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List of abbreviations

CEFR	Common European Framework for Reference for Languages
FL	Foreign language
K-S test	Kolmogorov-Smirnov test
L1	First language
L2	Second language
M-W-U test	Mann-Whitney-U test
N	Sample size
NLS	New Literacy Studies
P	p-value
PRI	Perceptual Reasoning Index
PROMS	The Profile of Music Perception Skills
PSI	Processing Speed Index
r	Spearman's rank correlation coefficient
R^2	Coefficient of determination in a multiple regression model
SA	Study Abroad
SD	Standard Deviation
SEM	Structural Equation Model
SPM	Standard Progressive Matrices
SPSS	Statistical Package for Social Sciences
SSIMHP	Song Stuck In My Head Phenomenon
VCI	Verbal Comprehension Index
VSPT	Vocabulary Size Placement Test
WAIS	Wechsler Adult Intelligence Test
WIST	Word Identification Strategy Training
WM	Working memory
WMI	Working Memory Index

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1. Introduction

Reading is recognized as one of the crucial skills necessary for successful development (Jenkins & O'Connor 2002: 1). Further, Jenkins and O'Connor (2002: 1) report on the following important objectives of reading, such as "building knowledge, acquiring information for accomplishing tasks and feeding our interests". Reading skills have been argued to be one of the most important skills for academic purposes like "learning new information and gaining access to alternative explanations and interpretations" (Grabe & Stoller 2001: 86). Additionally, Grabe and Stoller (2001: 86) point out the significance of reading abilities for synthesis and critical analysis skills. In fact, reading has been reported to bring a positive effect on second language acquisition in general (Walter 2007: 14). On the other hand, it has been observed that foreign language learners studying their first years of the tertiary level experience difficulties in FL reading, which leads to poor reading comprehension skills and low language proficiency on the whole (Gorsuch & Taguchi 2008: 254). Taking into consideration these aspects, learning how to improve reading acquisition in a foreign language becomes an important task in our society.

The increasing body of research has investigated music and rhythm as a powerful aid to foreign language learning and reading, in particular (Fonseca-Mora 2000; Anvari et al. 2002; Degé, Kubicek & Schwarzer 2015). The relation between music and language has been supported by numerous studies that bring different fields into the picture, such as applied linguistics, neurolinguistics and musicology (Besson & Schön 2001). Musical training does not only have a positive influence on reading-related abilities, but also it might enhance the cognitive skills, like general intelligence, working memory and retention (Gordon, Fehd & McCandliss 2015:2). Further, music seems to lower a language anxiety level, build community spirit and bridge the informal gap between the teacher and the student (Engh 2013: 115). Moreover, music has the power to engage all emotions, bring relaxation and motivation towards second language learning (Abbott 2002: 10). Therefore, musical activities seem to support improvements in different areas that are not related directly to musical talent.

Despite a considerably large research on the influence of music on foreign language acquisition, little is known about its influence on reading for adult foreign language learners. In fact, the potential role of music aptitude as a predictor of FL reading performance has not been fully investigated. Furthermore, my interest in inspecting the musical approach on FL reading was intensified as I recalled my positive personal experience in participating in musical activities during the foreign language course.

This study aims to obtain knowledge about the potential role of musical skills in FL reading learning. More precisely, it seeks to determine whether individual differences of learners such as general intelligence and working memory contribute to the relation between music and reading in a foreign language. Along with that, this thesis intends to investigate the process of the crosslinguistic transfer of reading skills between L1 and FL. Further, the present thesis calls for outlining the reasons for using musical stimulation as an alternative teaching approach in the foreign language classroom. With this in mind, I believe that inspecting influence of music aptitude on the reading abilities in a foreign language will bring new valuable insights into the field of foreign language acquisition.

For this purpose, a sample of thirty-eight undergraduates with German as a first language (L1) and Spanish as a foreign language (FL) was selected. The difference between second language and foreign language should be considered due to the setting of the study, namely German-speaking students learning Spanish as a foreign language rather than using a second language widely within the speech community. Further, students' music aptitude, FL reading, word-decoding skills in L1 and FL, working memory and general intelligence were tested. As a theoretical framework, a meta-analysis by Fonseca-Mora and Gómez-Domínguez (2015) was applied, which identified the variables investigated in the relation between music and reading abilities. For data analysis, it was, on the one hand the study by Anvari et al. (2002) but also the study by Strait, Hornickel and Kraus (2011) that served as a guideline. However, in contrast to my research interest, the above-mentioned authors investigated L1 reading abilities in pre-reading and elementary school children. Nevertheless, these studies questioned similarly whether musical skills could explain the reading abilities, and both works supplied valuable recommendations on the interpretation of results. In other words, the present study is greatly driven by studies of Anvari et al. (2002) and Strait, Hornikel and Kraus (2011) that play a great role in interpreting the results. The statistical software SPSS was applied for processing the data.

Having specified that, I will briefly summarize that I intend to conduct a quantitative research on the role of music aptitude in foreign language reading proficiency taking into account the factors of working memory and general intelligence. It aims to provide deeper insights into the existing body of theories and models of the relation between music and FL reading ability. Additionally, the present study is hoped to present useful findings for the further teaching implications based on the powerful potential of music.

In order to examine these questions, the thesis first presents an overview of the theoretical background on reading in a foreign language as well as the relation between music, language

and reading, specifically. Then, the sample along with the methodology applied for research will be reviewed. Lastly, the findings of the study with the following discussion will be provided. The final conclusions will summarize achievements and limitations of the thesis and offer possible teaching implications for enhancing FL reading proficiency by means of musical activities.

2. Reading in a second/foreign language

Urquhart and Weir (2002: 22) define L2 reading briefly as "the process of receiving and interpreting information encoded in language form via the medium of print". However, Grabe and Stoller (2011: 3) view this definition insufficient and refer to the complexity of the process of L2 reading acquisition that needs to be captured with regard to the purposes and different mechanisms involved into L2 reading. The authors (Grabe & Stoller 2011: 6) point out six major academic purposes for reading, such as search for information, comprehending, learning, synthesis of information, analysis of information and general comprehension. In addition to this, Grabe (2009: 14-16) describes L2 reading process as *rapid*, *efficient*, *comprehending*, *interactive*, *strategic*, *flexible*, *purposeful*, *evaluative*, *learning*, and *linguistic*.

In exploring reading development across different languages, a great deal of research has been conducted in a close relation to L1 reading acquisition. According to Jolly (1978, quoted in Alderson 1984: 2), "success in reading in a foreign language depends crucially upon one's first-language reading ability". Further, Goodman (1973, quoted in Alderson 1984: 3) introduces a *reading universals hypothesis*, which suggests that "the reading process will be much the same for all languages". Moreover, it hypothesizes that all readers of different languages employ a common set of cognitive processes as follows (Alderson 1984: 3):

(1) fulfil phonological processing while reading,
(2) use syntactic information to establish text meaning,
(3) set goals and employ reading strategies,
(4) use metacognitive knowledge,
(5) engage a working memory, and
(6) carry out a pattern identification.

Describing the universality of a reading process, the linguists often refer to *the transference of old skills* from L1 to L2 reading (Alderson 1984:2). Detterman (1993: 4) defines *transfer* from a cognitive psychology viewpoint as "the degree to which a behaviour will be repeated in a

new situation". That is, as Clarke (1979, quoted in Alderson 1984: 3) adds, good native language readers would be assumed to be good foreign language readers. However, the critics of the reading universals hypothesis argue that there are specific differences across languages that cannot be neglected and, in fact, may affect L2 reading acquisition (Koda 2007; Bernhardt 1991; Grabe 2009). In particular, Koda (2007: 17) describes L1 transfer into L2 as "the ability to learn new skills by drawing on previously acquired resources". Thus, she (Koda 2007:1) emphasizes that L2 reading is not simply a transfer of L1 reading abilities, but a more elaborate "dual-language processing":

> Unlike first language reading, second language reading involves two languages. The dual-language involvement implies continual interactions between the two languages as well as incessant adjustments in accommodating the disparate demands each language imposes. For this reason, L2 reading is crosslinguistic and, thus, inherently more complex than L1 reading.

Grabe and Stoller (2011: 34) indicate the following main discrepancies between L1 and L2 reading acquisition: *linguistic* and *processing* differences; *individual* and *experimental* differences; *socio-cultural* and *institutional* differences. Similarly, Bernhardt (1991, quoted in Urquhart & Weir 2002: 33) disagrees to approach L2 readers as a generalized group and lists the key differences that should be taken into consideration:

(1) L1 literacy,
(2) experience of previously acquired languages,
(3) the linguistic distance between L1 and L2
(4) cultural relations between L1 and L2, and
(5) orthography of L1 and L2.

With regards to the linguistic differences across the languages, Odlin (1989, quoted in Wu 2016: 44) suggests that language distance might affect the transfer of reading skills between L1 and L2. In fact, the author (Odlin 1989, quoted in Wu 2016:44) emphasizes that the more striking the difference between target and first languages, the more complicated the transfer is to be expected, especially at the lower word-identification level. And conversely, Bialystok (2001: 179) observes that transfer of the reading skills from L1 to L2 may be facilitated depending on the relatedness between two languages. That is, the similarity between L1 and L2 orthographic systems might assist in a faster and more accurate word-identification process (Koda 2005, quoted in Grabe 2009: 125). In the same fashion, Grabe (2009: 109) recognizes the influence of *linguistic distance*, when different languages "vary in their phonological, orthographic, morphological, syntactic, and semantic systems". The author (Grabe 2009: 109) points out that analysis of the reading acquisition pattern in different L1 helps to trace

"universals of reading development" and, as a result, gives a perspective about possible difficulties in L2 reading and approaches to solve them.

A linguistic distance affects greatly L1 and L2 orthographies that serve as a basis for further visual decoding in phonological and morphological systems (Grabe 2009: 114). Several linguists intended to investigate whether L1 orthography might affect the outcomes of word-recognition process in a second language referring to the *Orthographic Depth Hypothesis* (Perfetti & Dunlap 2008). They (Perfetti & Dunlap 2008: 18) explain the influence of orthography on L2 reading pointing out that:

> the more shallow or transparent the orthography – that is, the more reliable the correspondences between graphemes and speech segments – the more the reader uses a print-to-sound decoding strategy; the deeper or less transparent the orthography, the more the reader uses a direct look-up the word, without grapheme-speech decoding.

Ellis et al. (2004: 441) state that learning to read orthographically transparent languages such as the target languages of the present study, is easier than the languages with opaque orthography, such as Chinese or Hebrew. It is explained that the readers of the transparent languages are more likely to apply the alphabetic reading strategies successfully (Ellis et al. 2004: 441). Further, Koda and Reddy (2008, quoted in Grabe & Stoller 2011: 42) add that the orthography of the students' L1 might likewise influence L2 reading acquisition process among advanced L2 readers.

Clear distinctions in vocabulary and grammar of specific language systems as well as the reading strategies might reveal different patterns of L2 reading development. In fact, Grabe and Stoller (2011: 37) point out that L2 readers compared to L1 readers need more time and accurate instructions to develop their letter-sound correspondences, that is to be able to connect a "newly sounded-out word" with its mental representation. Further, L2 readers need to develop their grammar and discourse knowledge to perform better in reading comprehension (Grabe & Stoller 2011: 38). For example, often L2 students might have a large size of vocabulary knowledge, but they cannot follow the structure or arguments used in the text, which results in poor reading performance (Grabe & Stoller 2011: 37). Thus, a direct L2 instruction can promote the development of metalinguistic awareness of the reader, i.e. knowledge required for a strategic reading and text comprehension (Grabe & Stoller 2011: 28).

According to Yorio (1971, quoted in Alderson 1984: 3), differences in L1 and L2 proficiency may influence a reading process significantly. This is explained by the *Language Threshold Hypothesis*, which suggests that "L2 readers need to have enough L2 knowledge (i.e., vocabulary and structure) so that L1 reading strategies and skills can be used efficiently

to help comprehend the L2 text" (Clarke 1979, quoted in Grabe and Stoller 2011: 43). In fact, several linguists reveal in their findings that better L2 knowledge can be a better basis for successful L2 reading than L1 reading skills (Pichette, Segalowitz & Connors 2003, quoted in Grabe & Stoller 2011: 43).

Several linguists discuss a crosslinguistic interplay between L1 and L2 reading that involves not only linguistic, but also non-linguistic factors (Muljani, Koda & Moates 1998: 100). Specifically, these factors concern individual and experiential differences in L1 and L2 reading development (Grabe & Stoller 2011: 48). The authors (Grabe & Stoller 2011: 48) suggest the following individual differences in reading, namely level of L1 reading abilities, motivation for L2 reading, time input for practice in L2 reading, types of L2 text and language resources needed for L2 readers.

While in L2 reading instruction the aspect of motivation and attitude is often ignored, in L1 reading the teachers recognize its importance and influence on academic success (Schunk & Zimmerman 2006, quoted in Grabe & Stoller 2011: 49). Next, they (Grabe & Stoller 2011: 50) suggest that L1 readers seem to have more time allocated for reading learning. Given that development of automaticity and fluency is crucial in reading, many L2 readers do not have enough exposure to advance in their reading development (Koda 2005, quoted in Grabe and Stoller 2011: 50). Further, the level of difficulty of the texts can be approached differently by L1 and L2 learners which leads to different "reading experiences" between language learners (Grabe & Stoller 2011: 50). The sources that L2 readers use for a learning process, for instance, bilingual dictionaries, show a clear distinction between them and L1 readers, who do not require those materials (Grabe & Stoller 2011: 51).

Recently, many linguists have intended to investigate L2 reading from the contextual perspective and how it differs from L1 context (Wagner & Ridgewell 2009; Haeri 2009; Rueda, Velasco & Lim 2008). Several major distinctions were identified between L1 and L2 reading contexts, namely: interpersonal relations with the reader, amount of a new information given in the text and maintenance of the reader's comprehension by means of explanations (Grabe & Stoller 2011: 54). Another discrepancy between L1 and L2 reading relates to the attitudes and resources concentrated in L1 and L2 educational settings (Grabe & Stoller 2011: 54). That is, the previous experiences of L2 students acquired in their native country can be sharply different from the educational settings abroad. Relating this aspect, Dewey (2004, quoted in Wu 2016: 47) emphasizes that reading acquisition in study abroad (SA) context "may have unique advantages over at-home academic-year classroom learning". Further, the author (Dewey 2004, quoted in Wu 2016: 48) specifies the positive outcomes for reading comprehension in

SA settings such as improved word-recognition processes, as well as the development of a deeper background knowledge.

2.1. Difficulties in L2/FL reading

Reading is often seen as "a fundamental skill upon which all formal education depends" (Moats 1999: 5). Thus, failure of L2 students to cope with the reading tasks can have a detrimental effect on their academic perspectives, as well as self-esteem, confidence and motivation (Westwood 2008: 2). In addition, Organisation for Economic Cooperation and Development (2008, quoted in Westwood 2008: 2) declares that an individual's literacy level is correlated with his/her "quality of life, employability and earning capacity". Consequently, there is an increasing need in identifying the reading difficulties in foreign language learning. It should be noted that the reading difficulties reviewed in this section should be distinguished from the literacy problems connected with impairments.

Ziegler and Goswami (2005: 3) analyse the problems that the beginning readers are faced with, such as "availability, consistency and granularity of spelling-to-sound mappings". These aspects are related to the learning process of mapping between symbol and sound defined as a *phonological recoding* (Ziegler and Goswami 2005: 3). Having investigated phonological awareness across the languages, the authors (Ziegler and Goswami 2005: 4) establish it as a determinant of reading and spelling acquisition despite differences in phonological systems of the languages studied. They (Ziegler & Goswami 2005: 3) refer to the command of phonological recoding as "the first steps in becoming literate". The availability problem concerns the fact that not all phonological units are explicitly accessible prior to reading, which requires a further cognitive development (Ziegler & Goswami 2005: 3). The consistency problem implies that some orthographic elements have multiple pronunciations and some phonological units have multiple spellings, which can cause a slower reading development (Ziegler & Goswami 2005: 3). Lastly, the beginning readers can encounter a granularity problem that considers that there are "many more orthographic units to learn when access to the phonological system is based on bigger grain sizes as opposed to smaller grain sizes" (Ziegler and Goswami 2005: 3). The authors (Ziegler & Goswami 2005: 3) point out that acquisition of reading proficiency depends on solving these three problems.

Westwood (2008: 4) classifies the possible reasons of L2 reading difficulties into two following groups: factors intrinsic to readers and outside influences. With respect to the outside

factors, one of the most powerful reason of poor reading skills is considered an incorrect teaching instruction (Westwood 2008: 4). The author (Westwood 2008: 4) emphasizes that learners require an explicit teaching of phonic knowledge in order to be able to decode and spell the unknown words correctly. The International Reading Association (2010: 1-5) points out the following key standards for a qualified reading teacher: solid knowledge about reading development, instructional strategies and curriculum planning, analysis and evaluation of students' performance, and managing a literate environment. Thus, these requirements aim to provide a teacher's effectiveness in developing successful reader's competencies.

Further, Biancrosa and Snow (2006: 14) suggest an insufficient amount of time exposed to reading practice as a potential threat to L2 reading development. Another external factor of poor reading skills might be an inadequate language learning environment, where students lack vocabulary and syntactic knowledge necessary to process reading material (Westwood 2008: 6). Similar to Ziegler and Goswami, Westwood (2008: 6) refers to undeveloped phonological skills as one of the major obstacles in reading proficiency.

Concerning intrinsic factors that might complicate the acquisition of reading skills, Westwood (2008: 7) considers poor general intelligence, deficient working memory, visual or auditory skills and lack of learner's motivation or concentration. Birch (2015: 191) views differences in cognitive abilities among readers as the potential reason of difficulties in L1 reading and speech disorders, whereas L2 readers might encounter pronunciation complications, such as accents on account of "non-native motor commands or movements of the mouth", which should not be confused with the disabilities.

As Grabe and Stoller (2011: 20) report, reading difficulties in both L1 and L2 may be caused by inefficient functioning in lower-level and higher-level processing. For instance, Grabe and Stoller (2011: 24) warn that employing word-for-word translation strategies on a regular basis will result in a poor comprehension and the students "would lose motivation to become fluent readers". Therefore, it is important to expose readers to the texts that correspond to their abilities (Grabe & Stoller 2011: 24).

In order to implement relevant method for overcoming reading difficulties, two levels of reading should be considered, namely word and text levels (Westwood 2008: 14). In that sense, focus only on these levels of reading development supports the idea of *the simple view of reading* (Hoover & Gough 1990, quoted in Westwood 2008: 14). It contrasts with the views of *New Literacy Studies* (NLS), where cultural and socio-linguistic factors are seen as more important than the cognitive abilities in reading acquisition (Brandt & Clinton 2002, quoted in Westwood 2008: 14). With respect to the difficulties at word level, L2 learners usually fail to

use the most common methods for word identification, which are as follows (Westwood 2008: 16):

(1) automatic recall, i.e. substracting the word from memory,
(2) use the phonic knowledge, i.e. connection between the letters and their corresponding phonemes,
(3) identification of orthographic elements within the word,
(4) use the analogy, i.e. association of familiar words with uncertain ones, and
(5) use the context.

Consequently, poor readers may apply letter-by-letter phonic decoding that "makes the decoding process slow and inaccurate, overloading their working memory and impairing comprehension (Westwood 2008: 18). Thus, better reading comprehension requires an automatic word recognition, which assumes a shift from phonic decoding to identification of words promptly by sight (Prior 1996, quoted in Westwood 2008: 26). As a solution, an advanced program *Word Identification Strategy Training* (WIST) introduced by Lovett et al. (2000, quoted in Westwood 2008: 27) helps students to develop their word recognition strategies in a self-check mode.

Word-recognition skills can serve as a strong foundation for the next level of L2 reading development, that is text comprehension. Characteristics of an effective text interpretation involve a combination of word-identification abilities, ability to connect new information to a background knowledge and employment of appropriate reading strategies (Westwood 2008: 31). Several linguists describe a list of characteristics of L2 reader with poor comprehension skills. For instance, Ricketts et al. (2008, quoted in Westwood 2008: 33) report that poor readers seem to be incapable of following the ideas while reading and do not "monitor their level of understanding". In a similar vein, Cragg and Nation (2006, quoted in Westwood 2008: 33) observe that weak readers do not pay attention to details and facts and lack of critical analysis of information. Clarke (2013: 25) suggests that the specific areas of L2 reading acquisition where difficulties in text comprehension might possibly occur, such as vocabulary, oral expression of thoughts, figurative language (i.e. comprehending only a literal meaning), grammar, comprehension check and motivation.

2.2. Strategies in L2/FL reading

Cohen (2011: 7) defines the language learner strategies as "thoughts and actions, consciously chosen and operationalized by language learners, to assist them in carrying out a multiplicity

of tasks from the very onset of learning to the most advanced levels of target-language performance". Similarly, Scarcella and Oxford (1992: 63) emphasize a role of learner's strategies as an active tool for the improvement of language performance and describe them as the "specific actions, behaviours, steps, techniques [or thoughts] – such as seeking out conversation partners, or giving oneself encouragement to tackle a difficult language task – used by students to enhance their own learning". To give more credits to the concept of the language strategies, some linguists describe the ability to employ the learning strategies as an attribute of the "good language learner" (Rubin 1975, quoted in Chamot 2004: 14). However, several linguists argue that being aware of the learner's strategies is not enough for enhancing performance in a second language. For instance, Cohen (2003: 275) differentiates between *L2 learning strategies* and *L2 use strategies*, where use strategies are defined as the "conscious techniques employed after L2 learning has occurred". Along the same line, Anderson (1991: 468) believes that "strategic reading is not only a matter of knowing what strategy to use, but also the reader must know how to use a strategy successfully and orchestrate its use with other strategies. It is not sufficient to know about strategies; a reader must also be able to apply them strategically".

In contrast to the area of general second language learning, where the learning strategies have been greatly investigated, planning of learning strategies in L2 reading has been disregarded. In respect to the cognitive basis of reading tasks, reading strategies have been viewed as "any set of operations, steps, plans, routines used by the learners to facilitate the obtaining, storage, retrieval, and use of information" (Wenden & Rubin 1987: 19). Anderson (1991: 460) describes the reading strategies in a similar fashion as the "deliberate, cognitive steps that learners can take to assist in acquiring, storing and retrieving new information". Overall, a concept of reading strategies involves the following core characteristics, namely conscious, problem-solving and reader-initiated (Koda 2005: 212). Therefore, the readers who lack awareness of the reading strategies might experience some difficulties in understanding the required text (Koda 2005: 212).

Further, Macaro (2001: 73) emphasizes on the important role of metacognition in reading strategies, when the readers employ different techniques consciously aimed to comprehend the text. As Hammadou (1991: 27) illustrates, a successful reading comprehension implies not only understanding of particular words and sentences, but it also requires an integration of the readers' prior knowledge, language skills and their metacognitive strategies. By activating the metacognitive processes, the reader "carefully considers thoughts in problem-solving situations through the strategies of self-panning, self-monitoring, self-regulating, self-questioning, and

self-reflecting" (Hyde & Bizar 1989: 51). Further, Grabe and Stoller (2011: 38) suggest that metalinguistic knowledge is required for a successful transfer of L1 reading strategies. Therefore, L2 reading learning might be less laborious if the learner is already able to draw the strategies from L1 (Pinter 2011: 145).

At this point the research has identified a wide choice of L2 reading strategies, which were classified differently with regard to the author's perspective of a reading process. For instance, O'Malley and Chamot (1990: 44) introduce three linked types of reading strategies, such as cognitive (e.g., inferencing), metacognitive (e.g., comprehension check), social and affective (e.g., communicating with others during performing reading tasks). Another classification presented by Anderson (1991: 463) includes the following strategies: supervising (e.g., monitoring progress in comprehension), supporting (e.g., omitting uncertain words), paraphrasing (e.g., use of analogy), identifying text coherence (e.g., text-information processing), and test-taking (e.g., for a particular task on a test).

Different factors might influence strategy employment, such as age, gender, learning styles and level of the language proficiency (Geladari, Griva & Mastrothanasis 2010: 3765). For instance, Geladari, Griva and Mastrothanasis (2010: 3765) claim that less competent second language learners use a limited number of strategies focusing on decoding the single words rather than controlling the comprehension of the whole text. By contrast, the language learners with a higher language proficiency seem to show a high metacognitive awareness of the reading strategies and are able to apply them in accordance with the purpose of reading (Geladari, Griva & Mastrothanasis 2010: 3765).

Several studies have investigated the use of reading strategies in foreign language classrooms. For example, Geladari, Griva and Mastrothanasis (2010) examined the employment of reading strategies by thirty-two bilingual fifth and sixth grade students with Greek as a second language. To gain insight into the reading process and reading strategies used, the learners were tested by using basic *think-aloud reports* (i.e. involving student in thinking aloud while performing the specific task) and *retrospective interviews* (post-test interviews). The analysis of the data revealed a large number of reading strategies applied, for example, scanning, skipping the difficult parts, activating prior knowledge. The findings of the study indicated that more successful readers demonstrated better strategic knowledge, employing cognitive and metacognitive strategies. On the contrary, the less successful readers showed limited knowledge of the purposeful reading. Although being able to identify the problem zones in reading comprehension, the readers could not activate their prior knowledge

to solve it. The authors (Geladari, Griva & Mastrothanasis 2011) suggested to promote the linguistic development of L2 students through practicing the use of learning strategies.

Park and Kim (2011) investigated the reading strategies used by L2 university learners in online reading. As both teachers and students use electronic texts actively as a learning resource, the authors (Park & Kim 2011) aimed to reveal what reading strategies L2 learners used for online text comprehension in a course of a qualitative study. Before completing the online reading tasks, the participants undergone the training sessions, where they became familiar with the format of online assignments and practised thinking aloud. The findings indicated several reading strategies particular for online format, such as using hypermedia and using computer applications (Park & Kim 2011). Other strategies, which participants used to accomplish online reading tasks might be used in paper-based readings as well, for instance dialoguing, setting up reading purposes and planning, previewing and determining what to read, connecting prior knowledge and experiences with texts and tasks, and inferring. The above presented strategies require a considerate metacognitive and cognitive knowledge in order to complete the tasks with a high efficiency.

2.3. Individual differences in L2/FL reading

Individual differences have always been an important aspect for developing successful reading skills. This information might be particularly crucial for foreign language teachers as they "need to know what factors complicate the acquisition of the knowledge and processing strategies for effective reading" (Birch 2015: 11), or, to put it simply, what factors promote productive acquisition of reading skills and might be used for further instructions of FL reading.

The linguists have outlined various factors, which can influence the acquisition of foreign language literacy skills, such as age, gender, motivation, aptitude, L1 reading skills, teaching methods for reading (Grabe & Stoller 2011; Koda 2005; Ellis 2008). McKay (2006: 219) views three central factors in development of L2 reading skills: L1 literacy, cultural and background knowledge, and oral language. As suggested by Cameron (2001: 134), reading skills in a first language might serve as a great asset for efficient acquisition of foreign language reading skills. Specifically, language knowledge, skills and strategies acquired in the first language can be transferred into the foreign language learning basis (Cameron 2001: 135). However, McKay (2006: 220) emphasizes that effect of reading skills transfer from L1 to FL can be positive providing that the learners have overcome their language threshold. Thus, as Cummins (1981:

8) observes, lack of competence in a first language might have a detrimental effect on the reading skills in a foreign language. Focusing on FL reading proficiency of adult learners, Alderson (2005a: 39, quoted in McKay 2006: 220) argues that "second language knowledge is more likely ultimately to predict success in second language reading than are first language reading abilities".

Another factor that predicts success in FL reading outlined by McKay (2006: 221) is the *learner's schemata*, in other words, background and cultural knowledge. The schemata theory implies that reading abilities, and specifically FL learners' reading comprehension is influenced by readers' cultural awareness (Liu 2015: 72). As Bensoussan (1998, quoted in Liu 2015: 72) observes, students comprehend better culturally familiar texts than the ones which are unknown to the reader's background knowledge. Similarly, Droop and Verhoeven (1998, quoted in Liu 2015: 72) agree that "cultural familiarity and prior knowledge both have substantial influence on reading comprehension". Moreover, background knowledge of the readers might be more influential for reading comprehension than the meaning of unknown words as the readers might understand the text by employing "culturally familiar references" (Liu 2015: 72).

Finally, oral L2 knowledge, i.e. vocabulary and grammar used for understanding the written text is greatly recognized as a determining component of L2 reading success (Saville-Troike & Barton 2017: 144). McKay (2006: 219) emphasizes the importance of oral language skills due to its relationship with the skills necessary for reading acquisition, such as phonological awareness, grammar and vocabulary competence.

Alderson (2005a: 32) distinguishes two categories of crucial factors necessary for FL reading proficiency, namely reader's characteristics and linguistic properties of the text. Reader variables include the following: the reader's knowledge, namely *formal schemata* (e.g., language conformities), *content schemata* (e.g., knowledge about the world), motivations to read the text, strategies to process text effectively, and stable (e.g., sex, age and personality) and physical characteristics (e.g., automaticity of word-recognition) (Alderson 2005a: 33). These categories are similar to the taxonomy presented by McKay (2006: 219) for the exception of an important inclusion of individual non-linguistic factors, such as motivation, personality.

The individual differences of the reader are believed to affect FL reading performance significantly. For instance, Saville-Troike and Barton (2017:187) suggest an extensive list of individual factors which might influence a level of FL learning skills. These individual differences include the following components: age, gender, cognitive style, aptitude,

motivation, learning styles, learning strategies and personality (Saville-Troike & Barton 2017: 187). Interestingly, a great number of linguists indicate reader's interest or motivation as one of the most important factors of reading development in a foreign language (Melekoglu 2011; Gambrell 2011; Sperling, Sherwood & Hood 2013). According to Alexander and Jetton's (2000: 298, quoted in Arabski & Wojtaszek 2011: 246) observations, interest in reading can be categorized into situational and individual types. For example, individual interest assumes a prior curiosity about the text topic, whereas situational interest concerns interest affected by the situational factors, such as text and task (Arabski & Wojtaszek 2011: 246). Likewise, motivation has been seen as a great influence in L2 reading. Dörnyei and Csizér (1998: 203) claim:

> L2 motivation is one of the most important factors that determine the rate and success of L2 attainment: it provides the primary impetus to initiate learning the L2 and later the driving force to sustain the long and often tedious learning process. Without sufficient motivation, even individuals with the most remarkable abilities cannot accomplish long-term goals, and neither are appropriate curricula and good teaching enough to ensure student achievement.

More particularly, Dörnyei and Skehan (2003: 614) argue that motivation is a key factor for "why people decide to do something, how long they are willing to sustain the activity, and how hard they are going to pursue it". Viewing motivation as a complex concept, including the factors regarding not only L2 learner, but also the ones related to the learning task and learning settings, Dörnyei and Ushioda (2009: 86) introduce a concept of "L2 motivational self-system". This term concerns "possible selves" in L2 motivation, which are: *ideal self* (i.e., learner's aspirations towards L2 proficiency), *ought-to self*, (i.e., social expectations and the desire to avoid possible negative consequences), and *L2 learning experience* (i.e., the learning environment) (Dörnyei and Ushioda 2009: 12). Saville-Troike and Barton (2017: 92) point out the following two types of motivation: *integrative* that involves emotional or affective components, such as interest in L2 community and *instrumental* that incorporates pragmatic aspects, like passing a foreign language exam or finding a well-paid job. Similarly, Alderson (2005a: 53) views intrinsic and extrinsic motivation, where the intrinsic interest of the reader is thought to be more beneficial to the reading outcome. With regards to this, Grabe and Stoller (2011: 122) emphasize that "intrinsic motivation, self-efficacy, and expectations for success predict both amount of reading and reading comprehension development". Moreover, motivation in a combination with other factors affects positively reading proficiency of L2 learner. As an illustration, Nikolov (1999: 34) describes motivation and positive attitudes as an important part of FL learning process.

Another individual factor important for FL reading learning is aptitude which consists of phonemic skills, inductive learning ability, grammatical sensitivity, and associative memory capacity (Carroll 1965, quoted in Saville-Troike & Barton 2017: 90). In fact, Alexiou (2009: 46) claims that aptitude tests might be applied for predicting literacy success.

Further, intelligence is believed to be a significant factor for achievements in foreign language learning, especially for gains in reading comprehension (Dörnyei & Ryan 2015: 40). They (Dörnyei & Ryan 2015: 36) view intelligence as a component of foreign language aptitude, determining it as "a general source of aptitude that is not limited to a specific performance area but is transferable to many sorts of performance". A great number of studies over the years have shown that IQ scores correlate strongly with reading tests (Ellis 2008: 497).

Apart from the individual difference listed above, working memory capacity is likewise believed to affect reading proficiency in a foreign language (Daneman & Carpenter 1980). For instance, Degé, Kubicek and Schwarzer (2015: 6) report on a strong association between working memory and with reading performance. Furthermore, Daneman and Carpenter (1980, quoted in Alloway et al. 2006: 66), state that working memory is important for storage and processing of a verbal information. Therefore, developing a larger working memory capacity can bring beneficial results for the reading acquisition.

Studies on the relatively stable reader factors such as age, gender, personality found some insignificant effect on FL reading performance. Regarding age and FL reading, some studies show that age influences reading proficiency only in combination with other factors, for instance use of reading strategies (Šamo 2009: 121). Concerning the influence of gender on reading, Bügel and Buunk (1996) found that female students performed better than male students in the foreign language reading task.

3. Music and language

As McMullen and Saffran (2004: 289) underline, unlike other domains of human expertise, both music and language can reach our emotive system and function according to either universal or culturally-specific patterns. Analysing human cognition and potential, Gardner (2011) identified seven types of multiple intelligences, which include linguistic and musical intelligences. By musical intelligence, Gardner & Hatch (1989, quoted in MacKeracher 2004: 116) mean an ability "to produce and appreciate rhythm, pitch and timber". Similarly, a description of a linguistic intelligence implies a "sensitivity to sounds, rhythms, and meanings

of words" (Gardner & Hatch 1989, quoted in MacKeracher 2004: 116). Gardner (2011, quoted in Fonseca-Mora, Toscano-Fuentes & Wermke 2011: 102) claims that both intelligences have a similar structure explaining it in the following way: "the first sounds that babies create is a crying, then they are able to imitate rhythm and melodic contours which occur before they are able to pronounce a single word". Chen-Hafteck (1997: 85) takes a similar stance, suggesting that "music and language are the two ways that humans communicate and express them through sound. Since birth, babies start to listen and produce sound without distinguishing between music and language, singing and speech". Brown (2001: 277) introduces a "musilanguage" theory based on a mutual evolutionary history as a potential reason of similarities between music and language:

> these similarities [of music and language] could have arisen due to occurrence of an ancestral stage that was neither linguistic nor musical but that embodied the shared features of modern-day music and language, such that evolutionary divergence led to the formation of two distinct and specialized functions with retention of the shared features conferred onto them by the joint precursor.

Similarly, Mithen (2006: 25) indicates that language and music are both "combinatorial systems", which consist of acoustic elements, such as words and tunes. Furthermore, even though music and grammar are thought to be different in nature, the author (Mithen 2006: 20) argues that music and grammar share similar structures, and, in fact, views Universal Grammar as the equivalent of the musical competence. Fitch (2005: 30) reports on other similarities that music and language share, namely in listening and speech production. More specifically, the linguist (Fitch 2005: 30) states that these language areas share some phonological (i.e., rhythm) and hierarchical phrase structures, which can be displayed in a written form.

As music and language are closely interconnected and have a great number of shared features, music might be a possible supporting aid to facilitate second language acquisition. For instance, Stansell (2005: 3) lists several common characteristics of music and language learning, namely "activities of melody recognition, contour processing, timbre discrimination, rhythm, tonality, predictions, body movement, tactile involvement, and sound, sight, and form of symbols are required both in music and language".

3.1. Concept of music aptitude

Music aptitude has been defined differently as "universal human attribute", the ability to acquire a high musical proficiency, or simply ability to enjoy music (Levitin & Tirolovas 2009, quoted in Vangehuchten, Verhoeven & Thys 2015: 90). According to Gordon's (1997: 25,

quoted in Pei et al. 2016: 19) definition, "musical aptitude is a measure of one's potential for music learning and the foundation of music achievement". Considering the characteristics of music aptitude, it can be determined as "the ability to understand and perceive rhythm, pitch, timbre, tone durations, and formal instruction in music" (Oikkonen et al. 2014: 1103). In fact, "aural discrimination" is considered a main component for identification of a musicality level in music aptitude tests (Chan 2007: 1605). In particular, Gordon (1989, quoted in Chan 2007: 1606) views "audiation" as a basic element of evaluation of musicality, which shapes the ability to understand music or deduce musical meaning in situations where "the sound is not physically present (as in recall), is no longer physically present (as in listening), or may never have been physically present (as in creativity and improvisation)".

In the present study, understanding of music aptitude will be in agreement with a definition of a "potential for learning music" prior to the formal music education (Shuter-Dyson 1999: 627, quoted in Law & Zentner 2012: 2).

Many researchers assert an important role of musical training for improving music aptitude level. For example, Ericsson, Krampe and Tesch-Römer (1993: 375) conclude that the intense musical practice can result in developing professional musical skills. However, Law and Zentner (2012: 1) argue that music aptitude should not be measured only by means of exposure to musical trainings. In fact, they (Law & Zentner 2012: 1) suggest that musical ability may be revealed at different periods among individuals. Moreover, musically untrained people might have stronger musical skills than the musically trained ones. The authors (Law & Zentner 2012: 1) describe the former ones as the *musical sleepers* due to their "existing but dormant" musical abilities. The latter group is often called *sleeping musicians* (Law & Zentner 2012: 1), who, in opposite, lack significant musical achievements despite substantive musical trainings. This aspect relates strongly to the distinction in meaning between music aptitude and musical training, where the individuals with the equal degree of the musical education might differ in their musical abilities (Law & Zentner 2012: 2).

Having reviewed the notion of the music aptitude, it is equally important to establish how the musical ability can be best measure for the purposes of the present study. As Law and Zentner (2012: 2) point out, the tasks for assessing musical ability can focus either on the "comprehension of a specific, culturally evolved musical system", or "the ease of processing of elementary patterns rhythm and sound that can be found across various musical systems and traditions". This study will focus on the evaluation of the music processing skills of the participants.

It should be noted that most of the studies on the music perception and language proficiency contrast the performance of individuals with and without musical training and not their music aptitude level. In the present study, the musical abilities of the participants will be defined based on the music aptitude test results, and not the self-reported musicianship.

3.2. Music and second/foreign language acquisition

Due to the parallels between music and language, a music support has been largely used as a learning tool to facilitate a process of foreign language acquisition. Listening to music is often a preferred way among young learners as well as adults to improve their language proficiency (Abbott 2002: 10). It is linked to the properties of music that not only motivates and engages learners, but, in fact, makes learning a memorable and pleasant experience (Abbott 2002: 10). Moreover, music reduces language anxiety, which occurs when FL learners do not understand or speak correctly in a desired language (Fonseca-Mora, Toscano-Fuentes & Wermke 2011: 104). These properties of music were used as a basis in *Suggestopedia*, a technique which aims to relax learners by using classical music for more effective learning process (Salcedo 2010: 20). Furthermore, music simulates brain and activates subconscious resources necessary for language acquisition and better retention of vocabulary and language structures (Abbott 2002: 10). As Guglielmino (1986: 20) claims, "songs bridge the [brain's] hemispheres strengthening retention due to complementary functions and as the right hemisphere learns the melody, the left, the words". Similarly, Borchgrevink (1982: 154) elaborates on the influence of music on learning process with regards to the brain structure:

> For the normal "right handed" person the left hemisphere controls speech perception, speech production, prosody (local dialect / stress / intonation), musical rhythm and the act of singing; whereas the right hemisphere controls pitch and tonality in singing (but not in speech!)...As musical rhythm and pitch / tonality are seen to be controlled by different cerebral hemispheres, singing and almost any musical performance implies extensive integration and cooperation between the hemispheres.

Another supporter of the link between music and language in the brain activities, Newham (1995-1996: 72) adds that "the primarily right hemisphere-oriented process of music-making can enhance the process of language acquisition and memory which place demands upon the left hemisphere". Anton (1990: 1170) concludes that "when a learning activity combines both left and right hemispheres simultaneously engaged in a particular activity, an ideal learning situation is established and the most productive learning occurs".

Krashen's (1982) theoretical framework continues to explain how music and songs, might be beneficial for second language learning. He (Krashen 1982, quoted in Saglam, Kayaoglu & Methews Aydinli 2010: 10) suggests that in language learning a clear input is important to achieve better performance, especially in case of beginning FL learners. That is, for a more efficient comprehension of information simple structures, short words and commonly used words are needed (Saglam, Kayaoglu & Methews Aydinli 2010: 10). Given that songs usually include a well-known and used vocabulary often in a form of short repetitive phrases, as a result, they might facilitate second language learning (Abbott 2002: 10). Moreover, music has been known as a useful way to remember things and increase retention due to rhyming in songs (Abbott 2002: 10). Thus, the songs might be advantageous in memorizing phrase structures as they often "stick in the learner's head" causing the *Song Stuck In My Head Phenomenon* (SSIMHP) introduced by Murphey (1990).

In line with this argument, many linguists recommend taking this phenomenon into consideration while teaching vocabulary. Brown (2006) claims that a repetitive nature of the songs helps the learner to remember new words. Abbott (2002: 10) agrees and adds that "songs presumably enhance and stimulate memory because dual coding leads to deeper processing and better retention". Further, Griffee (1995, quoted in Saglam, Kayaoglu & Methews Aydinli 2010: 20) underlines that songs are useful not only for learning vocabulary in general, but what is more important, the songs provide new words in a meaningful context. Especially, the songs might help with understanding and memorizing various kinds of figurative language, such as metaphors or idioms (Nuessel & Cicogna 1991, quoted in Saglam, Kayaoglu & Methews Aydinli 2010: 21). Medina (2003: 18) specifies that story-songs might be more beneficial to vocabulary learning as the words occur repeatedly and in more naturalistic settings, which allows an easier acquisition of vocabulary. Moreover, the author (Medina 2003: 18) found that extra linguistic factors along with linguistic factors favour a higher retention of a new vocabulary. For instance, a facilitation of vocabulary learning might be enhanced by means of pictures and photos, which make unfamiliar words more comprehensible. In like manner, Schunk (1999: 113) recognizes the effectiveness of a combination of songs and gestures for better comprehension and retention of vocabulary as "mime or physical actions provide live modelling to connect the spoken and heard word to an image". In fact, Paquette and Rieg (2008: 228) agree that use of music helps to obtain a larger vocabulary size in a short time.

There is a relatively small number of studies that investigated a possible effect of music, specifically on vocabulary learning in a foreign language. For instance, Groot (2006) examined the effect of background music on FL vocabulary learning. The participants of the study were

thirty-six psychology students, who were the native speakers of Dutch and received a formal training in several foreign languages. Eighteen participants were tested in a silent condition, and other eighteen were assessed with background music. During the study, thirty-four widely-used Dutch and FL words were used as stimulus variables. The study process included six learning sessions, where each two sessions were followed by a test. Remarkably, while learning sessions a part of the fourth Brandenburg Concerto by Bach was used as a music background described as "classical, baroque, instrumental, and rhythmical" (Groot 2006: 475). The findings showed that the participants learning with a musical support recalled more FL words than the ones without music.

Another study conducted by Medina (2003) aimed to explore the effectiveness of a combination of music and story illustrations on English vocabulary acquisition. The participants of the study were forty-eight pupils of the second grade with low English proficiency. They were divided into four groups with different vocabulary learning methods: the first group listened to a story as a song version, the second group listened to the story only being told, the third group viewed the illustrations of the new word with a background music, and the fourth group listened to the oral version along with the pictures of the vocabulary words. The results of pre-and post-tests showed that the better retention of a new vocabulary was achieved when either illustrations or music as aid were used. Moreover, the highest results were achieved when a combination of music and pictures was employed.

A more recent study by Swaminathan and Gopinath (2013) examined L2 vocabulary of seventy-six Indian children based on their level of a musical expertise. In this study musically trained schoolchildren were considered the ones who had at least three months of a musical training in Indian and Western Music. The findings showed that the musically trained participants obtained better results.

Fonseca-Mora (2000: 148) stresses that music influences all areas of foreign language acquisition. The linguist (Mora 2000: 151) points out that song might be a useful tool for deduction of a grammatical information, for instance a position of an adverb in sentences as in "It *never* rains in Southern California" and "Didn't we *almost* have it all?". Musical approach in learning FL grammar might be especially beneficial as by grammar learners usually imagine an enduring conjugation of verbs and grammar rules, which, however, can be simplified by motivational resources, such as melodies and songs (Alinte 2013: 10). As Failoni (1993: 101) reports, melodies, rhythm, and intonation help to memorize the grammatical structures, similar to vocabulary, in a way that "the new structures that may seem isolated or out of context in pattern drills, are seen in a different perspective when they are part of a song". Whittaker (1981:

9) adds that songs as a means of "auditory recall" help to comprehend and learn too complex grammar concepts for adult learners. For instance, Saribocan and Metin (2000) suggest a selection of songs for learning various grammatical structures, for example "Yesterday" by the Beatles for past tense or "Blowing in the wind" by Bob Dylan for modals.

Investigating the effect of music on receptive and productive abilities, Sleve and Miyake (2006: 675) claimed that musical skills might be a significant factor for variances in phonological abilities of L2 learners. Further, they (Sleve & Miyake 2006: 675) explain that having good musical skills means having a "good ear" necessary for analysing and discriminating speech sounds that will help L2 learners to perform better in pronunciation of foreign sounds. In their study, Sleve and Miyake (2006) aimed to analyse the link between musical skills and the acquisition of L2 phonological skills indicating it as one of the important determinants of comprehensive communication. The participants, fifty native Japanese speakers, were tested for receptive and productive phonology skills in English language. For the receptive phonology task, the subjects listened to the minimal-pair sentences differing in phonemes and after that they had to choose which one was presented. Then, the participants listened to the record of a short story and marked the mispronounced words in a transcript. During the productive task, the participants' pronunciation on intelligibility and prosody was assessed by the native speakers. After, the musical abilities of the participants were measured. The findings supported a clear link between individual's musical abilities and perceiving and producing foreign language sounds (Sleve & Miyake 2006: 678).

Another study by Milovanov et al. (2008) intended to investigate an opposite direction of the relation, namely, whether children with advanced L2 production skills have a better music aptitude than children with less-advanced production skills. For this purpose, Finnish native speakers were asked to repeat 30 words in English after a native speaker's example. To ensure that all participants have English pronunciation skills, they received an 8-week pronunciation training. Based on the results of the pronunciation test, the participants were divided into two groups with different levels of proficiency. Furthermore, their music aptitude was measured. The findings of the tests showed that Finnish children with better pronunciation in English have higher scores in music aptitude than the children with less accurate pronunciation skills (Milovanov et al. 2008: 88).

Besides music influence on phonemic awareness of the language learners, in fact, music also improves knowledge of rhythm, which facilitates the recognition of language models, such as words, phrases or sentences (Saglam, Kayaoglu & Methews Aydinli 2010: 25).

Further, a proper pronunciation might influence largely the communication process, where mispronounced words might alter the meaning of an utterance and lead to misunderstandings (Saglam, Kayaoglu & Methews Aydinli 2010: 25). Peck (2001: 141) indicates that listening to songs and poems might help to learn and discriminate the sounds, which are repeated in songs and chants and as well improve listening skills in FL.

Musical activities seem to enhance not only FL receptive skills, but also productive oral skills needed for speaking. For instance, Cifuentes (2006: 51) recognizes the use of songs to promote active participation in the foreign language classroom. Then, good speaking skills require a certain degree of fluency which can be furthered through the repetition activities (Gatbonton & Segalowitz 1988: 473). Given that song usually includes repetitive elements, they can be used to promote automatization of a speech flow, and therefore a communicative proficiency of FL learner (Cifuentes 2006: 53).

In fact, some studies showed a positive correlation between singing and speaking activities. For example, Cifuentes (2006) used English songs as a strategy to encourage speaking of tenth graders. The participants could interpret in English their favourite songs and this activity enhanced significantly a level of higher oral production. Moreover, it was reported that students showed motivation and self-confidence while talking to their peers, focusing rather on expressing their ideas than being distressed about accuracy (Cifuentes 2006: 53).

Therefore, musical activities might provide a rich learning environment for achieving a higher proficiency in a foreign language. Music and lyrics seem to have a positive effect on various factors essential for efficient language acquisition, such as motivation, retention of a new vocabulary and grammar structures in the context as well as rhythm necessary for proper phonological production.

3.3. Music for motivation, language anxiety and cultural competency

A great deal of empirical research shows that foreign language anxiety has an unfavourable effect on the learner's performance in FL learning (Dolean 2016: 639). Language anxiety effect might be especially detrimental during various FL production activities, such as public speaking and active communication with learners (Saglam, Kayaouglu & Mathews Aydinli 2010: 9).

As explained in the *Affective Filter Hypothesis*, the nature of language anxiety is related to the affective variables that influence the process of foreign language learning (Krashen &

Terrell 1984: 59). Further, it suggests that FL language learners have better performance while "lowering the anxiety level of the acquisition situation", that is when there is no emotional barrier involved into the language learning process (Krashen & Terrell 1984: 59). The effect of lowering the affective filter in the foreign language classroom was reported in several studies (Lems & Lawrence 2005; Anton 1990).

Considering a negative effect of language anxiety on academic performance, it might be needed to find methods that decrease the anxiety level in the foreign language classroom. Music has been described as a "language of emotions", which might help people to express their emotions and, thus, reduce their affective filter (Corrigall & Schellenberg 2013: 299). Singing songs in the foreign language classrooms might have a range of advantages beneficial to redundancy of language anxiety, such as improving students' emotional well-being and increasing learners' connection to the group (Young 1992: 158). Learner's identification with the group seems to be one of the factors that helps to keep the affective filter low, therefore, FL language learners are less anxious during group activities (Liu 2006: 302). The findings of Dolean's (2016: 639) study supply evidence that using songs in foreign language classes can be an effective tool to lower the anxiety of students with higher level of anxiety than their peers.

Another essential component for successful language learning considered to be motivation. In Dörnyei's (2003: 36) definition of motivation, "an individual's motivation to learn a second language is sustained by both attitudes towards the second language community and the goals, or orientations, sought through the acquisition of the second language learning" motivation is partially connected to the interest in the culture of the second language country. Davies and Pearse (2000: 13) explain the use of motivation towards language learning in a similar way. Among the reasons that stimulate foreign language learners are need of foreign language knowledge for personal or professional goals as well as an attraction to the culture of the target language (Davies & Pearse 2000: 14). However, there are might be difficulties with motivation of reluctant language learners, where using musical activities as an enjoyable alternative might be a solution (Candlin 1992: ix). Serving as a source of motivation and united atmosphere, songs can provide insights into the culture, "providing a window into the frames of reference and values" of speakers of the target language (Candlin 1992: ix). Songs, being both universal and culturally distinctive, can be used as a pedagogical means to increase a cultural awareness among FL learners (Orlova 2003).

4. Music and reading

As described in Chapter 2, reading ability is an important factor for academic and social success and, therefore, it is crucial to ensure an efficient development of FL reading. Music and songs showed a positive effect on various areas of language acquisition. In this chapter, I will review the effect of music on a specific area of foreign language knowledge, namely reading proficiency.

It has been widely believed that musical intervention might enhance an academic performance, especially in math and reading (Tucker 1981, quoted in Darrow 2008: 32). Butzlaff (2000: 167) supports this claim and elaborates on a potential use of music in reading instruction. First, he (Butzlaff 2000: 167) outlines certain similarities between music and written text, where they "both involve written notation which must be read from right to left". Second, reading skills require a phonological awareness, that is a sensitivity to phonological peculiarities, and, likewise, music competency requires a sensitivity to tonal distinctions (Butzlaff 2000: 167). As Butzlaff (2000: 167) hypothesizes, "listening to music trains a general kind of auditory sensitivity that is useful in listening to music as it is in perceiving phonological distinctions". Lastly, the author (Butzlaff 2000: 167) points out a motivational effect of music on the development of reading skills. When students learn the lyrics of the songs, they might get engaged in the reading of a text and try to comprehend it in a meaningful context (Butzlaff 2000: 167). Thus, considering that lyrics of the songs can be quite predictable and repetitive, FL learners may train their reading abilities.

Further, several linguists distinguish specific primary learning processes that music and reading share. For instance, Slater (2005, quoted in Hall & Robinson 2012: 12) observes a similarity in "symbolic representation" between reading and music learning, where symbols are used in order to convey information clearly to others. Further, Sadoski, Paivio and Goetz (1991, quoted in Hall & Robinson 2012: 12) note the coding processes inherent to both reading and music learning processes, where encoding and decoding procedures assist in analysing and retrieving meaning. Then, Hansen, Bernstorf and Stuber (2004: 5, quoted in Hall & Robinson 2012: 12) review auditory processes present in reading and music learning. It refers to the identification of phonemes or morphemes in the words in reading and identification of sounds and tones in a musical context (Hansen, Bernstorf & Stuber 2004: 5). Thus, Gromko (2005: 199) hypothesizes that active music activities and relation between sound and symbol might

improve the cognitive abilities essential for discrimination of a spoken word into the phonemes. Further, the relation between music and components of reading ability will be reviewed.

4.1. Music and phonemic awareness

According to Ehri et al. (2001: 250), phonemic awareness is thought to be an essential precursor of reading abilities. Correspondingly, Hulme et al. (2002: 2) claim that phonemic awareness is an important skill for developing word-decoding abilities necessary for reading performance. That is, the good readers can apply fluently their phonemic skills for word-decoding tasks (Hulme et al. 2002: 2). As Torgesen (2002: 11) points out, phonemic awareness refers to the ability to recognize the smallest sound units in words. Hall and Robinson (2012: 12) explain that before a formal training in phonemic awareness, students perceive the language through sounds. For example, first, the language learners identify, comprehend and use the word "dog" before being able to distinguish "dog" through its visual form "d-o-g" (Hall & Robinson 2012: 12). Likewise, in music, the students, first, aurally recognize the notes in songs prior to identifying and comprehending the note visually (Hall & Robinson 2012: 12). Considering the similarities between the two systems, music-making might enhance phonemic awareness skills for FL learners and assist in distinguishing the phonological sounds (Hall & Robinson 2012: 12).

Several studies intended to investigate further the link between music and phonemic awareness. For instance, Gromko (2005) conducted a study to explore whether music training might enhance the phonemic awareness in young children. The participants of the study were taken from two different schools and divided into two groups: one with a 4-month music instruction and one without any music programmes. The results showed that the participants who undertook music training performed better on a phoneme segmentation task, which might indicate that music activities and association of sound with symbol may increase a phonemic awareness of the students. However, Gromko (2005: 206) points out that the results might be related to differences of reading-strategies instructions at different schools.

According to Fonseca-Mora (2013: 6), development of the phonemic awareness can be facilitated by employing particular songs with slow rhythm and simplicity of the melodic contours that are easily memorisable and favour the automatization of the decoding processes.

4.2. Music and phonological awareness

Torgesen et al. (1994: 276) describe phonological awareness as one of the strongest predictors and facilitators in reading acquisition. Yopp and Yopp (2009: 12) define phonological awareness as "sensitivity to the sound structure of language. It demands the ability to turn one's attention to sounds in spoken language while temporarily shifting away from its meaning". Wright and Jacobs (2003: 40) identified a positive influence of phonological awareness instruction on reading performance by focusing the learners' attention to the sounds of the language.

However, the research on the relation between music and phonological awareness is rather limited. For instance, Anvari et al. (2002) investigated the relation between phonological awareness, music perception skills and reading skills among 100 participants aged four-and five-year old. The findings of the study show a significant correlation between these three variables (Anvari et al. 2002: 126). Similarly, a more recent study by Herrera et al. (2011) aimed to evaluate an effectiveness of a musical training on children's phonological awareness and naming speed in Spanish. Participants of the research were preschool-children with Spanish either native or a second language. The results showed that regardless the native language of the participants, a music training had a beneficial effect on the development of the phonological awareness particularly of ending sounds (Herrera et al. 2011: 73). Fonseca-Mora (2013: 5) shares that intuitive musical-verbal games such as prolongating syllables or reinforcement of intonational patterns as well as the songs and nursery rhymes can support the development of the phonological awareness.

4.3. Music and reading fluency

Armbruster, Lehr and Osborn (2003: 22) define reading fluency as "the ability to read a text accurately and quickly". In addition, fluency occurs when the reader can recognize the words and construct their meaning within the context (Armbruster, Lehr & Osborn 2003: 22). Bashir and Hook (2009: 196) determine a reading fluency as a "bridge between decoding and comprehension". Reading speed is often used as an indicator of the reading fluency and refers to a number of words read per minute in silent reading with the effort to comprehend the text (Hasbrouck & Tindal 2006, quoted in Denton et al. 2011: 210). The linguists differentiate

between oral and silent reading fluency, where a developmental shift from oral to silent fluency is observed around fourth grade (Rasinski et al. 2012: 75).

Referring to LaBerge and Samuels' (1974) theory, where automatic and effortless word recognition and comprehension is believed to be a quality of a fluent reader, many researchers aimed to investigate the tools for enhancement of the reading fluency. For instance, the findings of Iwasaki et al. (2013: 139) show an effective role of song singing in improving the reading fluency due to the relation between repeated reading of the lyrics and automatization procedure. For this experiment, a musical method, which is similar to karaoke, called *Rock and Read* was implemented. During the study, the participants practiced and performed two popular songs each week. The lyrics of the songs were projected to the participants and first they were asked to identify the words they recognized. Next, the participants were engaged in the choral reading and singing along while reading the lyrics. The results showed that first-grade students performed one year's growth in reading (Iwasaki et al. 2013: 139).

Fonseca-Mora (2013: 7) adds that a melodic nature of songs facilitates process of reading as the learner focuses more on the melodic than a linguistic component of the text. In addition to the improvement of the reading fluency, similar to karaoke exercises can also give an opportunity to train pronunciation skills in a more relaxed and fun environment (Rengrifo 2009: 92).

4.4. Music and vocabulary

Vocabulary knowledge is believed to be critically important for reading comprehension (Bernhardt 2005: 142). According to Hahn (1987, quoted in Hall & Robsinson 2012: 13), the reader uses vocabulary items and context in order to understand the author's intention correctly.

Several empirical studies demonstrated strong associations between vocabulary level and understanding of the text (Hutchinson et al. 2003: 28). In fact, some findings show that readers might employ their L1 vocabulary for reading comprehension of the FL text (Proctor et al. 2006: 65). Another research revealed a link between vocabulary and reading comprehension when altering the difficulty level of the words in the text resulted in easier or harder text comprehension (Raphael et al. 1981: 329). In the same fashion, Anderson and Freebody (1979: 2) indicate the proportion of difficult words in the text as the most powerful predictor of text difficulty, and the reader's knowledge of the vocabulary as the measure of reading comprehension level.

Specifically, several scholars agree that examination of the vocabulary knowledge should be considered in two dimensions: *size* of vocabulary and *depth* of vocabulary. Breadth of the vocabulary refers to the "size of the mental lexicon", or to put it differently, a number of words that convey some meaning to the learner (Anderson & Freebody 1981, quoted in Tannenbaum, Torgesen & Wagner 2006: 383), whereas a depth of the vocabulary is considered a reader's knowledge about the word that includes such components as "pronunciation, spelling, meaning, register, frequency, and morphological, syntactic, and collocational properties" (Qian 2002, quoted in Shen 2009: 136). The differences between the dimensions of vocabulary knowledge are especially important in terms of instruction for effective reading comprehension (Beck & Mckeown 1983: 622). According to Beck and Mckeown (1983: 623), appropriate vocabulary instruction should not involve only "definitional approach", that is when students learn the definitions of the instructed words. The effective vocabulary instruction provides a student with a deep knowledge about the words being presented (Beck & Mckeown 1983: 623). Therefore, in addition to the definition of a new word the student needs to be presented with a contextual information about the word as well (Beck & Mckeown 1983: 623). Later, Beck, Mckeown and Kucan (2013: 41) suggest that vocabulary instruction should provide multiple repetitions of the new word that helps FL learners to grasp the word's meaning faster.

Gaining word-knowledge by listening to songs can be an enjoyable and easy process in extracurricular settings, when the words are acquired incidentally, i.e. "learning without the intent to learn" (Schmidt 1994: 137, quoted in Schwarz 2013: 17). Several studies investigated an effect of songs on the vocabulary acquisition. For instance, Schwarz (2013: 32) observed improvement of vocabulary acquisition of Austrian teenagers by listening to English pop songs outside school. Similarly, in classroom settings, Chinese L2 students, who were taught vocabulary explicitly by means of music and songs, demonstrated better results in vocabulary enhancement than their peers who had been instructed without songs implementation (Li & Brand 2009: 78).

4.5. Music and reading comprehension

Reading comprehension is believed to be an ultimate aim for a reading process (Tannenbaum, Torgesen & Wagner 2006: 381). Armbruster, Lehr and Osborn (2003: 41) describe reading comprehension as a complicated process, where good readers extract a meaning of the text by

employing "their experiences and knowledge of the world, their knowledge of vocabulary and language structure, and their knowledge of the reading strategies".

Fonseca-Mora (2013: 9) takes the view that a good development of reading comprehension relies on a language programme that contains well-structured tasks to improve the general level of knowledge and skills of FL learners. Accordingly, she (Fonseca-Mora 2013: 8) proposes to involve a communicative language teaching approach in reading, which is characterized mainly by improvement of reader's personal experiences and introduction of authentic texts into a learning situation. Further, Fonseca-Mora (2013: 8) recommends using the texts that include language in real use and interesting for a reader, for instance lyrics of the songs. McLaughlin (2012: 434) agrees that personal interest and motivation are the crucial factors for better reading comprehension. In a same fashion, Baker and Wigfield (1999: 453) explain that "engaged readers are motivated to read for different purposes, use knowledge gained from the previous experience to generate new understandings, and participate in meaningful social interactions around reading".

Concerning instruction on reading comprehension, Fonseca-Mora (2013: 10) believes that reading activities should be divided into three stages given that reading comprehension is a final product of interaction between reader and the text, namely before reading, during reading, and after reading. In fact, the author (Fonseca-Mora 2013: 10) observes that music and songs have an ability to contextualize the texts and increase their motivating degree. As learning a foreign language might cause a language anxiety and block normal comprehension, music facilitates reading by lowering the affective filters (Krashen 1985, quoted in Kasiri 2015: 158).

In view of these considerations, many studies have investigated an effect of music on the reading comprehension (Kasiri 2015; Register et al. 2007). Several linguists have confirmed a positive effect of music on reading comprehension tasks. For instance, Register et al. (2007) analysed an influence of music on slow students' reading comprehension abilities, where the participants were divided into experimental and control groups with musical training and without any respectively. The results showed that the experimental group with a musical intervention programme performed significantly better compared to the control group (Register et al. 2007: 32). Further, some linguists investigated an effect of background music on the text comprehension. In particular, Peretz (2003, quoted in Kasiri 2015: 159) observes a phenomenon of *capacity interferences*, when an overlapping between codes of linguistic comprehension and music processing might lead to the malfunction of the decoding processes. Carretti et al. (2009: 246) support this argument, underlining that reading comprehension

operation relies strongly on activation of attention, thus multitasking of listening to music and understanding of the text might lead to poor performance of the reader. Further, Furnham and Bradley (1997: 452) claim that comprehension scores might worsen depending on the complexity of music, for example in lyrical music. As an illustration of this argument, Liapis, Giddens and Uhlenbrock (2008) investigated reading comprehension performance of the same article between two groups with lyrical and non-lyrical settings. The results showed that non-lyrical environment further better text comprehension that the lyrical one, still not significantly. Kämpfe, Sedlmeier and Renkewitz (2011: 437) agree that the effect of music on reading comprehension tasks depends on the features of music. To demonstrate, Furnham and Stephenson (2007: 415) revealed that reading comprehension performance is better while listening to calm music rather than upbeat music. In a similar study, Cassidy and McDonald (2007: 525) showed that text comprehension is better while listening to slow-tempo than fast-tempo music.

Given these points, the findings of the above presented studies demonstrate the divergence of opinions on the role of music in a reading comprehension process.

5. Main objectives of the study

As earlier established, little research has investigated the influence of music on the reading ability in a foreign language, and even less research has examined whether the transfer effect of musical abilities on a reading performance is direct or mediated through other individual differences of FL learners. Therefore, this study seeks to analyse the effect of music aptitude on reading ability in a foreign language. Moreover, this thesis aims to determine whether general intelligence and working memory contribute to the relation between music and FL reading. In particular, the main objectives of this study are as follows.

First, this project intends to present insights into reading learning in a foreign language covering the aspects of cross-linguistic transfer, individual differences and difficulties in reading. Specifically, the thesis seeks to estimate an influence of students' L1 word-decoding skills on FL word-decoding performance. Then, this thesis tries to examine the influence of learners' musical abilities on a development of FL reading ability. Additionally, the findings of the study aim to determine whether musical training might have improved participants' general intelligence, working memory and word-decoding skills. In fact, the association among music aptitude, IQ and working memory will be deeper investigated. After these questions have

been clarified, this should show whether musical skills can account for the variance in reading-related skills in a foreign language. The findings are believed to provide valuable didactic guidelines for incorporation of music activities into FL reading learning.

For illustration, Table 1 summarizes the instruments of the present study.

Table 1 Overview of tests and questionnaire administered

General intelligence test *Raven's Standard Progressive Matrices (Raven 1969)*
Working memory test *Wechsler Adult Intelligence Scale-Fourth Edition (WAIS-IV) (2008)*
Music aptitude test *Mini Profile of Music Perception Skills (PROMS) (2016)*
L1 and FL word-decoding skills *Silent reading test*
Test for vocabulary and reading skills in a second language *DIALANG (2006)*
Questionnaire for biographical data

In light of the recent research, it was hypothesized that high-scoring musical subgroup would outperform the low-scoring musical subgroup in the test for general intelligence. This difference between musicals and non-musicals was expected as attending music classes has a school-like experience and, in fact, involves both brain hemispheres for a better learning process (Schellenberg 2004: 514). General intelligence was thought to be correlated strongly with working memory. It was expected as working memory presents processing and storage of resources necessary for laborious cognitive tasks as in measuring a general intelligence capacity (Fukuda et al. 2010: 2).

Challenging Corrigall and Trainor's (2011) findings about lack of association between musical abilities and word-decoding skills, musical participants were believed to achieve higher scores than non-musicals in FL silent reading test. It is assumed that word recognition skills are closely related with auditory skills essential in segmenting the speech sounds similar to the skills necessary for music perception (Herrera et al. 2011: 69). Given that word-decoding skills are often described as a precursor of reading, a strong correlation between reading-related skills was expected (Degé, Kubicek & Schwarzer 2015).

In line with Strait, Hornickel and Kraus' (2011) findings, it was hypothesized that musically apt participants would be better at the working memory task. It was believed that musically trained people could store more information and experience the activation of working memory during the musical trainings (Besson, Chobert & Marie 2011: 7). Then, working memory was expected to correlate with the vocabulary performance as better retention was beneficial for the acquisition of new vocabulary units.

Lastly, in contrast with Banai and Ahissar's (2013) conclusions, it was believed that musically experienced participants could perform better in the reading task. This outcome was expected due to the positive influence of music on the important components of reading performance, such as word-decoding skills and working memory (Degé, Kubicek & Schwarzer 2015). Consequently, a positive association between FL reading-related skills and working memory was expected.

With regards to the major research question, this study hypothesized the existence of the mediating role of the word-decoding skills, working memory and general intelligence between musical and FL reading ability. It was based on the results of the *Structural Equation Model* (SEM) suggested by Strait, Hornickel and Kraus (2011: 5) which showed that music accounts for the variance in the reading performance through the influence on the auditory working memory.

Table 2 presents an overview of the research questions investigated and the suggested hypotheses.

Table 2 Summary of research questions and hypotheses

What are the differences in the participants' general intelligence performance to be expected? *Musically experienced participants are believed to have higher IQ level.*
What are the differences in the participants' working memory performance to be expected? *Musicals have better working memory capacities.*
What are the differences in the participant's word-decoding skills in a foreign language? *Musically experienced participants are thought to have more developed word recognition skills.*
What are the differences in the participants' FL reading performance? *Musicals score higher in the reading-related tasks.*
Do L1 word-decoding skills impact FL word-decoding skills supporting the theory of the cross-linguistic transfer?

The impact is believed to be fairly strong.
What are the relations among music, intelligence and reading-related skills? *Music aptitude is expected to be strongly related with intelligence and reading-related skills. A positive association between reading performance and cognitive factors is to be found. On one hand better working memory is believed to lead to the higher intelligence and on the other hand to larger vocabulary size.*
Does music aptitude explain FL reading-related skills? *It is believed that musical ability does not lead directly to better reading-related skills in a foreign language but through a mediator.*
Do intelligence, working memory and FL word-decoding skills contribute to the relation between music aptitude and FL reading? *IQ, working memory and FL word-decoding skills are expected to mediate the influence of the musical abilities on FL reading.*

Having identified the major research questions, I will present the methods used in the study.

6. Methods

Following the findings of the meta-analysis by Fonseca-Mora and Gómez-Domínguez's (2015: 126), I used the following methods for investigation of the correlation between music aptitude and reading-related skills in a foreign language:

(1) Evaluation of reading-related skills, including measurements of word-decoding skills as well as vocabulary knowledge adapted to different levels of foreign language proficiency,
(2) Music aptitude test, and
(3) Tests for general intelligence and working memory

This study comprised the analysis of 27 international articles published between 2001-2013 with the purpose to determine the most frequently used research methods in investigation of the link between music aptitude and reading abilities in a foreign language (Fonseca-Mora & Gómez-Domínguez 2015).

According to the findings of the meta-analysis I selected the corresponding tests which would be further reviewed.

6.1. Participants

In order to keep the discrepancies between language talent and language proficiency in focus, I used Jilka's (2009: 8) recommendation on the recruitment of the participants. To ensure that the targeted abilities are investigated, the individual differences of the participants were taken into consideration and controlled. Therefore, I intended to keep the group of the participants homogenous according to the following factors:

(1) age and L1,
(2) preparation and experience in a foreign language,
(3) educational background and,
(4) motivation and interest in languages.

The sample consisted of thirty-eight participants who were selected from the University of Vienna and Vienna University of Economics. All the participants were the native speakers of German and Spanish language was tested as their foreign language. These students attended the first years of the university and their age varied between 18-20 years old. Further, I aimed to maintain an approximately equal proportion between male (18) and female (20) participants. At the moment of the testing procedures the subjects attended one of the following programmes at university:

(1) Bachelor's degree at the Department of Romance Studies (University of Vienna)
(2) Spanish teaching degree in secondary education at the Department of Romance Studies (University of Vienna)
(3) Bachelor's degree in Business, Economics and Social Sciences (Vienna University of Economics)

According to the entrance requirements of universities the students should have CEFR A2-B1 level of Spanish which might be attested by school-leaving exam of high schools in Austria. Besides knowledge of Spanish language, the subjects were proficient in several other foreign languages, e.g., English and French. Taking into account the academic settings and pre-requisites for passing the course, motivation in learning the language was taken as a given.

As Sleve and Miyake (2006) found, music aptitude can also be one of the individual differences that influence language learning and the participants of this study were diverse in terms of musical expertise. A great number of the participants (18) did not have any musical education and did not take up any musical training during the testing. However, all the subjects admitted that they enjoyed various activities accompanied with music such as dancing, singing and listening to music also while studying.

6.2. Measurements

6.2.1. DIALANG Reading/Vocabulary test

For testing FL reading I used *DIALANG* (2006) test since it offered different tests for different levels of learners according to the Common European Framework for language learning. The range of the levels varies from A1 to C2 with a detailed information on each level. DIALANG is particularly useful for learners of a foreign language on account of receiving a feedback at the end of the session. Moreover, the program diagnoses the abilities of the participants in sub-skills and gives an advice how to improve it.

DIALANG is defined as "a language diagnosis system" (DIALANG 2006: about DIALANG) and it was developed by various European higher education institutions within the framework of the programme for development of instruments for language learning and teaching *SOCRATES-Lingua II*. Currently the project is supported by Lancaster University. DIALANG assesses reading, writing, listening, grammar and vocabulary skills in more than ten European languages, including a foreign language of my research, Spanish.

In order to check reading skills of FL learners, a web-based version of DIALING was employed. Before running the tests, the program provided the participant with the clear instructions in any of the languages to be assessed. The assessment of reading comprehension abilities consisted of several stages. First, the participants took the *Vocabulary Size Placement Test* (VSPT) that estimated the size of their vocabulary knowledge. The test consisted of a list of seventy-five words where the participant should choose whether the word was real in a target language. It should be noted that there were fifty real words and twenty-five pseudo words in the list. The sample of the VSPT is displayed in Figure 1 (DIALANG 2006).

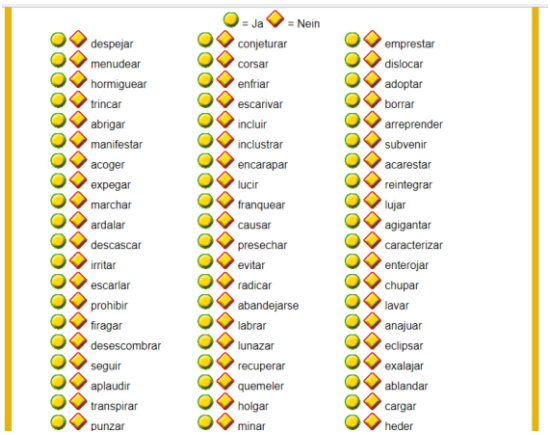

Figure 1 The sample of Vocabulary Size Placement Test in *DIALANG (2006) reading test*

The pseudo words are determined according to Huibregtse, Admiraal and Meara (2002, quoted in Alderson 2005b: 81) definition as "words that fulfil the phonological constraints of the language but do not bear meaning". The score was calculated with the internal algorithm and reported in the VSPT feedback on a scale from 0 till 1000.

Next stage was a self-assessment of the reading skills where the test-taker was presented with statements concerning his/her reading skills and should choose whether they were applicable. These results would be compared with the final results of the test and, therefore, the participant could see if s/he was realistic about their reading skills. Finally, the participant might proceed with the reading test. It consisted of thirty tasks oriented at sub-skills of identifying main idea, reading for detail and inferencing. These included multiple-choice questions, short-answer questions and gap-filling tasks (Alderson 2005b: 123).

Figure 2 illustrates one of the test items where a student has to answer a multiple-choice question (DIALANG 2006).

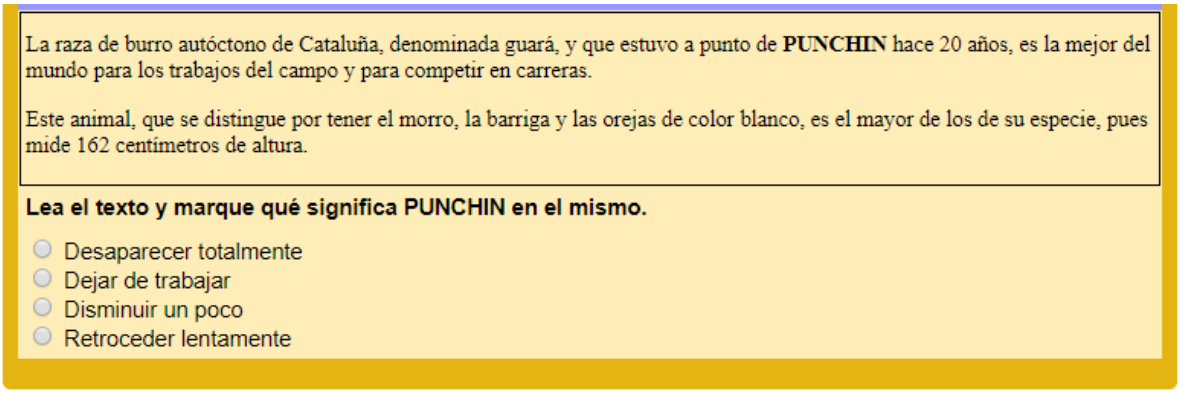

Figure 2 The sample of multiple-choice question in *DIALANG* (2006) *reading test*

At the end of the test a feedback menu was displayed which offered results and level of the reader.

Figure 3 shows the common reference levels and the description of the correspondent reading skills as found in the *Common European Framework of Reference for Languages: learning, teaching, assessment* (2001: 10).

	OVERALL READING COMPREHENSION
C2	*Can understand and interpret critically virtually all forms of the written language including abstract, structurally complex, or highly colloquial literary and non-literary writings.* *Can understand a wide range of long and complex texts, appreciating subtle distinctions of style and implicit as well as explicit meaning.*
C1	*Can understand in detail lengthy, complex texts, whether or not they relate to his/her own area of speciality, provided he/she can reread difficult sections.*
B2	*Can read with a large degree of independence, adapting style and speed of reading to different texts and purposes, and using appropriate reference sources selectively. Has a broad active reading vocabulary, but may experience some difficulty with low frequency idioms.*
B1	*Can read straightforward factual texts on subjects related to his/her field and interest with a satisfactory level of comprehension.*
A2	*Can understand short, simple texts on familiar matters of a concrete type which consist of high frequency everyday or job-related language.*
	Can understand short, simple texts containing the highest frequency vocabulary, including a proportion of shared international vocabulary items.
A1	*Can understand very short, simple texts a single phrase at a time, picking up familiar names, words and basic phrases and rereading as required.*

Figure 3 CEFR levels of reading comprehension skills and their description in the *Common European Framework of Reference for Languages: learning, teaching, assessment* (2001: 10)

Additionally, the feedback provided the participant with the possible suggestions how to make progress towards a higher level of reading comprehension skills and illustrated why self-assessment and test results might not match. The test took around 30-45 minutes including placement tests and self-assessment. DIALANG programme seems to be a useful tool not only for assessment of reading abilities but also for ways of its improvement. It should be noted that for a statistical processing of the results only a continuous value of reading-related VSPT was used. The average CEFR level of the sample will be presented in results, too.

6.2.2. Mini PROMS (Profile of Music Perception Skills) test for music aptitude

This test allows to identify individuals with musical skills who have not undergone any musical intervention as well as the ones who, despite the musical trainings may have various levels of musicality. As a matter of fact, the *Mini-PROMS* (Zentner & Strauss 2016) test aims to assess the musical competence of the participants disregarding whether they are musically trained or not. That is in assessment of music aptitude, it is employed rather neutral and abstract sound patterns than contextualized musical compositions (Law & Zentner 2012: 3). Otherwise, the participants with musical background would have the advantage of being familiar with a composition being played.

Another advantage of the programme is that it is research-friendly, and it helps to set up a researcher account in order to collect your own data. The Profile of Music Perception Skills has been developed at the Department of Psychology, University of Innsbruck as one of the research tools for personality and assessment category (Zentner & Strauss 2016). Concerning reliability of the test, the PROMS shows satisfactory psychometric properties and fair coefficients for the subtests (Law & Zentner 2012: 1). With regard to the previous test batteries used to measure musical intelligence PROMS includes more musical perceptual components to be tested and assesses them with a more significant specificity (Law and Zentner 2012:3). For time efficiency a brief version of Mini PROMS was preferred.

The test measures musical skills among multiple domains: tonal (melody, pitch), qualitative (timbre, tuning), temporal (rhythm, rhythm-to-melody, accent, tempo), and dynamic (loudness) (Law & Zentner 2012: 1). The Mini-PROMS version consists of four subtests, which assesses the participant's musical skills in *Melody*, *Tuning*, *Accent*, and *Tempo*. Table 3 shows a more detailed description of the musical dimensions tested as found in Law and Zentner (2012: 4-6).

Table 3 Description of Mini PROMS music subtests

Item	Description
Melody	This subtest uses "monophonic" melodies which contain constant rhythms. The difficulty of the trials is increased by means of "note density and atonality" (Law & Zentner 2012: 4). The stimuli used in the melodies are composed with "harpsichord" timbre which is relatively neutral and, therefore, unfamiliar to most listeners unlike the sounds of piano, guitar or violin (Law & Zentner 2012: 4).
Tuning	For tuning the piano sounds samples from the Vienna Symphonic Library are used. A "diatonic" harmony is preferred due to its culture-free nature and neutrality (Law & Zentner 2012: 6)
Accent	This subtest requires more subtle perceptual skills in order to detect the changes in the intensity of musical signals (Law & Zentner 2012: 5).
Tempo	Participants are introduced to the melodies that have either the same or different tempo in the comparison. For this subtest melodies with different rhythms and timbres are used, such as drums, harmony, and shaker (Law & Zentner 2012: 5).

All tests took fifteen minutes to complete. The test began with some general questions concerning age, education and relation to the music. Then the participant proceeded with the above-mentioned subtests. The task of the participant was to listen to the presented melody twice (first one is a *Reference* and second trial is a *Repetition*) followed by a short interval and identify whether the last comparison melody differed from the initial melody. Visually the procedure is displayed in Figure 4.

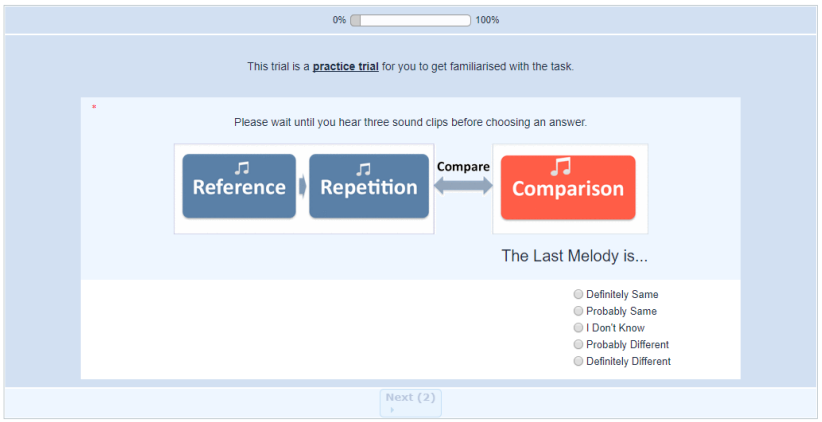

Figure 4 Mini PROMS test item (Zentner & Strauss 2016)

As can be seen in Figure 4, the answer could be one of the following options: *definitely same, probably same, I don't know, probably different and definitely different* (Zentner & Strauss 2016). The test-taker had two practice lessons before the actual test in order to get acquainted with the procedure. It was advised to use headphones during the sessions to perceive the sounds better. In fact, for a better reception it was suggested to control the sound system to ensure that the sounds were not played either too loud or too soft. At the end of the Mini PROMS test the participant received the results along with the feedback-profile on the music perception skills.

6.2.3. Wechsler Adult Intelligence Scale (WAIS IV) for working memory index

Working memory of the participants was measured by means of *WAIS IV* (Wechsler 2008) test battery, which is a widely used tool by psychologists and other professionals. WAIS-IV provides a measure of general intellectual functioning of adults and adolescents, including the four index scores (Wechsler 2008: 1). Those index scores represent the major components of intelligence, namely *Verbal Comprehension Index* (VCI), *Perceptual Reasoning Index* (PRI), *Working Memory Index* (WMI) and *Processing Speed Index* (PSI) (Wechsler 2008:1). Scale validity and reliability has been confirmed by means of several studies and retests (Wechsler 2008: 41). Working Memory Index measurement consists of three subtests: *Digit Span*, *Arithmetic* and *Letter-Number Sequencing* (Wechsler 2008: 14). The Digit Span subtest is a

core working memory subtest which measures *mental manipulation*, *cognitive flexibility*, *attention*, *encoding*, and *rote memory* and *learning* (Wechsler 2008: 15). During this subtest, an examinee undertakes three tasks, namely *Digit Span Forward*, *Digit Span Backward* and *Non-Word Sequencing*. During the Digit Span Forward, the test-taker was read a sequence of numbers and s/he should recall the numbers in the same order. In Digit Span Backward, the examinee was read a sequence of numbers and s/he should recall the numbers in reverse order. For Non-Word Span Sequencing, the examinee was read a sequence of non-existing words and s/he should recall and repeat them in ascending order. The tasks should be completed under the careful supervision of the instructor. The supervisor should read the items relatively slowly with a monotonous voice. Each item of the tasks allows two trials with the same span length. Each task included seven lines of digits and non-words to process. At the end, the instructor calculated the scores according to the guidelines on score administration (one score per repetition). The maximum score for the test was 42, that is 14 points per subtest.

6.2.4. Raven's Standard Progressive Matrices (SPM) test for general intelligence

SPM is a multiple choice non-verbal intelligence test introduced by Raven (1969). It is widely used as a measure of abstract reasoning and problem-solving skills that shape a general intelligence (Raven, Raven & Court 2000: 1). Raven, Raven and Court (2000: 1) refer to the latter as an "eductive" ability which is "the ability to forge new insights, the ability to discern meaning in confusion, the ability to perceive, and the ability to identify relationships". Moreover, this test is described as "culture-reduced" (Jensen 1980: 638), that is participants from different cultural and educational backgrounds can use it in an equal manner. Other beneficial characteristics of this IQ test include the reliability of the results, the universality of usage among different age groups and clearness of calculation (Raven, Raven & Court 2000). SPM test has several versions and in this study the Standard Progressive Matrices was used. The test consists of sixty questions divided into five sets of geometrical patterns, where the participant is asked to identify a missing part to complete the puzzle using given options (Raven, Raven & Court 2000: 1). Figure 5 shows the SPM patterns, which can be presented in the form of 2×2, 3×3 or 4×4 grid as found in Raven (2000: 2).

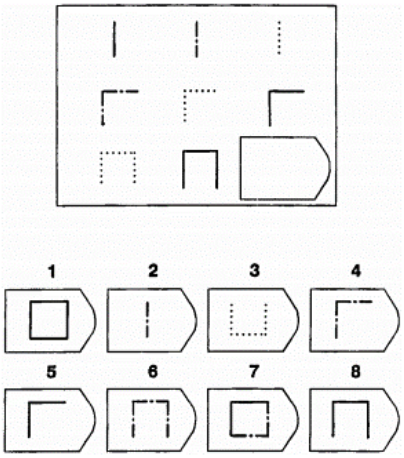

Figure 5 The sample of Raven's SPM item (Raven 2000: 2)

The patterns are characterized by increasing difficulty in solving. As Raven, Raven and Court (2000: 1) explain, "five sets provide five opportunities to grasp the method of thought required to solve the problems and five progressive assessments of pearson's capacity for intellectual activity".

Time needed to complete the test was quite individual, although on average it took around 40 minutes. The participants were asked to do the test at their own pace without pauses from the beginning till the end of the test.

The total score of SPM test equals the sum of the pattern's raw scores (one score per pattern) and upon completion of the test it is displayed on the screen.

6.2.5. Silent reading test for word-decoding skills

This test measures the students' level of reading fluency by counting a number of printed words that can be decoded by a participant within 3 minutes. The participants are presented with the text of Human Rights available in seventy languages, where German (as L1) and Spanish (as FL) versions were employed for the test. The text was translated by means of *Lexilogos* (Nègre 2002) computer program. Further, the difficulty of the text was controlled by employing *Readability Formulas*, which determines a necessary reader's level of reading comprehension.

The text was introduced by the strings of words with no spaces or punctuation separating them and the task of the subject was to identify the words by drawing the lines between them. Moreover, this test helped to measure the level of phonological awareness of the participants necessary for word-decoding. The test was conducted in a way that first the participant read silently the text in FL for 3 minutes, and then, the text in L1 with equal amount of time.

Subsequently the participant obtained scores separately for text in L1 and text in FL which was a total number of words identified in 3 minutes. The text samples used for Silent reading test can be viewed in the appendix.

6.2.6. Biographical questionnaire

Having agreed to participate in the study the participants were asked to fill in a brief questionnaire that included basic biographical information. Taking into consideration a large volume of data that was collected by means of the tests, I chose a simple version of a biographical questionnaire.

The questionnaire was distributed to each participant in a written form and collected upon completion. The questionnaire included the basic questions concerning their age, mother tongue and knowledge of foreign languages. Also, the subjects of the study were investigated concerning their musical experience, for instance, whether they play musical instruments or have an interest in musical activities in general. Also, they were requested to self-assess their musical abilities on the scale from 1 (I do not have any musical skills) till 10 (I have significant musical abilities). The full questionnaire can be found in the appendix.

6.3. Preparatory work and testing procedure

Upon identification of a participant profile for the study first I searched for academic institutions where Spanish course was a part of a learning programme. Next, I distributed call for participants flyers (including requirements for participation, advantages for participants and contact information) at the Department of Romance Studies at University of Vienna, Language Centre of University of Vienna and the University of Natural Resources and Life Sciences. This search technique was not well regarded, and I continued to send emails to the Spanish professors of the universities asking for their assistance in introducing my project personally during their classes. The teachers of Spanish at the University of Economics of Vienna allowed me to attend several Spanish lessons where I presented briefly the scope of my project to the students and distributed a form for leaving their email address for more information about participation. Having sent a more detailed information about the project to the students, I received a significant number of positive responses to take part in the study. Alongside this, I used online social media to post the recruitment flyer in the Facebook groups of various student

communities in Vienna. Additionally, by means of word of mouth my friends assisted actively in distributing the call for participants' information. The following stage of work was to check whether the potential participants profile fit the conditions of the study and arrange individual testing sessions via email correspondence. With regards to the ethical concerns the participants were ensured that their data will be processed anonymously, and all their test results were encrypted with the code, namely first letter of the first name, first letter of the surname, day of birth and the first letter of the place of birth, e.g., *OG12I*.

Time needed to complete the tests was approximately 120-130 minutes. Due to a large amount of time needed to complete the tests and possible impact of tiredness on the results I decided to divide the testing sessions into two phases: first, personal administration of the working memory and silent reading tests and second, online testing of DIALANG test, Mini PROMS test and SPM test via links with detailed instructions in email. Prior to conducting the tests, the participants filled out a short questionnaire. Then, after a brief introduction into the testing process, working memory and silent reading tests were completed. After completing the first stage of the testing, I sent an email with the information how to proceed with the online tests in a following sequence: DIALANG reading test, Mini PROMS test for music aptitude and SPM intelligence test. Upon completion of the tests the results were saved in a relevant database. During the testing procedure, it was ensured that the participants understood the tasks clearly and the follow-up questions were answered. Moreover, it was important to keep the testing settings agreeable for testees not to be distracted. With regards to the special equipment needed for the tests, the participants were requested to use earphones for music aptitude test for a better recognition of sounds.

Finally, the participants shared their positive impressions on the tasks taken and they were given a full profile with the results of the tests.

6.4. Analysis

After the relevant data for research had been collected by means of the above-mentioned tests, I used *SPSS Statistics Software* (2013, version 22.0.) in order to test the hypotheses and analyse my results. This tool is widely used for research and it is easy to use. This programme includes a wide range of data processing techniques and helps to illustrate the findings visually by means of charts, histograms, and other graphics.

In this study, I employed correlational analysis methods which did not involve a direct manipulation of variables and provided a natural view of the research question (Field 2009:

12). In correlational research, the performance in above-mentioned tests was estimated and investigated for relationships between them. Also, I used descriptive statistics in order to follow the trends in the sample. Lastly, multiple regression analysis was applied to inspect the influence of the predictor variables on the dependant variable.

In the following, I will describe briefly correspondent SPSS methods I used to answer my research questions. It should be noted that for all statistical calculations the statistically significant p-value was determined at $p<.0.5$.

6.4.1. Statistical analysis of sample parameters and test performance

Prior to inspecting the results of the tests of the participants, I analysed the sample data by means of the descriptive statistics. Together with the statistical models, I used the graphical representations of the general trends in the sample. First, the charts displayed the distribution of age, gender and musicians/non-musicians in the group. Further, the measures of mean, mode and median helped to identify the centre of frequency distribution. Then, K-S test showed whether the results were normally distributed, and subsequently the parametric or non-parametric statistical tests could be used for the following evaluations. Additionally, I visualized the results on the normality of data distribution by means of a Q-Q plot.

To take a closer look at the potential differences between participants with different level of musical experience, the participants were distributed into two correspondent groups: musically-experienced and musically naïve. The comparison of the variances in variables of two groups was conducted by using Mann-Whitney U test for non-normal distribution and a T-test for normal distribution.

6.4.2. Correlational analysis

The bivariate correlation analysis is a statistical method used to investigate whether two continuous variables show a relation (Larson-Hall 2010: 148). Due to the scope of the present study, the correlation analysis was applied to reveal, first the relationship between music aptitude (including the subtests Melody, Accent, Tempo and Tuning) and individual differences, such as general intelligence and working memory. Secondly, the relationship between music aptitude and reading-related tasks, such as FL word-decoding and vocabulary was examined. Particularly, the results of the correlation should show whether this value was

positive or negative. Based on the previous research, it was expected that the correlation between the variables would be positive. In other words, the larger the music aptitude, the higher general intelligence and working memory would be. Similarly, the larger the music aptitude, the better FL reading-related skills would be expected. Depending whether the data was normally distributed, the appropriate test would be applied, namely Pearson's *r* for normally distributed scores or Spearman's rho as a non-parametric alternative (Larson-Hall 2010: 161). The correlation coefficient would describe the strength of the relationship between the variables. It should be noted that this test usually reports on the relationship between two things, but it does not show which variable causes the other (Larson-Hall 2010: 164).

For the visual inspection of the results, a scatterplot with the regression line was applied. Particularly, if there was a correlation between the variables, a regression line should be inserted following the points, that is satisfying the assumption that the data is linear (Larson-Hall 2010: 149).

6.4.3. Multiple regression analysis

Multiple regression analysis is a statistical method used to explain and predict a response variable (e.g., FL reading performance) by means of a number of explanatory variables (e.g., music aptitude, working memory, general intelligence) (Larson-Hall 2010: 179). In fact, by applying a multiple regression, I was able to investigate whether explanatory variables could predict a variance in the response variable measures and to which extent. According to Field (2009: 212), a great deal of care should be given to the choice of the predictor variables added to the model as the values of the regression coefficients depend on the variables in the model. In the study, a stepwise regression model was used where the potential predictors were entered. Further, SPSS inspected carefully the variables which contributed to the variance in the dependant variable and excluded the ones which did not contribute. This type of regression model was preferred over the hierarchical regression model as it provided a purely statistical information not based on previous assumptions that might be false.

To answer the question whether music aptitude, FL word-decoding and WM could explain reading skills, I conducted the stepwise regressions where VSPT continuous values were set as a dependant variable. Music aptitude, FL word-decoding skills and working memory would be set as the predictors. Lastly, these findings were used for mediation analysis

to establish whether there was a direct influence of music on reading or individual differences of the participants might be involved in the relation between music and reading.

6.4.4. Mediation analysis

Mediation analysis, visually represented by *Structural Equation Model* (SEM), is a statistical method used to explain "how or why an independent variable influences an outcome" (Gunzler et al. 2013: 390). A simple mediation model is considered a causal system, where a cause (independent) variable is assumed to influence an outcome (dependant variable) Y through a mediator variable (Gunzler et al. 2013: 391). Figure 6 shows a mediational model as found in Baron and Kenny (1986: 1176).

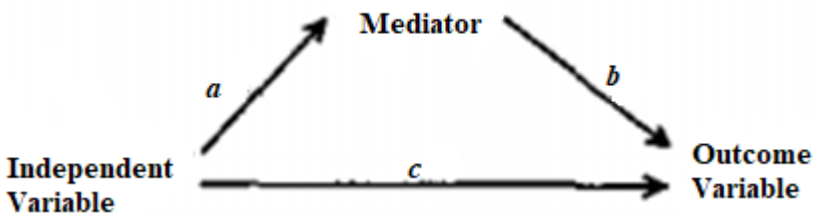

Figure 6 Mediation model with multiple variables (Baron & Kenny 1986: 1176)

As illustrated in Figure 6, independent variable influences the mediator, and mediator influences the outcome. Previously, the studies on the link between music and reading showed that music might predict reading performance by means of enhancing the working memory and attention following the causal pattern (Strait, Hornickel & Kraus 2011). Therefore, based on the prior research and theory, the mediation analysis was used to investigate the hypothesis that music aptitude as independent variable could influence reading performance in a foreign language through possible mediator variables (general intelligence and working memory). To put it differently, I tested whether music aptitude led to better working memory, intelligence and word-decoding skills, which, in turn led to better reading-related performance.

According to Baron and Kenny's (1986: 1173) approach, the mediation can be tested by using several regression analyses where the significance of the p-values is examined. Kenny (2008: 355) distinguishes between complete and partial mediation. In case, the predictor is not significant when the mediator is factored out, the finding supports the complete mediation. If predictor is still significant (that is the mediator and predictor both significantly explain variance in outcome), the findings establish a partial mediation.

7. Results

7.1. Results of Sample Parameters

7.1.1. Distribution of age

The average age of the sample was 19 years, where the youngest participant was 18 and the oldest was 20 years old. Figure 7 shows the distribution of age in the sample.

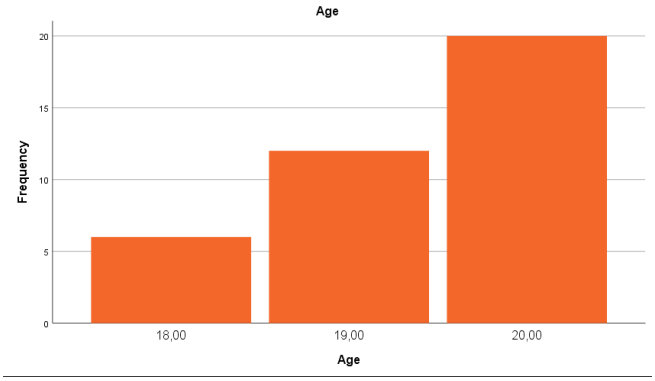

Figure 7 Age distribution of participants

As Figure 7 illustrates, there are six participants at the age of 18, twelve participants at the age of 19, and twenty participants at the age of 20. Detailed information can be found in Table 4 in the appendix.

7.1.2. Distribution of gender

Concerning gender, the sample consisted of 20 females (53%) and 18 males (47%). Figure 8 shows the distribution of gender in the sample.

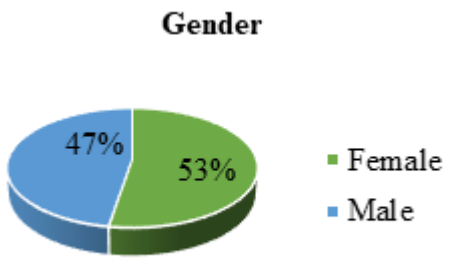

Figure 8 Gender distribution of participants

As shown in Figure 8, female participants prevailed slightly in the sample.

7.1.3. Musical expertise self-assessment

According to the biographical data in the questionnaire, eighteen participants out of thirty-eight reported on absence of musical training and twenty participants stated that they undertook earlier a musical training. Further the participants were categorized into two subgroups based on their musicality status as either *musically naïve* or *musically experienced* as suggested in Banai and Ahissar's (2013) study. In line with Law and Zentner's (2012) concept of *musical sleepers*, the self-assessment of the musicality level of the participates was further controlled by Mini PROMS test for the sake of complete certainty. Figure 9 displays graphically the distribution of musical experience of the sample according to the self-reported data.

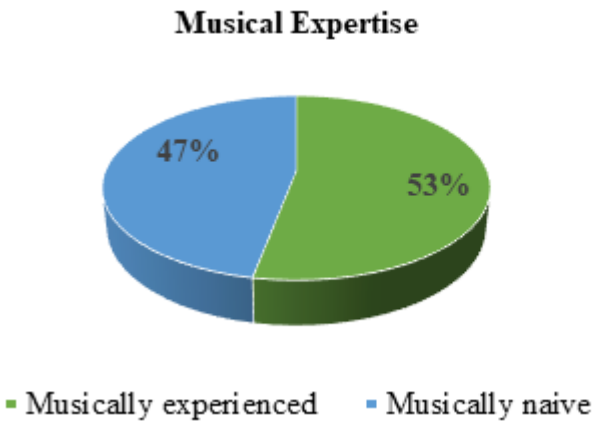

Figure 9 Distribution of musical expertise of participants based on a questionnaire

As Figure 9 shows that 53% of the participants are musically experienced, and 47% are musically naïve.

Concerning distribution of musical expertise separated by gender (based on further musical test results), the group of musically naïve participants consisted of 11 males and 8 females, whereas musically experienced participants consisted of 12 females and 7 males. Figure 10 displays the level of musical abilities in relation to gender of the participants.

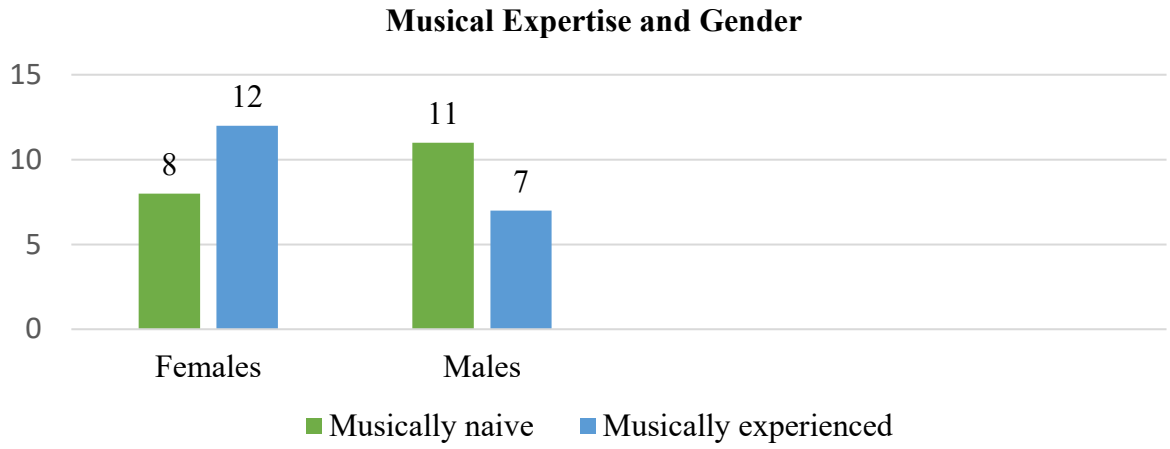

Figure 10 Distribution of musical expertise by gender

Figure 10 shows that female participants tend to have higher musical abilities than male participants in the sample.

7.2. Results of tests

7.2.1. Mini PROMS test for music aptitude

The average score of the Mini PROMS test within the whole sample was 22.75 (SD=3.701) with the minimum score of 12 and the maximum score of 27,5. Next, by means of a median split function, the scores of the sample were divided into the low and high scores. The participants with low scores were determined as musically naïve (<22.5) and the participants with high scores were determined as musically experienced (>22.5). Interestingly, the results of the mini PROMS test were not fully in correspondence with the self-reported information on musical abilities. In particular, two participants in the sample were identified as sleeping musicians, that is "individuals whose musical proficiency languishes despite multiple years of training" (Law & Zentner 2012: 1). One participant was indicated as a musical sleeper as he did not receive a musical training, but reached a high level of musical proficiency. As expected, the group statistics showed that musically experienced group in average performed better in the musical test than non-musicals (25.5>20). The difference in means of subgroups is illustrated in a form of a box plot in Figure 11.

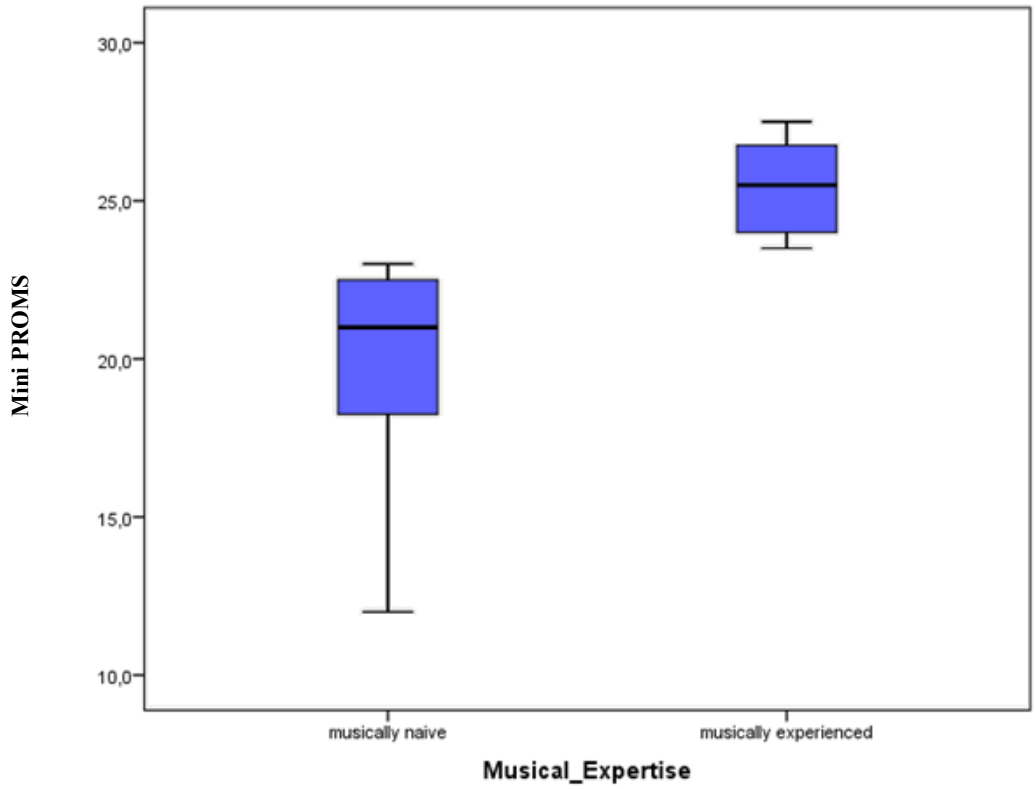

Figure 11 Mean score for each group: mini PROMS

A detailed information on the scores of Mini PROMS test and subtests is given in Table 5 and Table 6 in the appendix.

7.2.2. DIALANG Reading/VSPT test

As mentioned above, DIALANG provides values of reading ability not as a continuous value but a level of proficiency. Those values were not applicable for processing in SPSS, and VSPT scores as a reading-related alternative were used. Concerning the level of FL reading proficiency, the results showed that twenty-six participants achieved A2 level and twelve participants obtained B1 level. In particular, eighteen musically naïve participants achieved A2 level and only one participant obtained B1 level. Eight musically experienced participants reached A2 level and eleven participants achieved B1 level. Detailed information on reading performance can be found in Table 7 in the appendix. The results of FL reading are largely consistent with the performance on VSPT test, that is the higher the level in FL reading, the higher VSPT score was. The average score on the reading-related VSPT test in the whole sample was 583.16 where the maximum score was 789 and the minimum score was 433.

Large standard deviation index (SD=104.120) showed a big variance of estimates of vocabulary test within the group. By running K-S test for musical and non-musical groups, the value of significance was smaller than .05 that identified a non-normal distribution of data in musically naïve group (p=.009) and normal distribution of data in musically experienced group (p=.200). Figure 12 and Figure 13 show visually the distribution of data in a form of Q-Q plots.

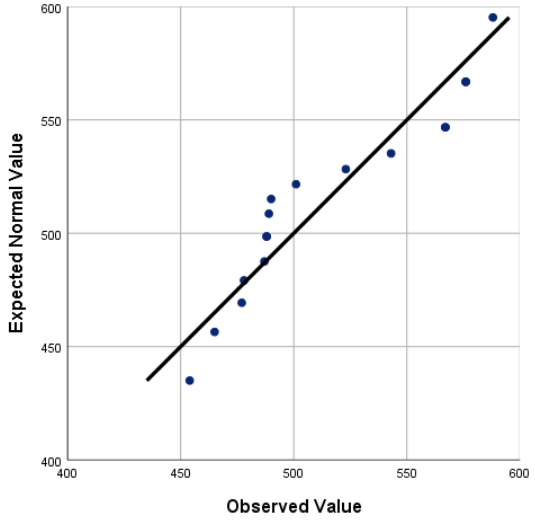

Figure 12 Q-Q VSPT in musically naïve group: normality of distribution

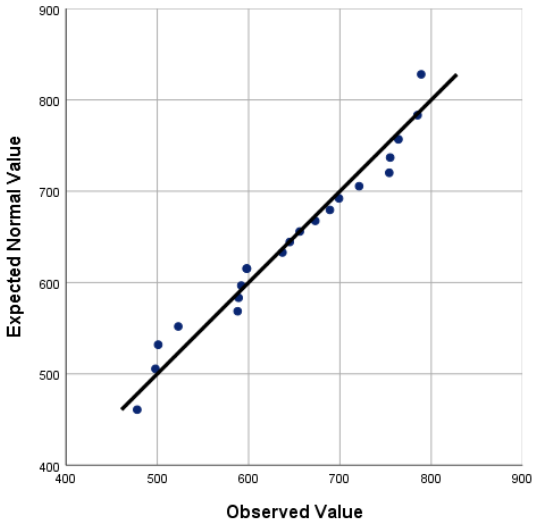

Figure 13 Q-Q VSPT in musically experienced group: normality of distribution

The means comparison between two groups showed that participants with musical expertise achieved better scores in the VSPT than the participants without musical experience (656.42>509.89). Mean differences in the VSPT are shown in Figure 12. Detailed information on VSPT performance can be found in Table 8 in the appendix.

M-W-U test showed that the difference in scores between two groups is significant (p=.000). Therefore, musical people have significantly better reading-related skills than non-musical people. Detailed information on M-W-U test indicators can be found in Table 14 in the appendix.

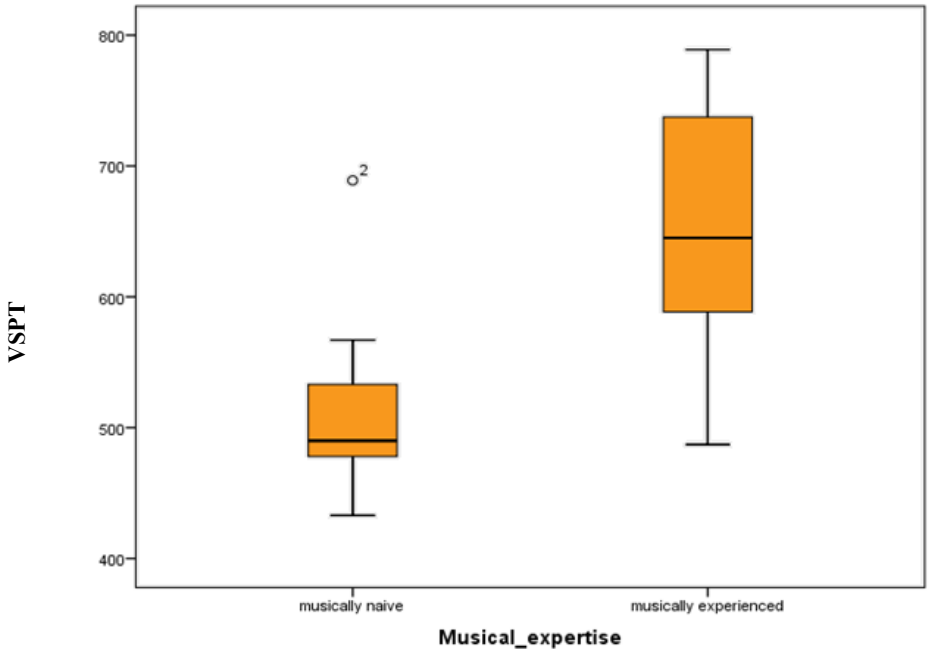

Figure 14 Mean score for each group: VSPT

As Table 14 illustrates, musically experienced group has a better performance than musically naïve group on the VSPT.

7.2.3. Silent reading test for L1 and FL word-decoding skills

According to group data statistics, the mean score in L1 silent reading was 157.76, and mean score in FL silent reading was 87.74. As expected it showed that the power of word identification in native language is stronger than in a foreign language. The results showed a great difference in frequency of values where the minimum score in L1 reading was 125 and the maximum score was 202. Similarly, in FL reading the scores varied drastically with a minimum score of 47 and the maximum score of 131. The values obtained from the participants were spread out further from the average score, which resulted in a large standard deviation index within the groups (SD=19.295 in L1 and SD=20.993 in FL). Focusing on performance in FL silent reading, I compared the scores of participants depending on their musical expertise. K-S test for normality showed that the data were normally distributed with p-value of .104>.05 in musically naïve group, and 0.091 >.05 in musically experienced group. Q-Q plots in Figure 15 and Figure 16 show the distribution of results. As the data in both groups were normally distributed, I ran a T-test for independent samples with FL silent reading scores as a test variable.

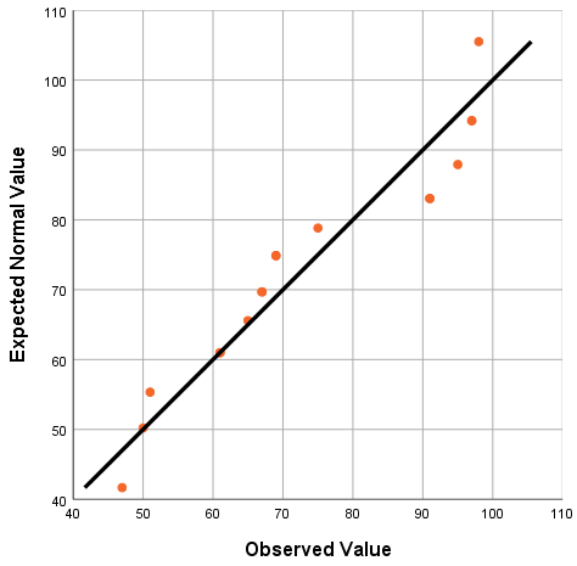

Figure 15 Q-Q Plot of FL silent reading test in musically naïve group: normality of distribution

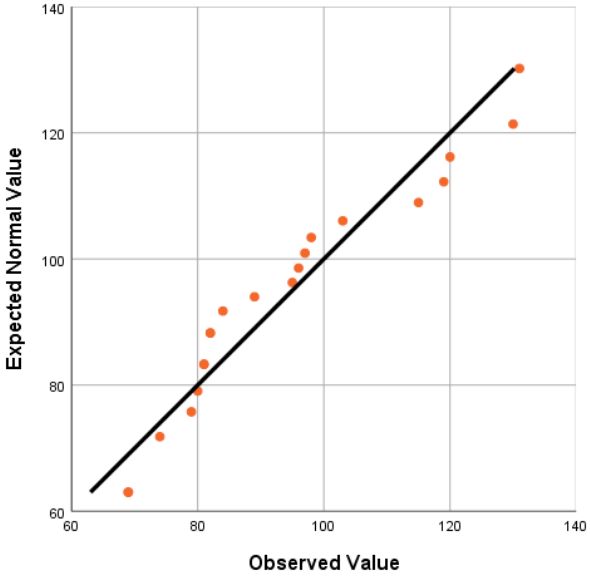

Figure 16 Q-Q Plot of FL silent reading test in musically experienced group: normality of distribution

Group statistics showed that musical participants scored better than non-musical participants (98>71.). SD=17, 77 in musically naïve group and SD= 19,15 in musically experienced group. Interesting that the highest scores in the group were achieved by musically experienced participants and the lowest scores by musically naïve participants. The difference in means between the two groups is illustrated in Figure 17. Detailed information on group performance on L1 and FL silent reading test can be found in Table 9 and Table 10 in the appendix.

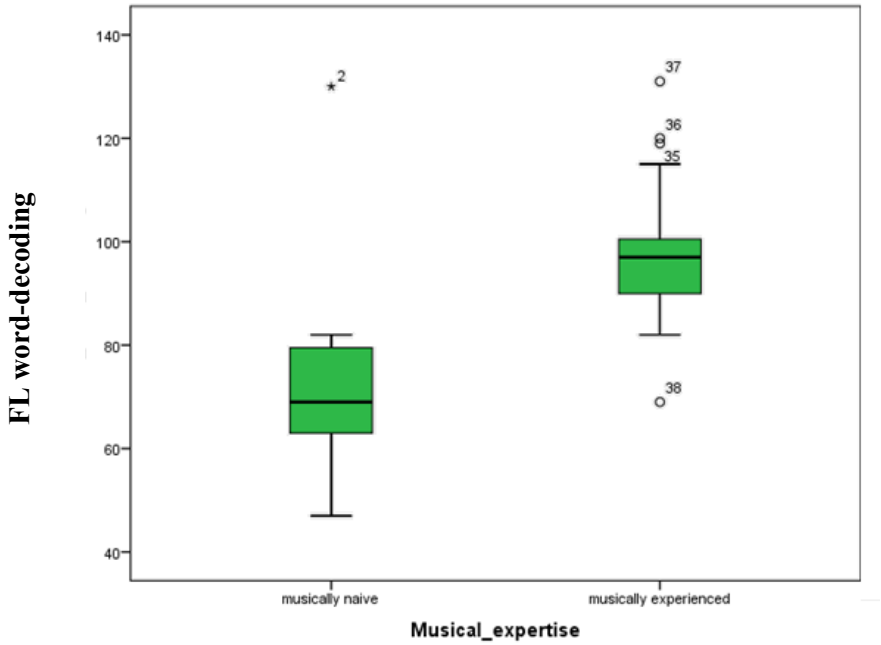

Figure 17 Mean score for each group: FL silent reading test

T-test showed that p-value (.002) was smaller than an alpha value which meant that the difference between means was significant. In this way, this result lined up with my intuitions obtained from the numerical data that musically experienced group was significantly better than non-musical group in FL word identification. Detailed results on T-test indicators in FL silent reading test can be found in Table 14 in the appendix.

7.2.4. Raven's Standard Progressive Matrices (SPM) test for general intelligence

The average raw score of the Raven's SPM test was 36.87, where the maximum score was 45 and minimum score was 25. The index of SD was 4.616 that showed that the results of the SPM test differed greatly among the participants.

K-S test of SPM scores identified a non-normal distribution of data both in the musically naïve group (p=.003) and musically experienced group (p=.028). The Q-Q plots in Figure 18 and Figure 19 display visually the normality of distributions of SPM scores of the corresponding groups.

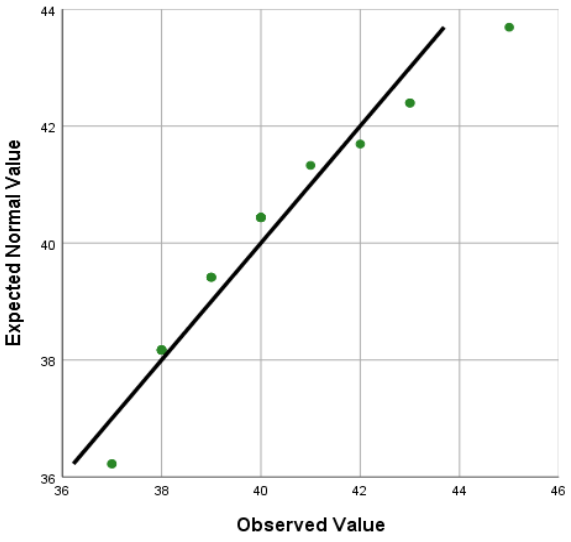

Figure 18 Q-Q Plot of SPM test in musically naïve group: normality of distribution

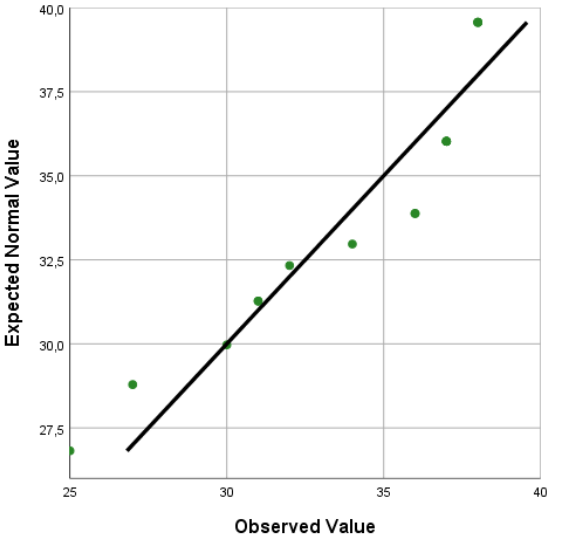

Figure 19 Q-Q Plot of SPM test in musically experienced group: normality of distribution

The comparison of means showed that musically experienced participants performed better than the musically naïve subjects on IQ test (33,79< 39,94). The difference in means between the groups is illustrated in Figure 20. Detailed findings can be found in Table 11 in the appendix.

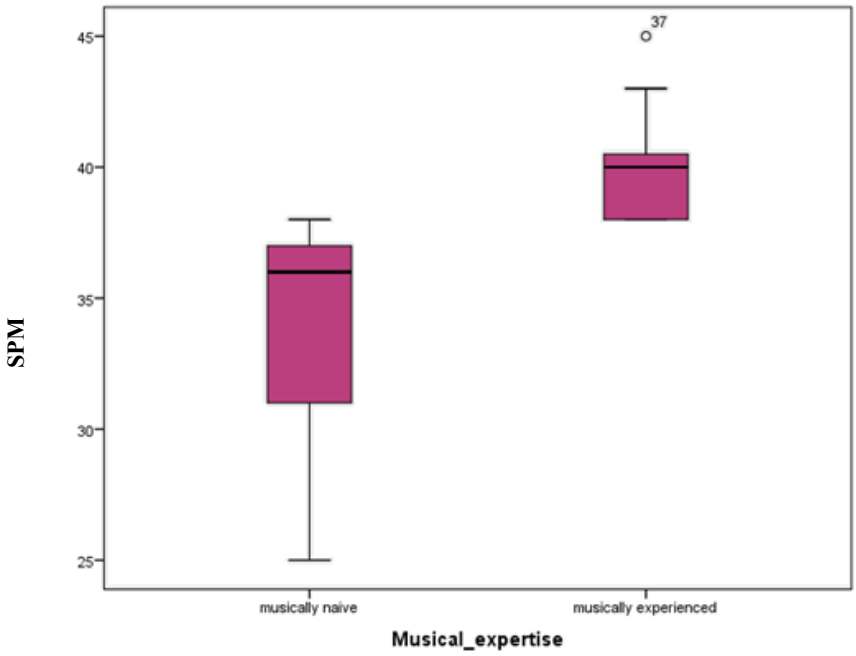

Figure 20 Mean score for each group: SPM

M-W-U test showed that the p-value was smaller than the alpha value (.000<.05) which meant that the difference between means of the two groups was significant, that is musically

experienced participants performed significantly better than participants without any musical experience in SPM test. Detailed information can be found in Table 14 in the appendix.

7.2.5. WAIS test for working memory

The average mean of values of working memory test was 23.34 where the lowest score was 20 and the highest score was 27. A standard deviation index was 2.474 that signified a comparatively smooth distribution of values between the participants. The results of this test showed a rather low level of working memory capacity among the participants, where a total score was largely influenced by a significantly low estimate in the non-word subtest. The means of the subtests were as follows: digit span forward (M=9.26), digit span backward (M=7.66) and non-word span (M=6.42). Detailed information on group performance can be found in Table 12 and Table 13.

K-S test showed that the scores in the musically naïve group were normally distributed (p=.200), whereas the results in musically experienced group were not normally distributed (p=.013). Figure 21 and Figure 22 show distribution of the results in the groups.

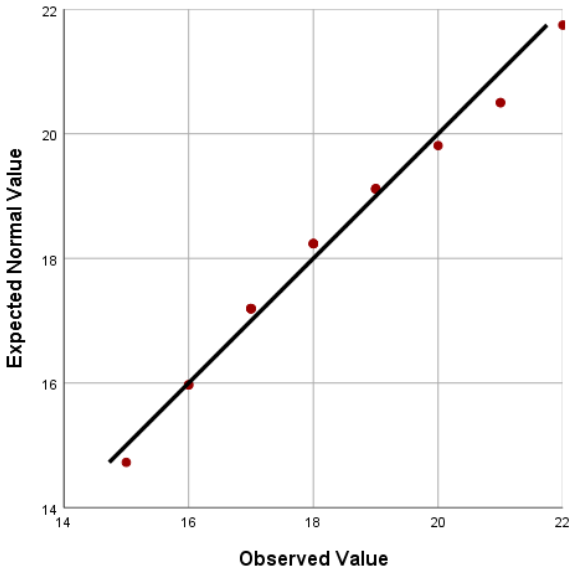

Figure 21 Q-Q Plot of WAIS test in musically naïve group: normality of distribution

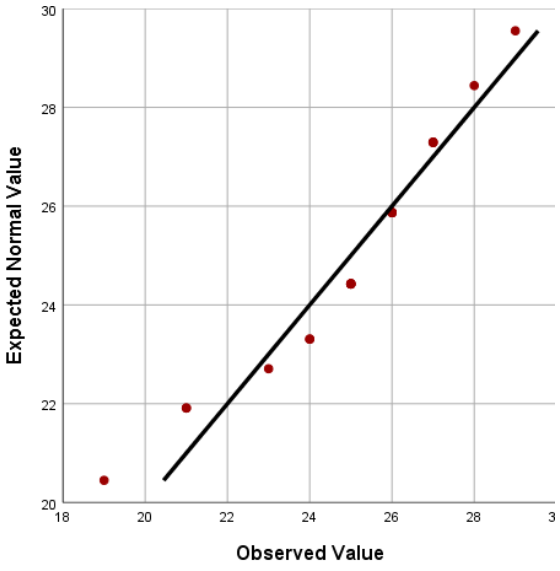

Figure 22 Q-Q Plot of WAIS test in musically experienced group: normality of distribution

Comparison of means of two groups demonstrated that musically experienced group outperformed a musically naïve group in working memory task (21.53<25.16). Detailed

information on group performance can be found in Table 12 and Table 13. The difference in means of the two groups is illustrated in Figure 23.

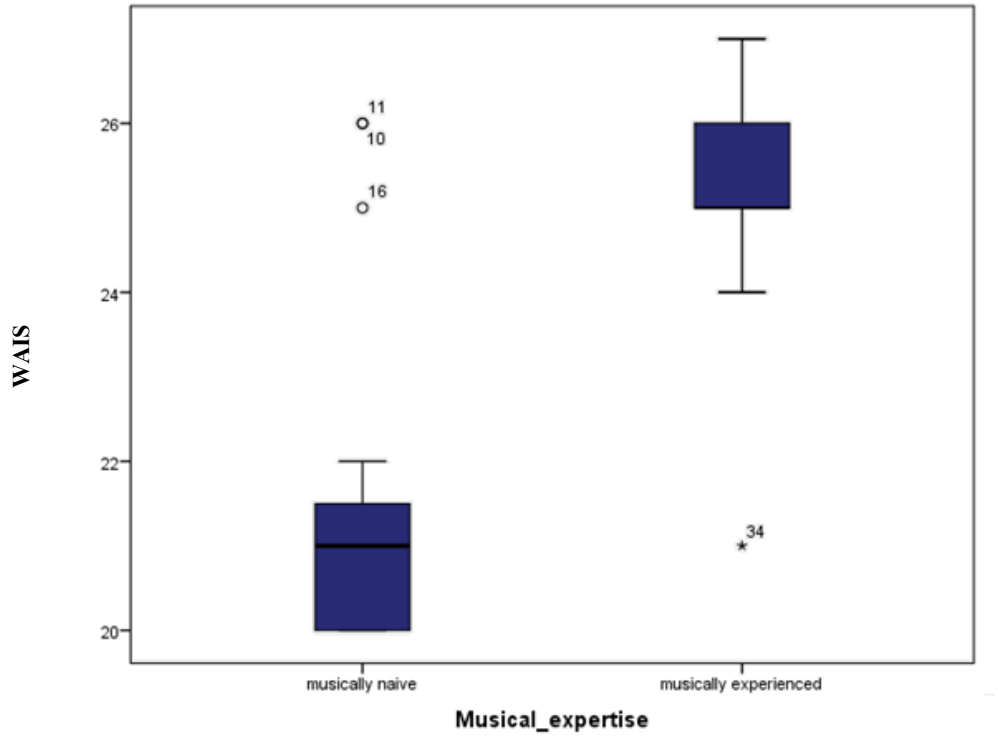

Figure 23 Mean score for each group: WAIS

M-W-U test showed that group with musically expertise had significantly higher results than the group without musical abilities in the working memory task (.000<.05). Consequently, the hypothesis that musical people have better working memory capacity than non-musical people was supported. The findings can be found in Table 14 in the appendix.

7.3. Results of correlational analysis

7.3.1. Correlation between music aptitude and reading related-skills

In the whole sample the Spearman correlation analysis showed a strong correlation between music aptitude and reading-related ability (VSPT r=.760, p=.000; FL word-decoding skills r=.711, p=.000). All Mini PROMS subtest had a strong positive correlation with reading-related tests, however tempo had a comparatively weaker correlation with word-decoding skills (r=.424, p=.004). A further significant strong correlation between vocabulary knowledge and word-identification skills was identified (r=.805, p=.000). The scatter plots in Figure 24 and Figure 25 illustrate the association between music aptitude and FL reading-related skills.

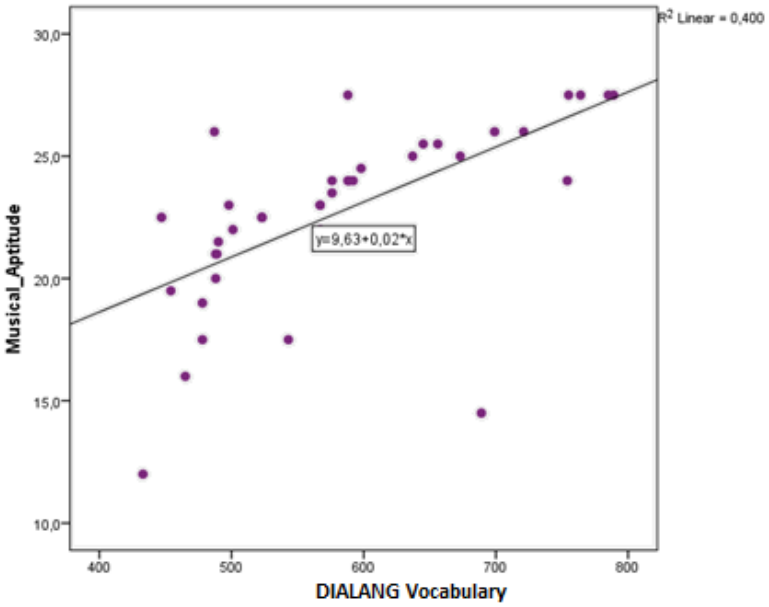

Figure 24 Correlation: music aptitude and DIALANG vocabulary

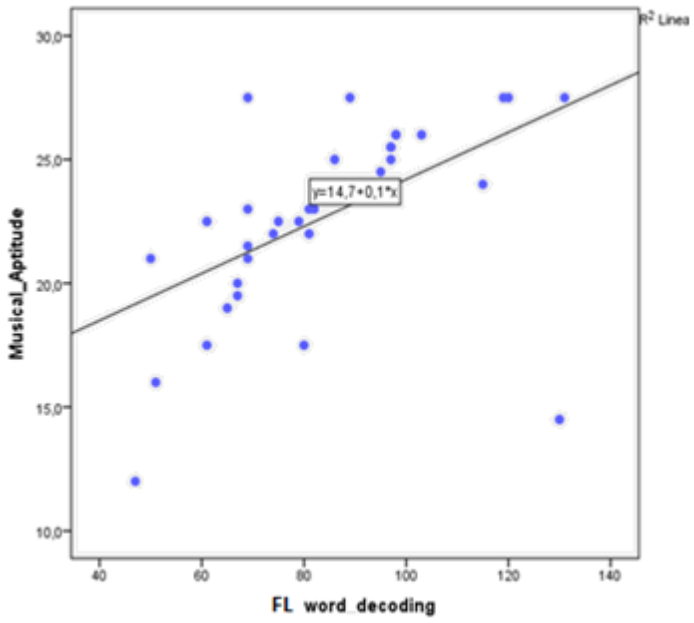

Figure 25 Correlation: music aptitude and FL word-decoding skills

As Figure 24 and Figure 25 demonstrate that values of music aptitude and reading-related skills resemble a line and have a strong positive association. Detailed findings can be found in Table 15 in the appendix.

7.3.2. Correlation between music aptitude and intelligence

The most remarkable result to emerge from the data was that the strongest correlation was found between music aptitude and general intelligence (r=.99). The p-value of .000 was smaller than the alpha-value that confirmed that there was a statistically significant correlation between levels of music aptitude and IQ. All musical subtests scores correlated significantly with IQ results. The value of general intelligence correlated strongly with other variables, where the most significant correlation was with working memory (r=.77, p=.000).

Visually the results of correlation between musicality and general intelligence are displayed in Figure 26 in a form of a scatter plot.

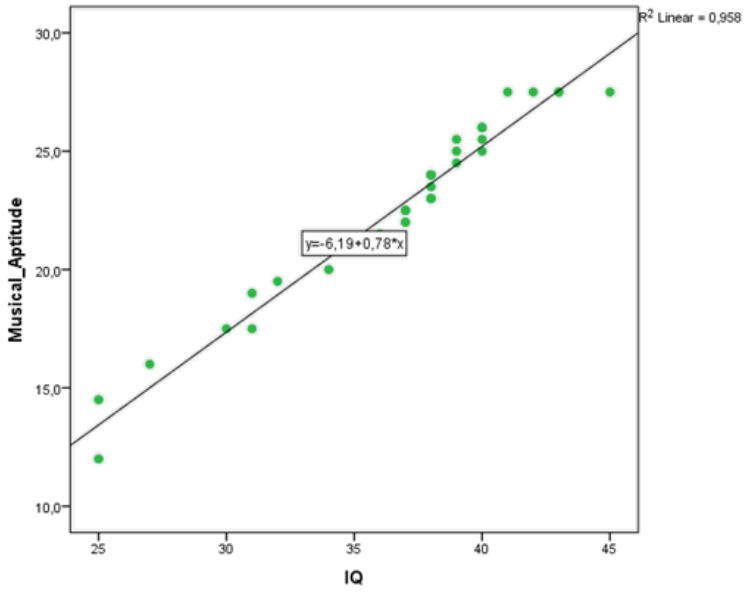

Figure 26 Correlation: music aptitude and general intelligence

Figure 26 shows a linear relationship where large values of music aptitude are associated with larger values of IQ. Detailed results can be found in Table 15 in the appendix.

7.3.3. Correlations between L1 and FL word-decoding skills

Spearman correlation analysis showed that there was a positive correlation between word decoding skills in L1 and FL silent reading (r=.586, p=.000). Figure 27 displays a linear relation between word-decoding skills in L1 and FL.

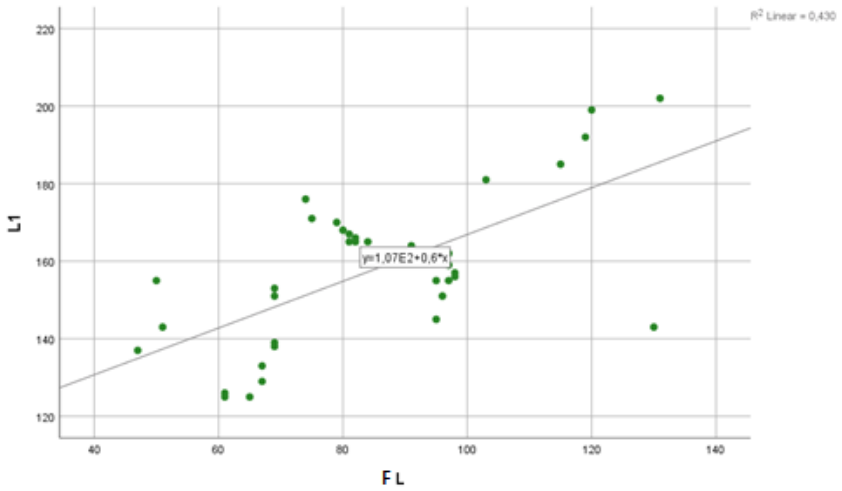

Figure 27 Correlation: L1 and FL word-decoding skills

Figure 27 shows a linear relationship between word-decoding skills in L1 and FL. Detailed results can be found in Table 16 in the appendix.

7.3.4. Correlation between music aptitude and working memory

The results showed that there was a significant positive correlation between music aptitude and working memory (r=.78, p=.000). Figure 28 illustrates graphically the association between musicality and working memory.

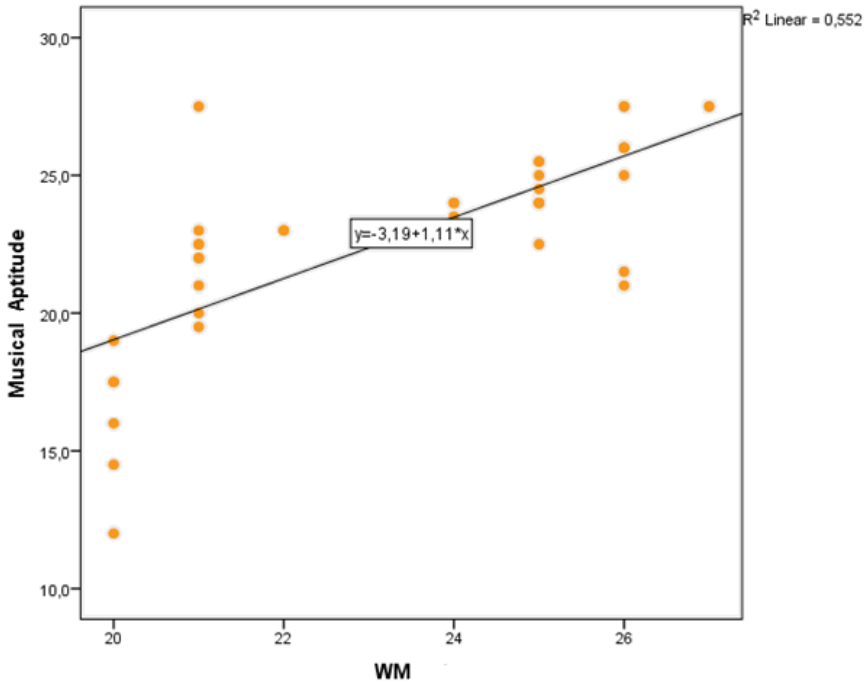

Figure 28 Correlation: music aptitude and working memory

As Figure 28 shows the higher the music aptitude, the better working memory is. Detailed results can be found in Table 15 in the appendix.

7.4. Results of multiple regression analysis

Taking into consideration that correlation between music aptitude and intelligence showed a nearly perfect correlation it should be treated with caution and tested further with a bigger sample for certainty. Therefore, it will not be further investigated in a multiple regression model.

7.4.1. Effect of music aptitude and working memory on FL reading-related skills

To discover a role of music aptitude and working memory in explaining the variance in FL reading-related skills, a stepwise multiple linear regression was applied. In this test, VSPT score was entered as the dependent variable. FL word-decoding skills, working memory and music aptitude were set as the independent variables. Working memory failed to reach the significance level and was removed from the model. That is, it may show that working memory overlaps strongly with music aptitude and, that is musically trained people have already developed a better working memory. Next, the results showed that FL word decoding skills explained 57% of variance in reading-related scores (R^2=.574, p=.000). When music aptitude scores were included, the model as a whole explained 65% of variance (R^2=.646, p=.012). Figure 25 illustrates graphically the variance in reading explained by FL word-recognition skills and music aptitude.

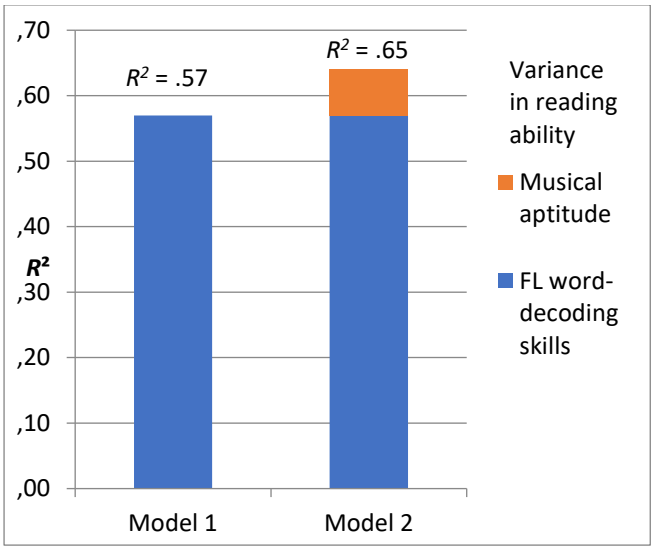

Figure 29 Multiple regression model: music aptitude and reading-related skills

Therefore, music aptitude seemed to explain variance in reading after FL word recognition scores were factored out. That is, music aptitude had a significant effect above and beyond the effects of FL word-decoding and could explain directly a reading performance in a foreign language. However, it should be tested whether this effect was caused by the overlap in music aptitude and a working memory capacity. Detailed results can be found in Table 17 in the appendix.

7.4.2. Effect of working memory on the link between music and FL reading-related skills

Having assumed that music aptitude and working memory might overlap strongly, a next regression model aimed to investigate the influence of working memory and FL word-decoding skills on reading skills when the music aptitude was excluded from the model. Interestingly, the regression model with a working memory as a predictor showed a similar percentage of variance explained by music aptitude as in Figure 29. The findings demonstrated that FL word-recognition skills accounted for 57% of variance in reading (R^2=.574, p=.000) and the regression model with working memory included explained 64% (R^2=.673, p=.018) of variance in FL vocabulary task. Figure 30 displays the results of the regression model.

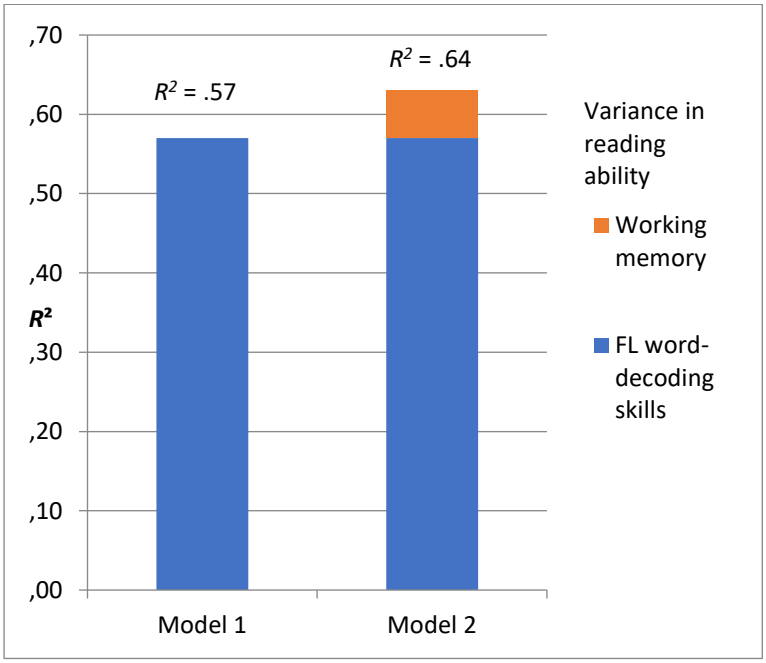

Figure 30 Multiple regression model: working memory and FL reading-related ability

Taking into account a similar effect of music aptitude and working memory on reading skills, an assumption about the role of working memory as a mediator between music and reading might be supported. Detailed information can be found in Table 18 in the appendix.

8. Discussion

The aim of the present study was to investigate the link between music aptitude and reading skills as well as to determine whether musicality of FL learners could predict their reading-related skills taking into account their general intelligence level and working memory span. Although, many researchers inspected some of these factors relating reading and musicality in children, few of them investigated these components in reading of FL adult learners. Further, this section will discuss the results of the statistical analyses with regard to the following research questions:

(1) Does the group with musical expertise outperform significantly the group without any musical expertise on the tests for general intelligence, working memory span, music aptitude and reading-related skills in a foreign language?
(2) Do the results of the sample support an association between musicality, reading-related skills, IQ and working memory capacity?
(3) Is there any association between word-decoding skills in a first and foreign languages?
(4) Does music aptitude explain FL learner's reading-related skills?

Additionally, this section will consider the limitations of the present study as well as its implications for future research.

8.1. Influence of music aptitude on FL reading-related task performance

The results of the reading-related VSPT showed that musically experienced participants performed better than the non-musical participants (645,43>509,82). These findings are consistent with the previous correlational and experimental studies on musicality and reading skills (Darrow et al. 2009; Southgate & Roscigno 2009; Anvari et al. 2002). However, there was a strong variance in scores within the groups. Interestingly, several participants that were not musically experienced gained higher scores than musically experienced participants in the reading-related tasks. Further, the findings indicated a strong correlation between music

aptitude and reading-related ability. As shown in the previous studies, the association between musical skills and reading might simply exist due to the strong correlation between reading comprehension and general intelligence essential in FL reading (Corrigall & Trainor 2011 :15). Therefore, musically experienced participants might be smarter and consequently better in reading.

As suggested by Dége, Kubicek and Schwarzer (2015), a strong link between musical skills and reading abilities might occur due to the initial significant correlations between music aptitude and components of reading proficiency, such as word-decoding skills, working memory and general intelligence. Similarly, in the present study musically trained participants achieved significantly better results than their musically untrained peers in the reading-related tasks, which assumes a favourable influence of music on their reading abilities.

8.2. Influence of music aptitude on general intelligence performance

The results of the Raven's SPM test are in line with previous findings, which support the claim that musically trained people have higher performance on tests of general intelligence (Schellenberg 2004). In fact, the results showed a significant gap in average general intelligence level between musicals and non-musicals

According to Schellenberg (2004: 511), this difference in performance might stem from the so-called Mozart effect when "passive listening to music composed by Mozart produces temporary increases in spatial abilities". Similar results were obtained in Banai and Ahissar's (2013: 4) study where the group with the smallest amount of musical experience (1-6 months) achieved higher IQ scores than the group without any experience. Further, the authors (Banai & Ahissar 2013:4) explained that learners with higher IQ are more likely to study music.

The result of the Spearman's correlation test between music aptitude test and general intelligence test confirmed the assumptions about a strong association between those variables. In fact, the strongest correlation among all variables given was observed between musicality and intelligence performance, which might be considered a perfect correlation (r=.99). Therefore, the students with the highest music aptitude performed the best in the IQ test and, conversely, participants with the poorest music aptitude achieved the lowest general intelligence scores. With regards to that link, Corrigall and Trainor (2011: 149) suggested that attending musical lessons usually taught students self-control and developed attention necessary for concentration for long time intervals and good academic performance.

It is peculiar that all subtests of music aptitude test such as Melody, Accent, Tuning and Tempo were strongly correlated with the general intelligence performance. Similar results were observed by Lynn, Wilson and Gault (1989, quoted in Schellenberg 2004: 1) who concluded that music aptitude was strongly associated with general intelligence.

Apart from the relation between general intelligence and music aptitude, IQ was observed to be strongly correlated with a working memory capacity. These findings are consistent with the previous studies which demonstrated a strong link between working memory span and general intelligence (Colom et al. 2005; Fukuda et al. 2010; Mogle et al. 2008). It complies with the aim of the tasks in the Raven's SPM test to complete the patterns which can be easily accomplished if more items can be simultaneously kept in the working memory (Fukuda et al. 2010: 3). However, Salthouse and Pink (2008: 2) pointed out that the relation between working memory and general intelligence relation was true with the larger pattern sizes as it revealed the individual differences needed to deal with more data.

To the best of my knowledge, no study has so far reported such a strong correlation between musical skills and IQ level among adult FL learners. Therefore, these findings should be tested with a bigger sample for certainty.

8.3. Influence of music aptitude on working memory capacity

As expected, musically experienced participants performed better that participants with poor musical expertise on the WAIS test. A similar trend in performance was observed in Banai and Ahissar's (2013: 5) study where participants with no musical experience tended to have a lower working memory span. It is interesting that a musically naïve group prevailed with the participants who had the poorest working memory skills, but in musically trained group the results were quite spread including a few participants with low working memory as well. This suggests that participants with initially poor working memory might have significant gains after music instruction. In parallel to this argument, Banai et al. (2009) conducted a study where the participants with poor working memory were instructed on the frequency and duration discrimination and they showed improvements in working memory spans already after a short training. Given that people with poor working memory do not usually take musical classes, the results of the present study might stimulate the students to attend music training for better working memory accumulation (Banai & Ahissar 2013: 9).

The link between working memory and musical skills was also supported by a strong correlation between Mini PROMS and WAIS results. In fact, the correlation between music aptitude and working memory was the strongest after accounting for IQ results. These outcomes relate fairly to Dége, Kubicek and Schwarzer's (2015) findings and support further the idea of the strong influence of musical abilities on the working memory skills. The relationship between music aptitude and working memory seemed to be largely driven by the Accent subtest closely which is related to the rhythm. These findings fit with the results of Strait, Hornickel and Kraus's (2011) study who determined a strong correlation between rhythm and working memory performance. This could be explained due to the specifics of the tasks employed to measure these variables that had a *phonological loop* as its basis (Dége, Kubicek & Schwarzer 2015: 8). Considering that the phonological loop responsible for storage of tonal and verbal information can be trained during the musical activities, this can result in a higher working memory span among musicians (Dége, Kubicek & Schwarzer 2015: 8). In fact, while measuring music aptitude the participants had to compare two sequences of sounds to the last one, which was linked directly to the ability to maintain several sounds in working memory.

Further, one of the peculiar observations to emerge from the results was that even the participants with the least of musical experience still outperformed non-musicians in the WAIS test that is consistent with Ho, Cheung and Chan's (2003) findings. They (Ho, Cheung & Chan 2003: 447) explained these outcomes with regards to the brain anatomy hypothesizing that music training served as a kind of stimulation, which modified left temporal lobe and resulted in facilitating working memory. In like manner, larger activation of brain regions in musicians during the working memory tasks has been greatly observed in several studies (Koelsch 2009; Tierney & Kraus 2013).

Another interesting observation was that the majority of musically experienced participants responded faster and without large delays or hesitations while repeating digits and non-words. According to Picton (1992: 456) this peculiarity is linked to the *P300* component which is activated when the person is engaged in the task of identifying the targets as well as decision processes. Thus, Besson, Chobert and Marie (2011: 8) pointed out that musicians displayed larger and shorter P300 estimates which was interpreted as an index of faster decision-making and stronger confidence. However, these characteristics of the musicians are not entirely supported by research and should be interpreted with caution.

8.4. Influence of music aptitude on FL word-decoding skills and L1-FL transfer

The results of the silent reading task aimed to determine whether learners were able to transfer the word decoding skills from their first language to the foreign language. Based on the previous research and theoretical frameworks it was expected to obtain a clear interdependence between the performance in L1 and FL word-decoding tasks. Surprisingly, no clear-cut tendencies between the scores in both languages were found. In fact, a participant with the highest scores in FL word-decoding test appeared to gain one of the lowest values in the L1 word-decoding test. Along with this subject, a few more participants showed similar unexpected results, for instance remarkably high scores in L1 silent reading and low scores in FL silent reading. Further, the results in FL word-decoding were greatly spread with a large discrepancy between the maximum and minimum scores. These differences in the results might be explained due to individual factors such as FL proficiency, L1 reading performance, poor phonological awareness as well as lack of attention and motivation towards a foreign language. In fact, different word-decoding strategies might have been used that resulted in gaps between the scores among the participants. Specifically, some subjects intended to do the tasks faster that led to the higher wrong decoding of words and poor scores in total, whereas other participants read the text carefully focusing on the quality of the outcome and, consequently, obtained better scores.

These several non-conformities in the results in L1 and FL word-decoding were not expected due to the concept of the cross-linguistic transfer. In fact, it was presumed that regarding similar orthographic systems in Spanish and German languages, a more significant word-decoding efficiency in FL can be achieved. However, Riches and Genesee (2006: 14) pointed out that often mere commonality between the languages was not sufficient for effective L1-FL transfer, therefore a special instruction on development of decoding skills might be needed. Despite the discrepancies in in L1 and FL word-decoding performance, a strong correlation between those variables was found.

With regards to the musical expertise of the participants, musically experienced participants obtained significantly better results than non-musical participants. However, yet within the groups there were large differences in the performance. For instance, the participant who performed the best in FL word-decoding task did not have any musical experience. Although this result was rather an exception than a tendency. Also, a strong correlation between music aptitude and FL word-decoding skills was found.

The influence of the musical abilities on the word-decoding skills has been largely confirmed in several studies (Gutiérrez-Palma & Palma-Reyes 2007; Kelly, Morris and Verrekia 1998). In the present study the strongest correlations between music aptitude and decoding skills was driven by Melody and Accent (stress in speech) subtests which was supported by Gutiérrez-Palma and Palma-Reyes' (2007) findings. Particularly, the authors (Gutiérrez-Palma and Palma-Reyes 2007, quoted in Rautenberg 2015: 3) assumed that readers in Spanish language employed stress clues that written words have and the "prosodic awareness helps the reader to identify these clues in the written language". Further, there was a strong correlation among the reading-related skills as observed in the past research (Rydland, Aukrust & Fulland 2012; Verhoeven & Leeuwe 2012; Ijalba & Obler 2015).

8.5. Mediating role of working memory between music aptitude and FL reading-related abilities

The results of the multiple regression model, where music aptitude, working memory and reading-related variables were entered showed that music aptitude and working memory overlapped in explaining the variance in FL reading-related performance. Taking into account that the tasks in the Mini PROMS test were largely based on memorizing the music stimuli, it might suggest a role of working memory as a mediator between music and language. These findings are consistent with Christiner and Reiterer's (2015: 5) outcomes where the relation between music and speech is considered reliant on working memory processes.

Similarly, these results seem to be in line with Strait, Hornickel and Kraus' (2011: 7) findings that showed the relationships among music aptitude, reading and auditory working memory by means of Structural Equation Model illustrated in Figure 31.

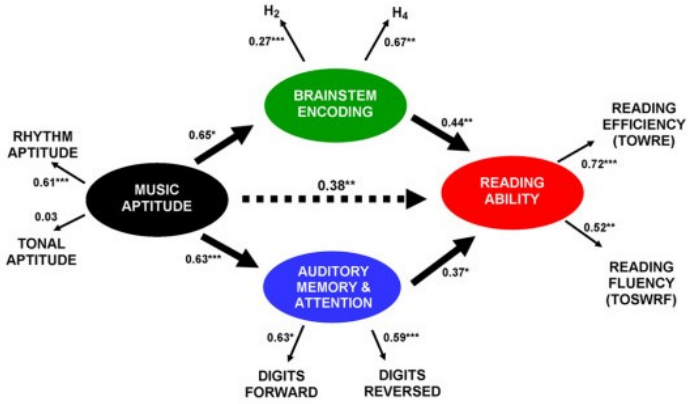

Figure 31 SEM of music aptitude, reading, auditory working memory/attention and auditory brainstem (Strait, Hornickel & Kraus 2011: 7)

The authors (Strait, Hornickel & Kraus 2011: 7) established that music aptitude could predict 38% of variance in reading due to enhancement in working memory. In fact, working memory was referred as a "common cognitive marker" for music aptitude and reading skills (Strait, Hornickel & Kraus 2011: 7). Further, the role of working memory as a mediator between musical skills and reading performance was assumed in a following manner: working memory was determined as a key component of reading proficiency on one hand, and on the other hand, the link between working memory and music aptitude has been already shown in previous research (Strait, Hornickel & Kraus 2011: 7). In the same fashion, the outcomes of the present paper suggest that high music aptitude leads to better working memory, and consequently it leads to better reading-related skills in a foreign language.

With regards to the mediation model first the predictor (music aptitude) improves the mediator (working memory), which has been reported in numerous studies (Schulze, Gaab & Schlaug 2009; Chan, Ho & Cheung 1998). According to Schön et al. (2010) working memory has been largely activated during the musical tasks. Further, numerous studies established that participants with musical abilities showed enhanced working memory in contrast to the non-musicians (Chan, Ho & Cheung 1998). Additionally, Tierney, Bergeson and Pisoni (2008, quoted in Besson, Chobert & Marie 2011: 7) determined that musical people "can hold more information and/or for longer in auditory memory than non-musicians" supported by the positive correlations between the musical expertise and working memory. Similarly, Dége, Kubicek and Scharzer (2015) found that reader learners who experienced a musical training developed a better working memory. Taken together, these findings support the strong relations between sensory and cognitive abilities produced by musical practice (Besson, Chobert & Marie 2011: 8).

Next, the mediation model shows that the mediator (working memory) influences the outcome (FL reading-related skills). The positive influence of the improved working memory on the reading success has been largely observed in the literature. For instance, Jansen et al. (2002, quoted in Dége, Kubicek and Schwarzer 2015: 2) determined working memory as a precursor of the reading. Previously, Share et al. (1984, quoted in Strait, Hornickel & Kraus 2011: 7) identified working memory as one of the sources of individual differences in reading acquisition. In general, the findings of the present study add substantially to the existing body of literature on the close link between working memory responsible for processing and storage of verbal information and FL reading.

Therefore, the findings of the present study assume a mediating role of working memory between music and FL reading-related abilities, suggesting that the influence might be fully

mediated by the enhanced working memory. That is, working memory capacity might explain the relation between music and FL reading.

8.6. Implication for the learning/teaching settings: using music to cultivate FL reading

The findings of this work pose important implications for developing student's reading skills in a foreign language supposing they receive a sufficient musical training necessary also for general cognitive abilities reviewed in this paper. Therefore, this section aims to demonstrate how not only formal musical training, but also the addition of musical activities in the classroom can bring positive effects on reading in a foreign language.

As Auerbach (1978, quoted in Abbott 2002: 10) points out, "music washes away from the soul the dust of everyday life". Indeed, this remark emphasizes that musical activities do not only enhance the cognitive abilities, but also make a process of learning enjoyable and motivating. Similarly, Stansell (2005, quoted in Hinson & Booker 2008: 22) considers music as "therapeutic, developmental, and mnemonic". Interestingly, a positive influence of music on the language learning in general and, in particular on the reading skills has been observed in numerous experimental studies reviewed in the present study. Although there is a strong support for music in the educational settings, it does not occur often due to the lack of the methodological instructions (Engh 2013: 113). Further, Engh (2013: 113) suggests several considerations that favour incorporating music into the foreign language classes. For instance, using a song in the classroom contributes to the development of the community among the language learners by enhancing "social harmony" and building a safe environment (Lems 1996; Huy Le 1999; Lake 2003, quoted in Engh 2013: 114). Moreover, the author (Engh 2013: 114) continues that adding music in the educational settings can break the boundaries between different communities. Alternatively, Cheung (2001, quoted in Engh 2013: 115) points out that music bridges the gaps between formal and informal learning, including the gap between teachers and students. As a result, teachers can involve students into the authentic and natural language learning stimulating them to practise a foreign language during the extracurricular activities (Jenkins & Dixon 1983, quoted in Engh 2012: 115). These considerations support the discussion of the positive effect of music on the language anxiety in Chapter 3.3. Moreover, music provides a culturally rich information for language learners that can also be used for teaching the norms of the target language (Jolly 1975, quoted in Engh 2013: 115). Taken

together, these suggestions show that music can be a valuable resource of teaching techniques for a productive foreign language learning.

With regards to FL reading, musical complementation to the teaching program can bring equally positive effect. As an illustration, pop songs can be implemented for learning simple vocabulary items as well as long phrases and formulaic expressions that can be used by language learners in conversations (Gatbonton & Segalowitz 1988, quoted in Abbott 2002: 10). In fact, the songs usually provide the learner with the meaningful and authentic use of the vocabulary items and syntactic structures, therefore it can complement the language program with relevant topic in a more enjoyable fashion (Abbott 2002: 10).

Use of rhythm in the melody can also enhance the working memory of the student necessary for better reading skills as discussed earlier. Specifically, previous research shows that learning to use the suprasegmental patterns in music such as pitch pattern assists in enhancing word-identification skills in a foreign language (Werker et al. 2002, quoted in Wong & Perrachione 2007: 566). As reported earlier, improved word-decoding skills lead to better reading proficiency. Rhyme in the lyrics is also known for the beneficial effect on the working memory necessary for FL reading learning (Newham 1995-1996, quoted in Abbott 2002: 10). Further, Newham (1995-1996: 72, quoted in Abbott 2002: 10) explains this effect that "the primarily right hemisphere-oriented process of music making can enhance the process of language acquisition and memory which place demands upon the left hemisphere". To put it differently, the songs might stimulate memory as "dual coding" favours better retention (Abbott 2002: 10).

As Hinson and Booker (2008: 24) indicate, FL teachers should "recognize the diversity of the learners" in the classrooms. Music method can be adjusted to any learning style and individual needs. For instance, for visual learners, music strategy can be combined with the pictures, for auditory learners it can be turned into the listening activity, and for kinesthetic students, who need physical activities, music can be added into the group game (Hinson & Booker 2008: 24). However, according to Abrate (1983: 8), some guidelines for selecting songs and music activities should be followed. The author (Abrate 1983: 8) provides several criteria that should be taken into consideration, such as the student's ability, the musical accompaniment and the speed of the songs. Abbott (2002: 11) adds a more detailed instruction on the song choice. In particular, more complex songs with interesting collocations and metaphors can be used for vocabulary learning necessary for reading (Abbott 2002: 11). Further, the songs with repetitive grammatical constructions can be used for grammar practice sessions (Abbott 2002: 11). Moreover, Abbott (2002: 13) emphasizes that the musical interests

of the students and the teacher matter whether the students will have an eagerness to perform in the class. With regards to the music accompaniment, Abrate (1983: 8) recommends using simple guitar melodies that do not obscure the lyrics of the songs.

Based on Spencer's (1994, quoted in Abbott 2002: 14) procedure, an effective incorporating of music into the language lesson requires an appropriate division of the musical activities into pre-listening, listening and post-listening tasks. Concerning the type of the music, pop-music was recognized as one of the most powerful teaching tools in the foreign language classroom, especially at the university level (Abbott 2002: 16). As an illustration of the pre-listening activity, the teacher could write the name of the song and the students could guess the theme of the song and identify the key words that might be used, and further, construct phrases and sentences with them (Abbott 2002: 15). This exercise helps students to acquire new vocabulary necessary for the reading comprehension, and, in fact, use the words appropriately in the context (Abbott 2002: 15). While listening to the song, students might be asked to identify stress in the sentence as well as the number of beats and syllables (Abbott 2002: 15). This exercise furthers the musical perception that enhances working memory, word-decoding skills and IQ level essential for a better reading comprehension as revealed in the present study. The comprehension of the lyrics can be also controlled by asking students answer true/false questions. As a matter of fact, singing the song or speaking the words in rhythm can be an enjoyable complementation at this stage. As a post-listening activity, the foreign language learners can be engaged in the communicative activities such as discussion and role play to develop the automatization and fluency in FL reading (Abbott 2002: 15).

The educators suggest several exercises that are especially productive for FL reading improvement and vocabulary enrichment. For instance, Lems (2001: 3) recommends "cloze activities", where the student is asked to fill the blanks of the lyrics and monitor whether the word choices are semantically relevant. This teaches the student to comprehend the text based on the context.

Therefore, it can be argued that a musical approach in the FL classroom can accomplish several learning objectives. First of all, familiarity with the songs can increase the motivation and interest of the foreign language learners and make a learning process more pleasant and relaxing. Additionally, the authenticity of the lyrics can improve a background knowledge of the student and introduce the culture of the target language speakers. Further, musical information stimulates memory and develops retention and automatization of FL vocabulary crucial for reading comprehension. Finally, various music activities such as discussion and storytelling improve the further comprehension of the text.

9. Conclusion

A great deal of recent research referred to musical input as an alternative teaching tool for FL reading enhancement. This paper set out to add valuable material to the body of knowledge already existing and investigate the relation between the music aptitude and reading-related ability in FL context. In particular, the links between music and reading through the factors of working memory and intelligence were inspected. Moreover, it was of interest to establish whether higher music aptitude could explain the better reading performance in a foreign language. In order to answer these questions, I divided my paper into the following main parts: the theoretical overview, data and methodology, and results as well as the discussion.

With regards to the previous research, a remarkable support for the relationship between musical and reading abilities has been revealed. This link was explained due to the common cognitive processes crucial for music and language learning. In fact, activation of both right hemisphere responsible for music-making and left hemisphere responsible for language-acquisition can bring the most productive learning results. Taking into account the individual differences that might influence success in FL reading, I also reviewed the effects of general intelligence and working memory in the existing literature. In fact, a close relation between music aptitude and the components of FL reading competence was inspected.

After reviewing the theoretical information, I presented the data and the methodology applied in the present study. First, a detailed description of the participants and testing situation was provided. Then, based on Fonseca-Mora and Gómez-Domínguez's (2015) meta-analysis, I offered a description of the methods to inspect the relation between music aptitude and reading abilities in a foreign language. Those included the following tests: Mini PROMS for music aptitude, DIALANG for reading and vocabulary knowledge, Raven's Standard Matrices Test for general intelligence, WAIS for working memory and silent reading test in L1 and FL for word-decoding skills. As this paper presented a quantitative research, the data were analysed by means of several statistical tests conducted by SPSS software. The descriptive statistics analysis showed the differences of the performance within the whole sample as well as the average values obtained in musically naive and musically experienced groups including the visual illustrations of results. The correlation analyses aimed to find whether there was an association among music aptitude, FL reading-related skills, intelligence and working memory. Additionally, the correlation analysis was applied to inspect the relation between L1-FL transfer of word-decoding skills. The findings of the correlation analyses were displayed in a

form of the scatter plot with the regression line. Then, the regression analyses were conducted to determine whether the music aptitude could explain FL reading-related abilities. Additionally, the analyses showed if intelligence and working memory contributed to the relation between music and FL reading. Further, the findings of the regression analysis were interpreted by applying the mediation analysis model.

Based on several previous studies, I hypothesized that the reading-related skills such as word-decoding and vocabulary knowledge along with the general intelligence and working memory would be better developed in the musically experienced students. In fact, I assumed that music aptitude could be accounted for variance in the reading-related performance through a mediator. However, it should be noted that little research has investigated whether music aptitude explains reading performance, therefore my findings regarding this research question lack support in the earlier research.

The results of the present paper showed that the participants with the musical expertise achieved significantly better results than their non-musical colleagues in the tasks, and therefore, turned out to have higher general intelligence, working memory, and FL reading-related abilities. The present findings seem to be consistent with the previous research that the musical training improves IQ, working memory and reading skills. Also, a strong association between L1 and FL word-decoding skills supported the theory of a crosslinguistic transfer. With regards to the hypothesis that music aptitude can explain FL reading abilities, the results of the tests confirmed partly this assumption. In fact, it was found that musical aptitude influences FL reading abilities indirectly through the so-called mediators, namely FL word-decoding skills and working memory. Thus, one of the most significant findings to emerge from this study is that the causal chain among music aptitude as a predictor, and working memory as well as word-decoding skills as mediators, and FL reading as an outcome was established. To put it in another way, better music aptitude improves the working memory and FL word-decoding skills, that, in turn, improve reading skills in a foreign language. Therefore, working memory and word-recognition skills contribute to the relation between music and reading skills. An indirect influence of general intelligence on FL reading skills should be further inspected.

To the best of my knowledge, only two studies have been found to research whether musicality can explain the reading abilities. Above all, the studies investigated the reading skills in the first language, whereas the present study investigated the reading skills in a foreign language. The study conducted by Strait, Hornickel and Kraus (2011) supported my findings and established that, in their case, auditory working memory/attention could be accounted as a

mediator between music and reading. However, Anvari et al. (2002) found that cognitive variables did not contribute to the relation between music and reading in pre-school children, and musical abilities explained uniquely the variance in reading performance. Therefore, a further research is needed to clarify the relation between music and reading.

Therefore, these findings confirm an important role of musicality in developing the reading skills in a foreign language. Taking into account a positive effect of musical abilities on general intelligence, working memory and reading-related skills, it might be recommended to introduce musical activities as an addition to the learning program in the FL class. As shown in several earlier studies, the inclusion of music into the lesson could bring a wide range of positive outcomes for the language proficiency and reading skills, in particular. First, music lowers the language anxiety and builds the cooperative spirit in the group among FL students. Next, music improves working memory necessary for better retention of the acquired vocabulary essential for the reading comprehension. In addition, the lyrics in the songs provide FL learners with an authentic language and background knowledge to elicit the meaning of the unknown words in the context. The implementation of musical activities in the classroom can be obscured due to the lack of relevant teaching methodology on the topic. However, several authors presented clear guidelines and instructions on how to add music into the learning programme depending on the following factors such as age and language proficiency of the students, musical interests of the teacher and students as well as musical accompaniment. Particularly, music furthers the individual approach to the students and offers different types of music complementation for visual, auditory and kinaesthetic types of learners.

After outlining the findings of the present paper, I review a number of potential weaknesses of the present study needed to be considered. Clearly, DIALANG reading test provides a reliable evidence of the reading level of the student and it measures important aspects of the reading comprehension such as creating connections, reasoning and interpreting of the text (Alderson 2005b: 122). However, it is rather applicable to the personal assessment of the reading level according to CEFR than for the quantitative research. In particular, the results of the DIALANG test would be more expository and applicable to SPSS processing if they were presented with a numerous variable. Consequently, the reading proficiency of the participants was described only by categories A2 and B1 and did not reveal the small differences that might have been found in FL reading skills. Therefore, an alternative test for the measurement of reading in a foreign language would be recommended.

Further, it is uncertain whether the results of the present study can be generalised. First of all, although the sample was kept largely homogenous, it is known that the process of foreign

language learning can be greatly affected by the individual differences (Reiterer 2009: 157). Taking into account a limited number of previous research on the role of the musical ability on the reading skills in a foreign language, the outcomes of this study should be treated with caution. The results of this study are encouraging and should be further investigated with a larger sample size. I hope that further research will shed more light on the relation between music aptitude and FL reading ability.

Taken together, considerable progress has been made about the influence of the music aptitude on the reading abilities in a foreign language. These findings confirm not only importance of the intelligence, working memory and word-decoding skills in FL reading, but it also emphasizes the positive effect of musical activities in the FL classroom as an educational alternative, providing therefore an influential component for successful reading in a foreign language.

10. References

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11. Appendix

11.1. Tables

Sample Parameters

Table 4 Mean age (in years)

		Frequency	Percent
Min	18,00	6	15,8
Mean	19,00	12	31,6
Max	20,00	20	52,6
	Total	38	100,0

Table 5 Mean score for each group: mini PROMS for music aptitude

	Mean (SD)	Min	Max	N
Total	22,75 (3,701)	12	27,5	38
Musically naïve	20	12	23	19
Musically experienced	25,5	23,5	27,5	19

Table 6 Mean score for whole group: mini PROMS subtests (Melody, Tempo, Tuning, Accent)

	Melody	Tempo	Tuning	Accent
N	38	38	38	38
Mean	6,092	6,05	5,34	5,263
SD	1,4183	1,019	1,001	1,0315
Min	2,5	3	3	2,5
Max	8,5	7	8	7,0

Table 7 Mean score for each group: DIALANG Reading Level

	A2	B1	N
Musically naïve	[18]	1	38
Musically experienced	8	11	

Table 8 Mean score for each group: DIALANG VSPT

	Mean (SD)	Min	Max	N
Total	583,16 (104,120)	433	789	38
Musically naïve	509,89	433	689	19
Musically experienced	656,42	487	789	19

Table 9 Mean score for whole group: silent reading test for word-decoding skills in L1 and FL

	L1	FL
N	38	38
Mean	157,76	87,74
Min	125	47
Max	202	131

Table 10 Mean score for each group: silent reading test for word-decoding skills in FL

	Mean (SD)	Min	Max	N
Total	84,74 (20,924)	47	131	38
Musically naïve	71,47	47	130	19
Musically experienced	98	69	131	19

Table 11 Mean score for each group: SPM raw score for general intelligence

	Mean (SD)	Min	Max	N
Total	36,87 (4,616)	25	45	38
Musically naïve	33,79	25	38	19
Musically experienced	39,94	38	45	19

Table 12 Mean score for each group: WAIS for working memory index

	Mean (SD)	Min	Max	N
Total	23,34 (2,474)	20	27	38
Musically naïve	21,53	10	20	19
Musically experienced	25,16	21	27	19

Table 13 Mean score total: WAIS subtests (Digit Span Forward, Digit Span Backward, Non-Word Span)

	Digit_Forward	Digit_Backward	Non-Word Span
N	38	38	38
Mean	9,26	7,66	6,42
SD	1,245	,966	1,030
Min	6	6	5
Max	12	9	8

Table 14 Test performance: comparison of group differences

M-W-U test	***U***	***Z***	***P***	**N**
DIALANG VSPT	32	-4.303	.000	38
WAIS	9.5	-4.983	.000	38
SPM	11	-3.254	.000	38
T-Test	***t(df)***		***P***	**N**
Silent reading (FL)	t(35)=.886		.002	38

Correlations

Table 15 Spearman's rho correlations for whole group: all tests

			DIALANG VSPT	Mini PROMS	Melody	Tempo	Tuning	Accent	Silent reading (FL)	SPM	WAIS
Spearman's rho	**DIALANG VSPT**	Correlation Coefficient	1,000	.760**	.689**	.557**	.513**	.523**	.805**	.755**	.594**
		Sig (1-tailed)		,000	,000	,000	,000	,000	,000	,000	,000
		N	38	38	38	38	38	38	38	38	38
	Mini PROMS	Correlation Coefficient	.760**	1,000	.858**	.645**	.800**	.790**	.711**	.990**	.777**
		Sig (1-tailed)	,000		,000	,000	,000	,000	,000	,000	,000
		N	38	38	38	38	38	38	38	38	38
	Melody	Correlation Coefficient	.689**	.858**	1,000	.599**	.531**	.510**	.630**	.867**	.659**
		Sig (1-tailed)	,000	,000		,000	,000	,001	,000	,000	,000
		N	38	38	38	38	38	38	38	38	38
	Tempo	Correlation Coefficient	.557**	.645**	.599**	1,000	.443**	,244	.424**	.711**	.477**
		Sig (1-tailed)	,000	,000	,000		,003	,070	,004	,000	,001
		N	38	38	38	38	38	38	38	38	38
	Tuning	Correlation Coefficient	.513**	.800**	.531**	.443**	1,000	.677**	.514**	.775**	.675**
		Sig (1-tailed)	,000	,000	,000	,003		,000	,000	,000	,000
		N	38	38	38	38	38	38	38	38	38
	Accent	Correlation Coefficient	.523**	.790**	.510**	,244	.677**	1,000	.506**	.736**	.659**
		Sig (1-tailed)	,000	,000	,001	,070	,000		,001	,000	,000
		N	38	38	38	38	38	38	38	38	38
	Silent reading (FL)	Correlation Coefficient	.805**	.711**	.630**	.424**	.514**	.506**	1,000	.692**	.549**
		Sig (1-tailed)	,000	,000	,000	,004	,000	,001		,000	,000
		N	38	38	38	38	38	38	38	38	38
	SPM	Correlation Coefficient	.755**	.990**	.867**	.711**	.775**	.736**	.692**	1,000	.774**
		Sig (1-tailed)	,000	,000	,000	,000	,000	,000	,000		,000
		N	38	38	38	38	38	38	38	38	38
	WAIS	Correlation Coefficient	.594**	.777**	.659**	.477**	.675**	.659**	.549**	.774**	1,000
		Sig (1-tailed)	,000	,000	,000	,001	,000	,000	,000	,000	
		N	38	38	38	38	38	38	38	38	38

Table 16 Spearman's rho correlation between L1 and FL silent reading

			L1	FL
Spearman's rho	**L1**	Correlation Coefficient	1,000	,586**
		Sig. (2-tailed)	.	,000
		N	38	38
	FL	Correlation Coefficient	,586**	1,000
		Sig. (2-tailed)	,000	.
		N	38	38

Table 17 Multiple regression model: music aptitude and reading-related skills

		R	R^2	F Change	Sig. F Change	*B*	*SE B*	β	*p*
Model 1		,76	,57	48,46	0,000				
	Constant					263,76	47,22		
	FL word-decoding					3,77	0,54	,76	< .01
Model 2		,80	,65	7,08	0,012				
	Constant					132,48	65,89		
	FL word-decoding					2,92	0,59	,59	< .01
	Musical_Aptitude					8,93	3,36	,32	< .05

Table 18 Multiple regression model: working memory and FL reading-related ability

		R	R^2	F Change	Sig. F Change	*B*	*SE B*	β	*p*
Model 1			,57	48,46	0,000				
	Constant					263,76	47,22		
	FL word-decoding					3,77	0,54	,76	< .01
Model 2			,64	6,14	0,018				
	Constant					39,01	100,87		
	FL word-decoding					3,04	0,59	,61	< .01
	Working memory					12,28	4,95	,29	< .05

11.2. Human rights text in Spanish and German

Español:

Toda persona tiene los derechos y libertades proclamados en esta Declaración, sin distinción alguna de raza, color, sexo, idioma, religión, opinión política o de cualquier otra índole, origen nacional o social, posición económica, nacimiento o cualquier otra condición. Además, no se hará distinción alguna fundada en la condición política, jurídica o internacional del país o territorio de cuya jurisdicción dependa una persona, tanto si se trata de un país independiente como de un territorio bajo administración fiduciaria, no autónomo o sometido a cualquier otra limitación de soberanía.

Toda persona tiene derecho a la libertad de pensamiento, de conciencia y de religión; este derecho incluye la libertad de cambiar de religión o de creencia, así como la libertad de manifestar su religión o su creencia, individual y colectivamente, tanto en público como en privado, por la enseñanza, la práctica, el culto y la observancia.

Todo individuo tiene derecho a la libertad de opinión y de expresión; este derecho incluye el de no ser molestado a causa de sus opiniones, el de investigar y recibir informaciones y opiniones, y el de difundirlas, sin limitación de fronteras, por cualquier medio de expresión.

Toda persona tiene derecho a participar en el gobierno de su país, directamente o por medio de representantes libremente escogidos. Toda persona tiene el derecho de acceso, en condiciones de igualdad, a las funciones públicas de su país. La voluntad del pueblo es la base de la autoridad del poder público; esta voluntad se expresará mediante elecciones auténticas que habrán de celebrarse periódicamente, por sufragio universal e igual y por voto secreto u otro procedimiento equivalente que garantice la libertad del voto.

Toda persona tiene derecho a un nivel de vida adecuado que le asegure, así como a su familia, la salud y el bienestar, y en especial la alimentación, el vestido, la vivienda, la asistencia médica y los servicios sociales necesarios; tiene asimismo derecho a los seguros en caso de desempleo, enfermedad, invalidez, viudez, vejez u otros casos de pérdida de sus medios de subsistencia por circunstancias independientes de su voluntad. La maternidad y la infancia tienen derecho a cuidados y asistencia especiales. Todos los niños, nacidos de matrimonio o fuera de matrimonio, tienen derecho a igual protección social.

Toda persona tiene derecho a la educación. La educación debe ser gratuita, al menos en lo concerniente a la instrucción elemental y fundamental. La instrucción elemental será obligatoria. La instrucción técnica y profesional habrá de ser generalizada; el acceso a los estudios superiores será igual para todos, en función de los méritos respectivos. La educación tendrá por objeto el pleno desarrollo de la personalidad humana y el fortalecimiento del respeto a los derechos humanos y a las libertades fundamentales; favorecerá la comprensión, la tolerancia y la amistad entre todas las naciones y todos los grupos étnicos o religiosos y promoverá el desarrollo de las actividades de las Naciones Unidas para el mantenimiento de la paz. Los padres tendrán derecho preferente a escoger el tipo de educación que habrá de darse a sus hijos.

Español preparado:

todapersonatienelosderechosylibertadesproclamadosenestadeclaraciónsindistinciónalgunadera zacolorsexoidiomareligiónopiniónpolíticaodecualquierotraíndoleorigennacionalosocialposició neconómicanacimientoocualquierotracondiciónademásnoseharádistinciónalgunafundadaenlac ondiciónpolíticajurídicaointernacionaldelpaísoterritoriodecuyajurisdiccióndependaunapersona tantosisetratadeunpaísindependientecomodeunterritoriobajoadministraciónfiduciarianoautóno moosometidoacualquierotralimitacióndesoberaníatodapersonatienederechoalalibertaddepensa mientodeconcienciaydereligiónestederechoincluyelalibertaddecambiardereligiónodecreenciaa sícomolalibertaddemanifestarsureligiónosucreenciaindividualycolectivamentetantoenpúblicoc omoenprivadoporlaenseñanzalaprácticaelcultoylaobservanciatodoindividuotienederechoalalib ertaddeopiniónydeexpresiónestederechoincluyeeldenosermolestadoacausadesusopinioneselde investigaryrecibirinformacionesyopinionesyeldedifundirlassinlimitacióndefronterasporcualqu iermediodeexpresióntodapersonatienederechoaparticiparenelgobiernodesupaísdirectamenteop ormediorepresentanteslibrementeescogidostodapersonatieneelderechodeaccesoencondicion esdeigualdadalasfuncionespúblicasdesupaíslavoluntaddelpuebloeslabasedelaautoridaddelpode rpúblicoestavoluntadseexpresarámedianteeleccionesauténticasquehabrándecelebrarseperiódic amenteporsufragiouniversaleigualyporvotosecretouotroprocedimientoequivalentequegarantic elalibertaddelvototodapersonatienederechoaunniveldevidaadecuadoqueleasegureasícomoasuf amilialasaludyelbienestaryenespeciallaalimentaciónelvestidolaviviendalaasistenciamédicaylo sserviciossocialesnecesariostieneasimismoderechoalossegurosencasodedesempleoenfermedad invalidezviudezvejezuotroscasosdepérdidadesusmediosdesubsistenciaporcircunstanciasindepe ndientesdesuvoluntadlamaternidadylainfanciatienenderechoacuidadosyasistenciaespecialesto doslosniñosnacidosdematrimonioofueradematrimoniotienenderechoaigualprotecciónsocialtod apersonatienederechoalaeducaciónlaeducacióndebesergratuitaalmenosenloconcernientealainst rucciónelementalyfundamentallainstrucciónelementalseráobligatorialainstrucciótécnicayprof esionalhabrádesergeneralizadaelaccesoalosestudiossuperioresseráigualparatodosenfunciódel osméritosrespectivoslaeducacióntendráporobjetoelplenodesarrollodelapersonalidadhumanayel fortalecimientodelrespetoalosderechoshumanosyalaslibertadesfundamentalesfavorecerálacom prensiónlatoleranciaylaamistadentretodaslasnacionesytodoslosgruposétnicosoreligiososyprom overáeldesarrollodelasactividadesdelasnacionesunidasparaelmantenimientodelapazlospadrest endránderechopreferenteaescogereltipodeeducaciónquehabrádedarseasushijos

Deutsch

Alle Menschen sind vor dem Gesetz gleich und haben ohne Unterschied Anspruch auf gleichen Schutz durch das Gesetz. Alle haben Anspruch auf gleichen Schutz gegen jede Diskriminierung, die gegen diese Erklärung verstößt, und gegen jede Aufhetzung zu einer derartigen Diskriminierung.

Niemand darf willkürlichen Eingriffen in sein Privatleben, seine Familie, seine Wohnung und seinen Schriftverkehr oder Beeinträchtigungen seiner Ehre und seines Rufes ausgesetzt werden. Jeder hat Anspruch auf rechtlichen Schutz gegen solche Eingriffe oder Beeinträchtigungen.

Jeder hat das Recht, sich innerhalb eines Staates frei zu bewegen und seinen Aufenthaltsort frei zu wählen. Jeder hat das Recht, jedes Land, einschließlich seines eigenen, zu verlassen und in sein Land zurückzukehren.

Jeder hat das Recht, in anderen Ländern vor Verfolgung Asyl zu suchen und zu genießen. Dieses Recht kann nicht in Anspruch genommen werden im Falle einer Strafverfolgung, die tatsächlich auf Grund von Verbrechen nichtpolitischer Art oder auf Grund von Handlungen erfolgt, die gegen die Ziele und Grundsätze der Vereinten Nationen verstoßen.

Jeder hat das Recht auf eine Staatsangehörigkeit. Niemandem darf seine Staatsangehörigkeit willkürlich entzogen noch das Recht versagt werden, seine Staatsangehörigkeit zu wechseln.

Jeder hat das Recht auf Arbeit, auf freie Berufswahl, auf gerechte und befriedigende Arbeitsbedingungen sowie auf Schutz vor Arbeitslosigkeit. Jeder, ohne Unterschied, hat das Recht auf gleichen Lohn für gleiche Arbeit. Jeder, der arbeitet, hat das Recht auf gerechte und befriedigende Entlohnung, die ihm und seiner Familie eine der menschlichen Würde entsprechende Existenz sichert, gegebenenfalls ergänzt durch andere soziale Schutzmaßnahmen. Jeder hat das Recht, zum Schutz seiner Interessen Gewerkschaften zu bilden und solchen beizutreten.

Jeder hat das Recht auf Erholung und Freizeit und insbesondere auf eine vernünftige Begrenzung der Arbeitszeit und regelmäßigen bezahlten Urlaub.

Jeder hat das Recht auf einen Lebensstandard, der seine und seiner Familie Gesundheit und Wohl gewährleistet, einschließlich Nahrung, Kleidung, Wohnung, ärztliche Versorgung und notwendige soziale Leistungen gewährleistet sowie das Recht auf Sicherheit im Falle von Arbeitslosigkeit, Krankheit, Invalidität oder Verwitwung, im Alter sowie bei anderweitigem Verlust seiner Unterhaltsmittel durch unverschuldete Umstände. Mütter und Kinder haben Anspruch auf besondere Fürsorge und Unterstützung. Alle Kinder, eheliche wie außereheliche, genießen den gleichen sozialen Schutz.

Jeder hat das Recht, am kulturellen Leben der Gemeinschaft frei teilzunehmen, sich an den Künsten zu erfreuen und am wissenschaftlichen Fortschritt und dessen Errungenschaften teilzuhaben. Jeder hat das Recht auf Schutz der geistigen und materiellen Interessen, die ihm als Urheber von Werken der Wissenschaft, Literatur oder Kunst erwachsen.

Jeder hat Anspruch auf eine soziale und internationale Ordnung, in der die in dieser Erklärung verkündeten Rechte und Freiheiten voll verwirklicht werden können.

Jeder hat Pflichten gegenüber der Gemeinschaft, in der allein die freie und volle Entfaltung seiner Persönlichkeit möglich ist. Jeder ist bei der Ausübung seiner Rechte und Freiheiten nur den Beschränkungen unterworfen, die das Gesetz ausschließlich zu dem Zweck vorsieht, die Anerkennung und Achtung der Rechte und Freiheiten anderer zu sichern und den gerechten

Anforderungen der Moral, der öffentlichen Ordnung und des allgemeinen Wohles in einer demokratischen Gesellschaft zu genügen. Diese Rechte und Freiheiten dürfen in keinem Fall im Widerspruch zu den Zielen und Grundsätzen der Vereinten Nationen ausgeübt werden.

Deutsch vorbereitet:

allemenschensindvordemgesetzgleichundhabenohneunterschiedanspruchaufgleichenschutzdurchdasgesetzallehabenanspruchaufgleichenschutzgegenjedediskriminierungdiegegendieseerklärungverstößtundgegenjedeaufhetzungzueinerderartigendiskriminierungniemanddarfwillkürlicheneingriffeninseinprivatlebenseinefamilieseinewohnungundseinenschriftverkehroderbeeinträchtigungenseinerehreundseinesrufesausgesetztwerdenjederhatanspruchaufrechtlichenschutzgegensolcheeingriffeoderbeeinträchtigungenjederhatdasrechtsichinnerhalbeinesstaatesfreizubewegenundseinenaufenthaltsortfreizuwählenjederhatdasrechtjedeslandeinschließlichseineseigenenzuverlassenundinseinlandzurückzukehren.jederhatdasrechtinanderenländernvorverfolgung asylzusuchenundzugenießendiesesrechtkannnichtinanspruchgenommenwerdenimfalleeinerstrafverfolgungdietatsächlichaufgrundvonverbrechennichtpolitischerartoderaufgrundvonhandlungenerfolgtdiegegendiezieleundgrundsätzedervereintennationenverstoßenjederhatdasrechtaufeinestaatsangehörigkeitniemandemdarfseinestaatsangehörigkeitwillkürlichentzogennochdasrechtversagtwerdenseinestaatsangehörigkeitzuwechselnjederhatdasrechtaufarbeitauffreieberufswahlaufgerechteundbefriedigendearbeitsbedingungensowieaufschutzvorarbeitslosigkeitjederohneunterschiedhatdasrechtaufgleichenlohnfürgleichearbeitjederderarbeitethatdasrechtaufgerechteundbefriedigendeentlohnungdieihmundseinerFamilieeinedermenschlichenWürdeentsprechendeexistenzsichertgegebenenfallsergänztdurchanderesozialeschutzmaßnahmenjederhatdasrechtzumschutzseinerinteressengewerkschaftenzubildenundsolchenbeizutretenjederhatdasrechtauferholungundfreizeitundinsbesondereaufeinevernünftigebegrenzungderarbeitszeitundregelmäßigenbezahltenurlaubjederhatdasrechtaufeinenlebensstandardderseineundseinerfamiliegesundheitundwohlgewährleisteteinschließlichnahrungkleidungwohnungärztlicheversorgungundnotwendigesozialeleistungengewährleistetsowiedasrechtaufsicherheitimfallevonarbeitslosigkeitkrankheitinvaliditätoderverwitwungimaltersowiebeianderweitigemverlustseinerunterhaltsmittel durchunverschuldeteumständemütterundkinderhabenanspruchaufbesonderefürsorgeundunterstützungallekinderehelichewieaußerehelichegenießendengleichensozialenschutzjederhatdasrechtamkulturellenlebendergemeinschaftfreiteilzunehmensichandenkünstenzuerfreuenundamwissenschaftlichenfortschrittunddessenerrungenschaftenteilzuhabenjederhatdasrechtaufschutzdergeistigenundmateriellenteressendieihmalsurhebervonwerkenderwissenschaftliteraturoderkunsterwachsenjederhatanspruchaufeinesozialeundinternationaleordnunginderdieindiesererklärungverkündetenrechteundfreiheitenvollverwirklichtwerdenkönnenjederhatpflichtengegenüberdergemeinschaftinderalleindiefreieundvolleentfaltungseinerpersönlichkeitmöglichistjederistbeiderausübungseinerrechteundfreiheitennurdenbeschränkungenunterworfendiedasgesetzausschließlichzudemzweckvorsiehtdieanerkennungundachtungderrechteundfreiheitenandererzusichernunddengerechtenanforderungendermoralderöffentlichenordnungunddesallgemeinenwohlesin

einerdemokratischengesellschaftzugenügendieserechteundfreiheitendürfeninkeinemfallimwiderspruchzudenzielenundgrundsätzendervereintennationenausgeübtwerden

11.3. Biographical questionnaire

universität wien

Vienna, April 2017

It would be greatly appreciated if you have time to fill in a brief questionnaire for research in foreign language learning. Your data will be treated strictly confidentially and will only be used for the purposes of the research project.

Please answer the following questions.

1. Age
2. Gender
3. Indicate the field(s) of your studies (either ongoing or completed):
4. Provide your proficiency level of Spanish (1=min, 10=maximum)
5. Which foreign languages do you speak?
6. Do you play musical instruments?
7. Indicate your level of musical abilities (1=minimum, 10=maximum)
8. Do you enjoy musical activities?

Thank you!

11.4. Abstract

This thesis seeks to investigate the influence of music aptitude on the reading skills in a foreign language. Despite the growing body of research on a positive effect of music in language acquisition, less is known about the role of musical ability in relation to the reading performance for adult foreign language learners. Specifically, this study asks whether the cognitive factors such as working memory and general intelligence contribute to the association between music and reading. This study hypothesizes that music aptitude affects reading skills through the mediating role of working memory and general intelligence.

For this purpose, thirty-eight undergraduates, native speakers of German and learners of Spanish with different levels of music aptitude were tested on their reading-related skills in a foreign language. Additionally, their working memory and general intelligence were examined, too. Then, the results were discussed with regards to the findings of the previous research.

The outcomes of analyses revealed that participants with higher music aptitude performed better than their non-musical colleagues in the tasks. Correlation analyses showed a strong association among music aptitude, reading-related skills, working memory and general intelligence. Multiple regression analyses indicated that musical abilities explain the variance in FL reading skills, possibly due to the mediating role of working memory. The findings of this study provide valuable teaching implications, suggesting musical activities as an alternative tool in a foreign language classroom.

11.5. Zusammenfassung

Die vorliegende Arbeit versucht, den Einfluss der musikalischen Begabung auf die Lesefähigkeiten in einer Fremdsprache. Trotz der wachsenden Körper der Forschung über die positive Wirkung von Musik im Spracherwerb ist die Rolle der Musikalischen Fähigkeiten in Bezug auf die Lesekompetenz für erwachsene Fremdsprachenlehrer wenig verstanden. Konkret diese Studie analysiert, ob die kognitiven Faktoren, wie Arbeitsgedächtnis und Intelligenz zur Vereinigung zwischen Musik und Lesen beitragen. Diese Arbeit vermutet, dass die musikalische Begabung die Lesekompetenz durch die Vermittlung von Arbeitsgedächtnis und IQ beeinflusst.

Zu diesem Zweck wurden achtunddreißig Studenten mit der Muttersprache Deutsch und Fremdsprache Spanisch und unterschiedlichen Ebenen der musikalischen Begabung auf Ihre Lesebezogenen Fähigkeiten in der Fremdsprache getestet. Zusätzlich wurden ihre Arbeitsgedächtnis und Intelligenz untersucht. Dann wurden die Ergebnisse in Bezug auf die

Ergebnisse der bisherigen Forschung diskutiert. Die Ergebnisse der Analysen zeigten, dass die ProbandInnen mit größerer musikalischer Begabung ihre nicht-musikalischen Kollegen in den Aufgaben übertrafen haben. Korrelationsanalysen zeigten eine starke Assoziation zwischen musikalischer Begabung und Lesebezogenen Fähigkeiten, Arbeitsgedächtnis und Intelligenz. Regressionsanalysen zeigten, dass musikalische Fähigkeiten die Varianz der Lesefähigkeiten in der Fremdsprache erklären, möglicherweise aufgrund der vermittelnden Rolle des Arbeitsgedächtnisses. Die Ergebnisse dieser Studie bieten wertvolle Beobachtungen, die auf musikalische Aktivitäten als eine alternative Methode in einem Fremdsprachenunterricht hindeuten.