=0.666). Since the p-value is greater than .05, gender is not a statistically significant component for the musical scores of the participants. The t-test results for pronunciation performance and gender were presented in Table 18.

Table 18.

*Summary of the Independent Samples T-test for Pronunciation Performance and Gender*

| | | Number | Mean | Std. Deviation | Df | t-value | p. (2t.) |
|---|---|---|---|---|---|---|---|
| Pronunciation | Male | 15 | 2.68 | 1.094 | 49 | .097 | .923 |
| | Female | 36 | 2.72 | 1.125 | | | |

The results of the *t*-test show that there is not a statistically significant difference in pronunciation performance of the participants in terms of gender (t (49) =.097, p=0.923). The results demonstrate that gender is not a distinctive factor for participants' pronunciation performance since the p-value is greater than .05.

***Results for Research Question # 5*** **Are participants' musical aptitude levels and holistic judgments of their pronunciation performance correlated with their age?**

The main aim of this research question is to reveal whether age has an effect on musical aptitude scores and pronunciation scores. Pearson's product-moment correlation coefficient obtained to answer this question and the findings of the analysis were presented below:

Table 19.

*Correlation between AMMA Total Score Pronunciation Rating and Age*

| | | Age | AMMA Total | Pronunciation Rating |
|---|---|---|---|---|
| Age | R | 1 | -.129 | -.192 |
| | p | | .368 | .178 |
| | N | 51 | 51 | 51 |
| AMMA Total | R | -.129 | 1 | .369** |
| | p | .368 | | .008 |
| | N | 51 | 51 | 51 |
| Pronunciation | R | -.192 | .369** | 1 |
| | p | .178 | .008 | |
| | N | 51 | 51 | 51 |

** Correlation is significant at the 0.01 level (2-tailed).

The results show that the relationship between age and participants' total musical aptitude scores is not statistically significant ($r$ = -.129, $p$ = .368). Namely, the p-value is greater than .05 and there is not any conclusive evidence about the significance of the relationship between the variables. In addition to this, there is not any significant relationship between age and pronunciation ratings of the participants either ($r$ = -.192, $p$ =.178). These results reveal that age is not a variable affecting musical aptitude total scores and pronunciation performance.

In the next chapter, the results of the research questions will be discussed regarding the prior studies in the relevant literature.

# CHAPTER V
# DISCUSSION

## 5.0. Presentation

The primary concern of this quantitative study was to question the correlation between musical aptitude and foreign language pronunciation skills. In the first phase, AMMA was implemented to measure musical aptitude levels. The results of the four research questions, which were asked in the introductory part, were presented. In the second phase, participants' pronunciation performance were recorded and evaluated by three native speakers of English. In order to understand the influence of musical aptitude on pronunciation skill, the results were compared and presented. After that, the correlation between gender and musical aptitude and pronunciation scores were questioned. Finally, the effect of age on musical aptitude and pronunciation was investigated. That is to say, the main aim of this part is to discuss the findings of the current study with reference to the research questions.

## 5.1. Discussion Regarding Research Questions

*Do the construct validation and reliability analyses of the data collection tool (Advanced Measure of Musical Aptitude Test) reveal acceptable statistics and coefficients?*

AMMA is a test to measure musical aptitude of the participants. This question investigates how fits AMMA is to measure musical aptitude levels.

Validity is defined as "the extent to which the interpretations of the results of a test are warranted, which depends on the test's intended use" (Kimberlin & Winterstein, 2008). Reliability means the extent to which a tool yields findings consistently (Yasar & Cogenli, 2014). Reliability coefficient scores vary between -0.00 and +1.00 and the larger the reliability score means more reliable results.

In this study, the reliability coefficient value was obtained through Cronbach's Alpha and the result showed that AMMA's reliability score is .702, which indicated acceptable reliability to obtain accurate results for pronunciation performance of the participants (Tavakol & Dennick, 2011). Gordon (1989) stated that standardization

program proves AMMA as an aptitude test. Not only are split- halves reliability scores reported as .80 for Tonal, .80 for Rhythm, and .81 for Total), but test-retest reliability scores also are informed as .80 for Tonal, .81 for Rhythm, and .83 for Total (as demonstrated in Table 8) for undergraduate and graduate non-music majors (Gordon, 1989, p.40). Pei et al. (2016) also confirmed its applicability for participants from oriental countries regarding its high reliability and concurrent validity. Given data indicate a slight difference between reliability scores. These data signify that the current study result is in line with Gordon' results and AMMA is appropriate for its purpose.

*Is there a relationship between students' musical aptitude levels and holistic judgments of their pronunciation performance?*

In order to answer this question, Pearson's correlation analysis was conducted. Data showed that there is a correlation between musical aptitude levels and holistic judgments of participants' pronunciation performance at a moderate level. Some studies (Slevc & Miyake, 2006; Milovanov, et al., 2008, 2009, 2010) also claimed that musical aptitude affects the attainment in pronunciation skills. Slevc and Miyake (2006) conducted a study with 50 Japanese participants and used the Wing Measures of Musical Talent to find musical aptitude. The results demonstrated that musical ability correlates with L2 receptive and productive pronunciation skills .52, and .45, respectively. Another study by Milovanov et al. (2008) on the effect of better SL pronunciation skills on musical aptitude scores (measured by the Seashore Measurement of Musical Talent) with elementary school children proposed "language skills, both in production and discrimination, are interconnected with perceptual musical skills" (p.85). They also indicated "participants with musical aptitude more readily produced correct foreign language phonemes than the participants with less musical aptitude" (p.82). Milovanov et al. (2009) conducted another study about the significance of musical aptitude (Seashore test) and linguistic abilities on mismatch negativity with 40 children learning English as a FL. The study mainly focused on brain reactions against different durations in musical and phonological stimuli. The result of the study demonstrated that children with better musical aptitude and linguistic skills are also better in encoding different durations. Milovanov et al. (2010) administered another research on the interaction between musical aptitude (Seashore test) and L2 pronunciation on 46 university

students and found out a significant relationship between them. They also clarified that musical individuals are more careful about the musical aspects of the language.

The finding of the current study for the second research question proposed a similar result, and it was consistent with the other studies mentioned above.

*To what extent can participants' musical aptitude predict holistic judgments of their pronunciation performance*?

According to obtained results through regression analysis, musical aptitude is shown to affect foreign language pronunciation skills 14% ($R^2 = .141$). It accounted for 14% of the variance. One-way ANOVA for regression equation results demonstrated that musical aptitude significantly correlated with foreign language pronunciation skills. As mentioned in the discussion of the second research question, Slevc and Miyake (2006) found out a correlation between musical aptitude score and receptive and productive pronunciation skills 12%. Milovanov et al. (2010) figured out a similar correlation between them, (.64). Dolman and Spring (2014) conducted a similar study with similar procedures with Milovanov et al.'s (2010) study. However, they did not find any statistically significant convincing results between musical aptitude and pronunciation performance as Milovanov et al. (2008, 2009, 2010) had found. They indicated the discrepancy in results and recommended similar studies with participants from different backgrounds. Dolman and Spring (2014) also gave reference to Jackendoff's (2009) study and agreed to be cautious about the relationship between them. Jackendoff (2009) presented similarities and differences between music and language and claimed "both language and music involve a sequence of digitized sounds: speech sounds in language, tones or pitch events in music. This is certainly one reason for the strong intuition that they are alike. However, the resemblance ends there" (p.198). Moreover, Martens, Nakatsukasa and Percival (2016) conducted a study to enlighten the effect of musical training on FL learning. Firstly, 79 music majors took the Language Learning Aptitude Measures (LLAMA), then, 23 of them took AMMA. As a result, they found a correlation only between AMMA Rhythm and LLAMA sound recognition scores and claimed that music and pronunciation skills are connected to each other to a limited extent. Although these studies (Dolman & Spring, 2014; Martens, Nakatsukasa & Percival, 2016) asserted a slight and limited correlation, the current study's findings are in line

with those studies (Milovanov et al., 2008, 2009, 2010), which indicate the correlation.

*Do participants' musical aptitude levels and holistic judgments of their pronunciation performance vary according to their gender?*

To find the effect of gender on musical aptitude total score, two independent samples *t*-tests were run and the results showed that gender is not a distinctive factor for either musical aptitude levels or pronunciation performance. In brief, being a male or a female does not affect musical aptitude and pronunciation performance. Pollatou, Karadimou, and Gerodimos (2005) carried out a study to reveal gender differences in musical aptitude and found out that there is no discrepancy in musical aptitude scores of boys and girls. Moreover, Martens, Nakatsukasa, and Percival (2016) conducted a study to find a correlation between music and FL learning skills and analyzed the effect of gender on the FL learning process. However, they did not find any relationship among them. Gordon (1979, cited in Olson & Jay Samuels, 1973) also indicated that there is no significant or systematic connection between scores for music audiation and gender. Accordingly, the findings of our research are compatible with the similar studies in the literature.

*Are participants' musical aptitude levels and holistic judgments of their pronunciation performance correlated with their age?*

The final research question investigating the relationship between age and musical aptitude/pronunciation revealed that age is not correlated with either musical aptitude scores or judgments of foreign language pronunciation performance. Milovanov et al. (2010) found out that the FL learning age does not explain attainment in pronunciation. Martens, Nakatsukasa, and Percival (2016) put age factor in their study and did not find any correlation between age and aptitude scores. Besides, Gordon (1989) asserted that age, experience, and music experience does not affect the scores on the AMMA. On the other hand, there are other studies (Olson & Jay Samuels, 1973; Snow & Höhle, 1977) which investigated the relationship between age and pronunciation skills. Olson and Jay Samuels (1973) conducted a study on pronunciation and its link with age with elementary, high school, and college students. The pre-test and post-test results demonstrated that there is no difference between different age groups in terms of their pronunciation performance. Snow and Höhle (1977) questioned the correlation between age and success in

pronunciation. They claimed that younger participants are not more successful than older participants and also pointed out that the differences between the young group and older groups diminish by a few months after starting to learn a second language. Thus, the outcomes of the current study support those of parallel studies in that all approve the theory that musical aptitude levels and pronunciation performance are not related to age.

# CHAPTER VI
# CONCLUSION AND SUGGESTIONS

## 6.0. Presentation

In this chapter, the summary of the previous chapter and findings will be presented. Along with them, limitations of the study and pedagogical implications will be given with some suggestions for further studies.

## 6.1. Conclusion

The goal of the study is to uncover if any relationship between musical aptitude measured by AMMA and FL pronunciation performance exists. The study was carried out at Gaziantep University with 51 sophomore students. Fraenkel et al. (2011) indicated that correlational studies should be conducted with at least 30 participants**.** So, the sample size of the current study was sufficient. AMMA was used as a scale to measure the participants' musical aptitude levels. After that, participants' speech was recorded by the researcher via a voice recorder, and graded by three native speakers of English by utilizing the pronunciation component of the TESOL speaking rubric.

At the introduction part of the current study, several studies on individual differences were presented briefly. Then, in relation to the current study's concern, the importance of pronunciation, varieties in pronunciation, and its contribution to intelligibility and comprehensibility were mentioned. Kennedy and Trofimovich (2008) stated that starting and keeping communication is one of the main challenges of L2 and FL learners. However, reaching this goal does not mean producing a native-like accent because there are other important dimensions of communication, such as intelligibility, and comprehensibility (Kennedy & Trofimovich, 2008). In this regard, Lewis (2006) stated that pronunciation is the most eminent factor affecting intelligibility and some tests like Cambridge Certificate of Proficiency in English also give importance to pronunciation with its specific qualities, e.g., "stress, rhythm,

intonation" (Levis, 2006, p.246). Intelligibility is defined as how much a speaker's utterance is comprehended by a listener. Comprehensibility, which is "one aspect of communicative effectiveness", is explained as comprehension of utterances or words (Trofimovich & Isaacs, 2012, p.905). Hahn (2004) conducted a study on the importance of these properties of pronunciation and the effect of the "primary stress" on intelligibility in nonnative speech and the results demonstrated that stress, one of the suprasegmental components of pronunciation, contributes to comprehension. Although Trofimovich and Isaac (2012) conducted a study about the relationship between accent and comprehensibility and revealed that they are different but related constructs. Several studies (Caspers, 2010; Murphy, 2014) supported that speaking like a native English speaker has no significant effect on intelligibility and comprehensibility on non-native speech. Caspers (2010) found that suprasegmental features are essential for intelligibility. Moreover, Murphy (2014) asserted that speaking like a native is unnecessary for ESL and EFL learners because it is almost impossible to achieve. All things considered, the extent to which pronunciation and communication is understandable is mostly determined by the extent to which speech is intelligible and comprehensible.

Thereafter, along with various musical aptitude tests, studies on musical aptitude were also presented. Musical aptitude studies demonstrated that musical aptitude interacts with several domains in brain such as "general intelligence, verbal memory, literacy, visual perception, spatial skills, and basic auditory and visual timing skills" (Milovanov et al., 2008, p.81). However, this study aimed to illuminate its relationship with foreign language pronunciation. Other studies on the function of speech and music in the brain stem (Wong, Skoe, Russo, Dees & Kraus, 2007) indicated the importance of music practice and added that musicians display more robust encoding ability than non-musicians. Milovanov and Tervaniemi (2011) also indicated "music and language seem to grow from a common source ever since birth and musical elements aid learning linguistic functions such as sound patterns and syntax" (p.324). Reiterer's (2018) study on the relationship between musical aptitude and the Hindi language pointed out the importance of playing an instrument: "This clearly indicates individuals who learn to play more instruments have an advantage in auditory discrimination, i.e., a well-trained auditory cortex" (p.137). Saito, Sun and Tierney (2018) proposed that music learners may be more perceptive and capable of detecting acoustic features in speech. Dege's and Schwarzer's study

(2011) on children about the effect of musical training on phonology training revealed that phonology training programs should be supported by musical activities. Furthermore, they pointed out that phonological awareness may also contribute to pupils' reading ability. Another study conducted by Anvari, Trainor, Woodside, and Levy (2002) with 100 students between the ages of four-five on musical experience and linguistic achievement demonstrated that music ability has a positive impact on phonological realization and reading skills of pupils. They also claimed that basic auditory ability corresponds to early reading ability, since both use the common auditory mechanism. Besides, some authors (Torppa & Huotilainen, 2019) suggested the use of musical elements for individuals with hearing problems for the augmentation of the perception of prosody and speech. Peretz and Zatorre (2005) also indicated the importance of musical training on brain's "the cortical motor areas" and its effect on "the plastic changes in the brain" (p.104). Asaridou and McQueen (2013) supported that musical aptitude is correlated with L2 phonological production and perception skills thanks to the common mechanism that controls them. In addition, they stated that musical aptitude helps predict tone discrimination tasks in non-tone-language speakers. Asaridou and McQueen (2013) also argued that music training or aptitude contributes to speech segmentation skills of children. Patel's (2012) OPERA hypothesis, which refers to the effects of music on speech, indicates that music and language overlap in pitch processing. He pointed out that a sound can be processed differently in the left or right brain part, depending on the attribute of the sound. However, basic acoustic features are processed by both music and speech through employing overlapping brain networks.

The current study focused on the relationship between musical aptitude and its effect on foreign language pronunciation skills as well as the influence of some demographic factors like gender and age. The study was conducted at Gaziantep University at the department of English Language Teaching with 51 sophomore students in 2019-2020 academic year. Firstly, the relationship between musical aptitude and participants' pronunciation was analyzed through a Pearson product-moment correlation. The data were collected through AMMA and scored by three independent native speaker raters. The correlation analysis revealed the reliability among raters' scores. The analysis of variance (ANOVA) confirmed that there is a statistically significant difference at a moderate level between musical aptitude and

pronunciation performance. The data indicated that pronunciation performance and musical aptitude levels are correlated with each other positively. Finally, musical aptitude and its relation with age and gender were measured via independent samples *t*-tests, and the results indicated no relationship. This means that age and gender do not affect both musical aptitude scores and foreign language pronunciation performance. Thus, in the light of literature upon this study, it is proven that music is one of the variables affecting pronunciation performance of Turkish EFL learners and musical aptitude and pronunciation contribute to each other in FL learning**.** Fonseca-Mora, Toscano-Fuentes, and Wermke (2011) indicated the importance of the early stages of language development before puberty. They stated that babies are equipped with "musical perceptual capabilities" and "newborns' cry melodies are shaped by the ambient spoken language" (p.103). Şenel (2006) indicated that the musical ear, which is innate, and also known as "phonetic ability" (p.116), influences the ability to produce the utterances properly. Some people have high; some have average, and low phonetic ability that is why the age of onset should not be ignored to minimize the effect of this type of ID variable among learners. Fonseca-Mora, Toscano-Fuentes, and Wermke (2011) emphasized the essential role of music in language learning, and stated, "Music played in the external environment is also perceptible in utero. Term-fetuses can discriminate musical notes and may habituate to a brief piano sequence with changing melodic contour" (p.103).

Şenel (2006) mentioned that various problems exist in pronunciation learning and teaching process such as, teachers' attitudes, mother language interference, the age of onset, and so on. In this study, as per the effect of music on pronunciation and when the effect of the age of onset of exposure is considered, the earlier exposure seems beneficial to reach native-like pronunciation for learners. Music activities can provide easier pronunciation learning because they "bridge the [brain's] hemispheres, strengthening retention due to complementary functions as the right hemisphere learns the melody, the left, and the words" (cited in Fonseca-Mora, Toscano-Fuentes, and Wermke, 2011, p.104). Regarding these facts, Dege and Schwarzer (2011) also mentioned that the early developing brain treats language as if it is music.

### 6.2. Limitations of the Study

The main limitation is that the study was conducted with 51 sophomore students at a state university. That is why the results of this study are valid only for this institution and for this context.

The second limitation was that the study employed a one-shot measurement design.

Finally, although multiple raters were used for the judgments of pronunciation performance, the ratings were still subjective.

### 6.3. Pedagogical Implications

The current research and the results obtained through two-fold have some implications. As assumed, pronunciation is one of the most significant components of learning a second or foreign language. It contributes to intelligibility and comprehensibility in communication. Intelligibility has several components; however, pronunciation plays an essential role for both the listener and the speaker during conversations. Musical aptitude, which fixes after nine, should be taken into consideration because the findings demonstrated that it explains 14% of the attainment in pronunciation. To contribute to the mutual relationship between musical aptitude and pronunciation skill, musical exercises may be beneficial if it starts from birth with lullabies because Turkish learners may have some troubles in producing English sounds due to different prosodic features between the Turkish and English languages.

Moreover, some studies (Pei et al., 2016) emphasized the useful effects of music training on learning segmental and suprasegmental features. Playing an instrument or listening to music may also contribute to better retention which should be borne in mind. The results of a study administered by Craig and Pitronaci (2014) who advise music clubs as an economical and effective way of teaching pronunciation for language teachers indicated that music not only builds up fulfillment in language learning, but it also meets socio-cultural needs and perceptions of language in terms of fluency and articulation. They also stated that music is employed as a free time activity for entertainment in language classes, but it is more than this. It not only brings authentic voice with different dialects but also introduces the target culture. Besides, listening to or singing a song provides a great

body of vocabulary and it also helps remember rhythm or stress easily. If sounds are the body of a language, then suprasegmentals are its branches and FL learners with musical ability have an extra opportunity (Zybert & Stepień, 2009). Regarding music and its relation with language, singing can be profited in FL classrooms because some studies (Peynircioglu, Durgunoglu & Kusefoglu, 2002) showed that individuals with a sensitive ear are in better identifying and controlling linguistic sounds. Peretz and Zatorre (2005) also implied that the brain of a person who deals with musical training is more enhanced anatomically and functionally than the brain of an untrained person**.** Milovanov and Tervaniemi (2011) also implied the benefits of music and added "Neurofunctional accounts of music listening indicate the contribution of a network consisting of fronto-temporal and temporal areas in both the right and left hemispheres". Namely, these findings confirm that enhancement in one domain can be an advantage to improve other related domains. Especially, simple music practice in chilhood facilitates learning FL pronunciation and this fact reminds us the importance of the age of onset in language learning process.

AMMA and other musical aptitude tests mentioned in the previous chapter are practical and not time-consuming to apply in FL/SL classrooms. Thus, separating students with low and high musical aptitude and integrating music program/activities into the pronunciation teaching process, especially before puberty, to strengthen weaknesses can be another implication of this study.

Finally, pronunciation exercises on course books should be included according to young learners' needs and interests, and these exercises should be designed by taking music activities into account. They should be beyond "listen and repeat" exercises.

### 6.4. Suggestions for Further Studies

The major goal of the current study was to contribute to the relationship between musical aptitude and FL pronunciation performance. To generalize the results, the study should be replicated with a different number of participants from different cultures at different levels because the effects of the linguistic characteristics of mother language on pronunciation still need more investigation. Moreover, longitudinal research could have yielded more valid and reliable findings. The effect of music and musical aptitude should also be investigated in breadth and depth with other skills in language learning,

such as reading, speaking, and listening efficacy, motivation in learning a new foreign language, and communication skills.

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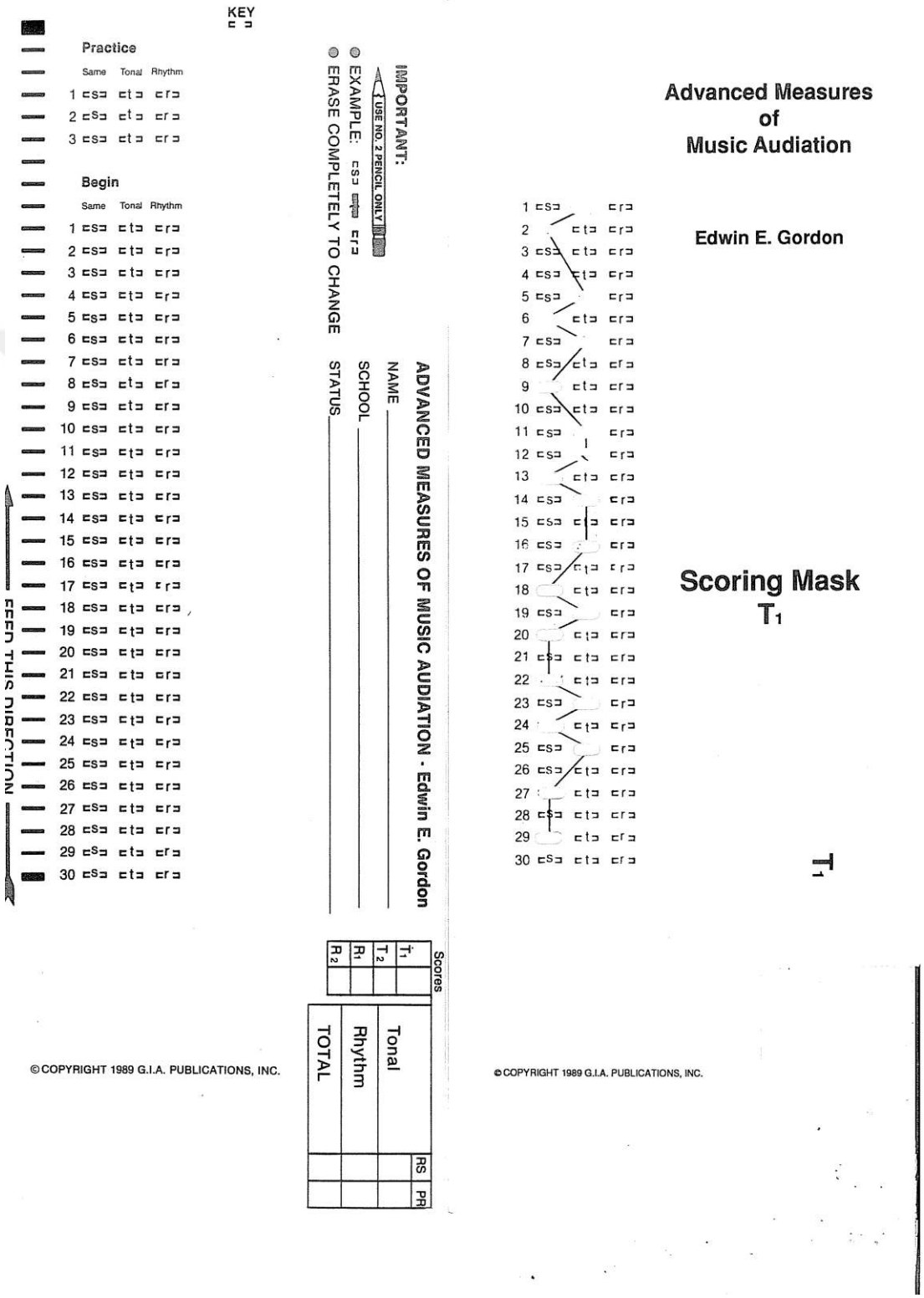
# APPENDICES

## APPENDIX I: AN ANSWER SHEET AND A SCORING MASK FOR AMMA



**APPENDIX II: AMMA RAW SCORES AND PERCENTILE RANK NORMS**

| Total Raw Score | College CNMM P.Norms |
|---|---|
| 80 | |
| 79 | 99 |
| 78 | 98 |
| 77 | 97 |
| 76 | 96 |
| 75 | 95 |
| 74 | 94 |
| 73 | 93 |
| 72 | 92 |
| 71 | 91 |
| 70 | 90 |
| 69 | 89 |
| 68 | 88 |
| 67 | 87 |
| 66 | 86 |
| 65 | 84 |
| 64 | 82 |
| 63 | 80 |
| 62 | 78 |
| 61 | 76 |
| 60 | 74 |
| 59 | 72 |
| 58 | 70 |
| 57 | 68 |
| 56 | 65 |
| 55 | 62 |
| 54 | 59 |
| 53 | 56 |
| 52 | 53 |
| 51 | 50 |
| 50 | 47 |
| 49 | 44 |
| 48 | 41 |
| 47 | 38 |
| 46 | 35 |
| 45 | 32 |
| 44 | 29 |
| 43 | 26 |
| 42 | 23 |
| 41 | 20 |
| 40 | 18 |
| 39 | 16 |
| 38 | 14 |
| 37 | 12 |
| 36 | 10 |
| 35 | 8 |
| 34 | 7 |
| 33 | 6 |
| 32 | 5 |
| 31 | 4 |
| 30 | 3 |
| 29 | 2 |
| 28 | 1 |

## APPENDIX III: TESOL SPEAKING RUBRIC

| TESOL RUBRIC | Elementary (1 p.) | Pre-intermediate (2.p) | Intermediate (3 p.) | Upper intermediate (4 p.) | Advanced (5 p.) |
|---|---|---|---|---|---|
| **PRONUNCIATION** | -Pronounces very familiar words with constant errors<br><br>-Non-stop hesitations and long pauses<br><br>-Robotic speech | Pronunciation mostly understandable but limited control of stress & rhythm.<br><br>-Robotic speech.<br><br>-Constant hesitations, repetition and constant pauses. | -Some pronunciation errors with problematic sounds.<br><br>-Some use of robotic speech.<br><br>-Hesitates and repeats Many pauses | -Intonation, word stress & individual sounds clear with occasional pronunciation errors or slips.<br><br>-Some pauses to find word or think about what to say.<br>-Occasional repetition | -Rare slip-ups with pronunciation.<br><br>-Few pauses mostly to consider what to say.<br><br>-Few hesitations |

TESOL Speaking Rubric https://tesolau.com/course-resources/tesol-rubric-speaking.pdf

# APPENDIX IV: PERMISSION FORM

Evrak Tarih ve Sayısı: 12/02/2019-9553

T.C.
GAZİANTEP ÜNİVERSİTESİ
Gaziantep Eğitim Fakültesi

Sayı :73628654/302.08.01/
Konu :Bilimsel ve Eğitim Amaçlı/Çalışma İzni

**EĞİTİM BİLİMLERİ ENSTİTÜSÜ MÜDÜRLÜĞÜNE**

İlgi :30.01.2019 tarih ve 6637 sayılı yazınız.

Enstitünüz Yabancı Diller Eğitimi Anabilim Dalı yüksek lisans öğrencilerinden Sultan BAŞARAN'ın "Müzikal Eğitimin Yabancı Dil Telaffuz Becerisine Etkisi" adlı tezinde kullanmak üzere, Fakültemiz Yabancı Diller Eğitimi Bölümü İngilizce Öğretmenliği Lisans Programı öğrencileri ile çalışma yapması talebiniz uygun görülmüştür.

Bilgilerinizi ve gereğini rica ederim.

Prof.Dr. Mehmet Fatih ÖZMANTAR
Gaziantep Eğitim Fakültesi Dekanı

Evrakı Doğrulamak İçin : https://ebys.gantep.edu.tr/enVision/Dogrula/8V4945T
Gaziantep Üniversitesi Gaziantep Eğitim Fakültesi Ayrıntılı bilgi için irtibat: Bulut KEKEN
Tel: 0 (342) 360 43 72 Faks: 0 (342) 317 27 79
E-Posta: : Elektronik ağ:www.gantep.edu.tr
egtfakdek@gantep.edu.tr

# CURRICULUM VITAE

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Sultan BAŞARAN was born in İstanbul in 1986. She graduated from the English Language and Literature department at Gaziantep University. She has been working as a teacher of English for eight years in the Ministry of National Education. She took part in an Erasmus+ project in 2019. She completed the TESOL certificate program of Arizona State University in 2019.

# ÖZGEÇMİŞ

Sultan BAŞARAN 1986 yılında İstanbul' da doğdu. Gaziantep Üniversitesi İngiliz Dili ve Edebiyatı bölümünden mezun oldu. Milli Eğitim Bakanlığında 8 yıldır İngilizce öğretmeni olarak çalışmaktadır. 2019 yılında bir Erasmus+ projesinde yer aldı. 2019 yılında Arizona Devlet Üniversitesi'nin TESOL sertifika programını tamamladı.