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# Melodies that help:
# The relation between language aptitude and musical intelligence

## 1. Introduction

Music and rhythm have been defined as powerful aids to language learning, memory, and recall. But is this due to structural and motivational properties of instrumental music and songs or is there a relation between learners' language aptitude and musical intelligence? It seems that everyone who feels motivated to do it is able to learn other languages to some degree as long as an appropriate learning method is used. However, learning foreign languages is not easy, as many variables need to be considered if the desired result is optimal language learning in a non bilingual environment. Probably, one of the main obstacles to learning a foreign language in this context is the lack of continuous target language auditory input. While in first language acquisition babies start receiving sonorous stimuli in their mother's womb, in foreign language learning opportunities to receive auditory input are mainly limited to the classroom, the teacher, the classmates and situations in which listening is included in the lesson.

Language acquisition depends on interaction. With interactions affect has been shown to be a mediating force for communication to become successful. For instance, teacher talk and parental talk share many similar features. Both can be described as simplified codes created to help the hearer to learn and understand language (Arnold and Fonseca-Mora, 2007). They share features such as the frequent use of repetition, of formulaic expressions, expansions, preference for simplified vocabulary, change in voice volume, and modification of intonational contours. These speech melodies are indicators of emotions and they have a great impact on communication because, as Berger and Schneck (2003: 689) state, "Humans are not thinking machines that feel, but rather, feeling machines that think". These melodies become a help for language learning. Exaggerated melodic contours found in adult-directed-to-infant-speech are considered to be parental intuitive behaviour to guide their babies' musical beginnings (Papousek 1996), but they are also seen as a species-specific learning guidance towards language (Feu and Piñero 1996, Wermke and Mende 2009). Melodies and music in general, are present in the language teaching context as well.

A well-known and popular example of this use of exaggerated melodic contours in teacher talk can be observed in the movie *My Fair Lady* based on Bernard Shaw's play *Pygamalion*. Professor Higgins, a famous phonetician, distorts the rhythmic articulation of the following utterance: "The rain in Spain falls mainly in the plain", and it is just at this precise moment when his student, the humble florist, Eliza Doolittle, starts reproducing language properly.

In this article we will be exploring how music and language are two human capacities which share common points of interest (Schön et al., 2008, Fonseca-Mora, 2002b), with musical intelligence being the first to appear in a child. Melody, rhythm and reception of sounds with varying auditory frequency that are grouped according to a prewritten system (Gardner 1993: 104) are features of both capacities. Also, we will see how the development of auditory skills in L2 can benefit from the use of musical elements in the language classroom, in the same way as melodies observed in L1 acquisition have been described as a common scaffolding for singing and speaking (Wermke and Mende 2009).

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## 2. The relationship between language and music

Language and music are two capacities with a mutual evolutionary history:

> the musilanguage stage in evolution. . .was neither linguistic nor musical but . . . embodied the shared features of modern day music and language, so 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… (Brown, 2001: 277)

According to many researchers, music is rhythm, a reflection of our physiological life. Music is also melody, sequence of sounds, which is associated with our emotional life. Finally, for humans, music is harmony, simultaneity of sounds that need to be analyzed and studied. Gardner (1999) identifies the musical intelligence and the linguistic intelligence as two of the nine intelligences that explain his theory of human cognition. While the first sound babies emit is that of crying, after a period of time, they are able to imitate rhythm and melodic contours which occur before they are able to pronounce a single word. These musical aspects of language are then replaced by phonemes. Stansell (2002:11) enumerates a number of characteristics shared by both capacities

> Activities of melody recognition, contour processing, timbre discrimination, rhythm, tonality, predictions, body movement, tactile involvement, and sound, sight, and form of symbols, with their context in song, phrases, and rule structures are all common in the musical and language learning processes.

Sloboda (1989), Patel (2003a), among many others, establish similarities and differences such as the following between music and language:

Similarities:

1. Both are universal and specific to human beings.
2. They have three modes of expression: vocal, gestural and written.
3. Speech and song are spontaneously developed at the same time.
4. The natural environment is auditory – vocal.
5. There is a human ability to create an unlimited number of new sequences using musical contours or words.
6. Rhythm and melody are essential elements.
7. Both follow a fixed order in structure through use of words or musical notes creating a sentence or a melody.
8. The first capacity that emerges is that of receptivity and then, consequently that of productive ability.
9. Both are culture-bond.

Differences:

1. While a language normally needs to be translated into another language, it doesn't make sense to translate music to another culture.
2. Although many people are only competent in one language, most people are familiar with different musical styles.
3. Musical rules don't provide meaning whereas grammar provides meaning to language.
4. The range of musical styles evolve and progress quite quickly in comparison to the grammar of a language.
5. While language asks about the real world, objects and relations, music doesn't have this manipulative function.
6. Music poses less cognitive demands than language
7. Emotional expression is essential in music but not in language.
8. Despite the fact that temporal structure and rhythmic organization play an important role in both language and music, the metric is specific to a piece of music, and the suprasegmental structure of language prosody is less specific and more variable.
9. The numbers and variety of tones are similar in all cultures, whereas the numbers of phonemes connected to language vary.

Speech melodies are the natural intersection between music and language. Speech melodies are directly connected to intonation. The communicative value of intonation does not come, however, from the detailed study of each one of the tonal variations and the accompanying silence, but from the observation and analysis of those changes that pose a particular choice of the issuer and, therefore seek to create a particular effect on listeners. Bolinger (1989: 1) defined intonation essentially as a symptom of how we feel about what we say or how we feel at that moment in which we speak. The speaker plans his speech also from the prosodic point of view. The choice of form of the message we want to communicate, ie, its wrapping sound, the selection of lexical items and even the syntactic order of the statement, basically depends on two factors: the intention of the speaker and the listener's pragmalinguistic competence. The transmitter adapts his speech to the needs of the recipient, acting thus as facilitator of his

message. The speaker aims to achieve the greatest possible impact on the listener, with the least effort required in the decoding process by the latter (Fonseca-Mora, 2002b). These speech melodies have a specific role in L1 and L2 acquisition.

**3. Melodies in L1 acquisition**

It is decisive for the acquisition of one's native language not only to understand what is being said, but also to learn how it is said. Each language is characterized by very specific musical elements in the form of its prosody, that is, its intonation system and constituent rhythm. Intonation is one of the most essential prosodic features. It provides the key to the perception of word stress and the recognition of sentence structure. This is particularly evident in the early phases of L1 acquisition. It is only through prosody that a language becomes accessible to a child. Prosody enables the segmentation of the flow of audible speech and thus the recognition of meaningful structural elements. Melody is the most salient prosodic element for this developmental process from the very beginning. Both term foetuses and newborns already demonstrate a preference for melodies with simple rhythms that characterize many musical pieces as well as speech prosody. Term-foetuses can furthermore distinguish between voices: mother versus stranger (Kisilevsky et al., 2003) or male versus female (Lecanuet et al.1993). Music played in the external environment is also perceptible in utero (Kisilevsky at al.2004). Term-fetuses can discriminate musical notes (piano D4 versus C5, Lecanuet et al.2000) and may habituate to a brief piano sequence with changing melodic contour (Granier-Deferre et al.1998).

Upon birth, infants show perceptual preferences for melodies and rhythms to which they were exposed prenatally (James et al., 2002;). For example, an infant will respond most intensively his or her mother's voice shortly after birth (Damstra-Wijmenga, 2009;). Newborns are also able to discriminate between upward and downward pitch contours (Carral et al., 2005) and their brains have been shown to perceive a violation of the beat in a rhythmic sound sequence (Winkler et al., 2009). In general, human infants are well-equipped with surprising musical perceptual capabilities. Recently it was also demonstrated that newborns' cry melodies are shaped by the ambient spoken language (Mampe et al., 2009).Their extraordinary sensitivity for melody seems to be responsible for the observation that babies are capable of differentiating between rhythmically different languages and different speakers. Perceiving the emotional (prosodic) features of speech from an early age, infants increasingly apply this knowledge in order to segment the stream of continuous speech into meaningful parts and to recognize words (Jusczyk, 1999). They also demonstrate a preference for the infant directed speech (IDS), or "motherese", used by adults communicating with infants, characterized by extreme intonation, elongated syllables, and exaggerated melodic formation (Fernald, 1989). IDS is probably an essential factor in the development of language from both a phylogenetic and an ontogenetic perspective (Falk, 2009).

IDS is characterized by exaggerated melodic expression, and exemplifies how messages are conveyed to the preverbal human infant by means of melody (Fernald, 1992, 1993). Language-content specific aspects are not essential to IDS: exclamations, interjections, nick-names and sound imitations predominate (Papoušek, Papoušek, & Symmes, 1991). The melodic and rhythmic properties of IDS constitute meaningful emotive sounds, albeit still lacking symbolic meaning and abstract notions (Falk, 2009). Cross-linguistic analyses, including tonal languages, proved that IDS is characterized by different melody contours, each associated with a different emotive context: approval, prohibition, attention, or comfort (Fernald, 1992). Neurophysiological data support the strong impact motherese has on infants by demonstrating that cortical structures participate in the processing of prosodic information, particularly frequency modulation amplitude ("normal" versus "flattened" speech). Investigating Japanese neonates ranging in age from 2 to 9 days with near-infrared spectroscopy (NIRS), it was found that IDS affected blood flow to the frontal area of the brain more than adult-directed-speech (ADS). Furthermore a hemispheric asymmetry with better processing of IDS on the right side of the brain was shown (Saito et al., 2007). Examining cortical activation in 3-month-old Japanese infants using the same technique (NIRS), bilateral activation in the frontal, temporal, and temporoparietal regions was demonstrated in response to normal and flattened speech during quiet sleep. Moreover, the right temporoparietal region was found to show a more marked response to melody (Homae et al.2006).

Infants and older children exhibit an expressive ability to interpret the intention behind a vocal utterance. Using playback studies, four-month-old infants were shown to be capable of both differentiating between prototypical melodic contours in motherese and reacting appropriately to them, that is "understanding" the implied context-dependent messages conveyed (Papoušek et al.1990). Wermke & Mende (in press) argue that "from a phylogenetic perspective, this probably points to older layers of language, to a time when prehistoric prosodic capabilities were unfolding and only later served as scaffolding for the evolution of the referential and symbolic capabilities of spoken language".The typical preference of babies for melody and rhythm seems to have its neurophysiological origin in the fact that the right hemisphere plays a particularly important role in the earliest phases of language

development (Friederici & Hahne, 2000). Melodic elements therefore have not only a special attraction for infants as audible stimuli, but also form the characteristic basis of their own vocal utterances (Wermke, & Mende, 2009). The long developmental journey from the earliest emotionally loaded utterances of an infant to the fully developed language of an adult effectively begins at that point when feeling and need are conveyed to another via melody (Wermke, & Mende, in press).

Mitigated crying, cooing and babbling are produced, in a great variety of melodic forms, at a very early stage in the course of L1 acquisition (Wermke & Mende, 2006; 2009; Wermke, 2002). Moreover, comparing the frequency of occurrence of cries, coos and babbles consisting only of simple, i.e. single-arc melodies versus those consisting of complex, multiple-arc melodies, Wermke and Mende (in press) found a continuous, nearly monotonic increase of complex melody structures from the 4th week to the 28th week of life and beyond. Based on their longitudinal studies during the last 25 years, they postulate that "melody should be seen as a forerunner of codified abstract meaning in the strict linguistic sense" (ibid.). Their findings support the assumption that melody functions as a framework and scaffolding during early L1 acquisition, from the simple melodies that prevail during the first week of life to the first spoken words (and possibly beyond, as language use continues to be refined). This is supported by the finding that a disturbed melody development during early pre-speech phases of L1 acquisition did correlate to language disorders of the same children 2.5 years later (Wermke et al.2007).

These fundamental insights with respect to the scaffolding function of melody during essential early phases of L1 acquisition imply strong analogies for an effective L2 acquisition.

## 4. Melodies in foreign language learning

Music is probably one of the most frequently used resources in foreign language classes as music is a potent and beneficial instrument for language learning. Children generally love music, singing, and imitating. Adult learners choose listening to foreign language songs in their free time as they believe this can improve their language learning skills (Fonseca-Mora & García, 2010). They appreciate such activities because they are fun and therefore, reduce language anxiety often caused by an inability to understand and speak the target language correctly. New language acquisition can benefit from structural and motivational properties of music in songs because, as many researchers confirm, these musical activities help develop auditory perception (Slevc and Miyake, 2006) and metacognitive knowledge and aid phonological memory. Apart from this, they help in memorisation of language (Schellenberg et al., 2007). Music and songs have been shown to be instruments which increase sensibility, aid memory, improve concentration, help develop reading and writing abilities, favour physical development and give rise to enjoyment when learning. Music

> has the unique quality of integrating emotional, cognitive and psychomotor elements that activate and synchronise brain activity. Not only does music relax and stimulate the listener simultaneously, it also educates learners with regard to listening skills and refined architecture of sound. (Brewer and Campbell, 1991: 231)

Neural activities, associated with listening to music, work deeper in the auditory cortex influencing the frontal, temporal, parietal and subcortical areas which are related to attention (Schellenberg et al., 2007), semantics and syntactic processing, memory and motor functions (Koelsch et al., 2004;), and, the limbic and paralimbic system, which is related to the processing of emotions (Koelsch et al., 2006). Teachers can take advantage of the fact that "all normal (non brain-damaged) people possess some musical intelligence" (Gardner, 1985: 285) in order to help learners acquire oral language capacities. Using music can produce an ideal situation for learning because "songs bridge the [brain's] hemispheres, strengthening retention due to complementary functions as the right hemisphere learns the melody, the left, the words" (Guglielmino,1986: 20) and Borchgrevink (1982:154-156) adds that

> 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.

### 4.1. Songs

Songs for language learning have been considered in relation to the development of the four skills, activation of both hemispheres, memory, motivation and cultural sensitivity. Jolly (1975) and Thain (2010), amongst many others, emphasise the use of songs in lessons because they help in the development of the four skills: listening, speaking, reading and writing. Songs activate both parts of the brain. The pronunciation of words, understanding, rhythm and musical execution correspond to the left hemisphere, whereas, melodic expression, tone, emotions and artistic expression (non verbal communication) correspond to the right hemisphere.

Many authors have found a positive association between songs and memory. Murphey (1990) defines the 'song-stuck-in-my-head' phenomenon as a melodic Din like an (in) voluntary musical and verbal rehearsal. Falioni (1993: 98) affirms that "many people often remember rhyme, rhythm and/or melody better than ordinary speech", in particular when the information is significant to them. Crookes and Schmidt (1991) identify interest in the lesson, relevance, expectation and satisfaction as the four motivational elements in foreign language learning. When somebody listens to songs, they sing, dance and learn the lyrics in an unconscious manner. With the use of songs in the classroom students " concentrate on messages and ideas as they would in their native language" because "they are doing something with language: they are participating actively in the game called communication" (Murphey, 1987: 7,8). Music training develops auditory skills (Kraus and Chandrasekaran, 2010) as well as verbal memory (Chan and Cheung, 1998). Listening to songs and singing them improves listening skills in a foreign language, one of the essential capacities necessary for language learning . If a person is not able to distinguish between the phonemes and intonation which differentiate the target language from the mother tongue, it will be impossible to learn the L2. Children with a poor phonemic awareness in L1 (Ehri et al. 2001) present lower levels of progress with respect to the learning of foreign languages (Hu, 2003).

Cultural sensitivity is another important element to be considered as culture or cultural elements are often present in songs. Abbott (2002:10) suggests that "cultures have musical traditions because of the enjoyment people receive from creating rhythms and expressing their feelings, ideas, thoughts, and cultural values through lyrics". Songs provide both cultural and linguistic elements with respect to L2 learning. Attitudes towards the country where the language is spoken and the culture and the customs there will influence acquisition of the language, too. When students are not studying in the country where the language is spoken, songs offer an important way to introduce culture and help motivate students (Murphey, 2010).

### 4.1.2. Effects of singing songs

Singing is an activity that mixes linguistic and musical information, incorporating both hemispheres of the brain throughout the corpus callosum, which strengthens the transmission of messages. Some studies point out the benefits of singing exercises, relating them to pronunciation and learning of grammar and vocabulary. In Falioni's words "Practically all grammar points can be found in musical text, and the text also offers a wide variety of vocabulary, all of which can be utilized to practice the four communication skills" (1993: 98).

Restrepo and Silverman (2001) state that pronunciation is the most difficult part in the acquisition of a language as there are many differences between the phonological elements of the mother tongue and the foreign language. If we don't pronounce words correctly, it could be that we cannot hear them correctly. So, singing can facilitate development of the auditory capacity and improve word articulation; in fact, "there probably isn't a better or quicker way to teach phonetics than through songs" (Leith, 1979: 540). Songs can be effective in the development of phonetic abilities and it is easy to find songs that emphasise a specific phoneme we want to work on. According to Palmer and Kelly (1992), songs exaggerate the stress and duration of the phonetic elements, what benefits memory and acquisition of the foreign language. These authors affirm that divisions of four beats in the majority of songs coincide with the stress and non-stressed syllables of utterances, thus aiding memorization. After a study of 23 Spanish students in an English bilingual program where they had to sing either in Spanish or English from the outset, Fitzgerald (1994) found that the participants´ pronunciation, their reading skills and participation all benefited.

Moreno et al. (2009) also studied the effects of music on learners during a period of eight weeks to observe if the students were able to identify pitch changes in target language sentences. Of the 20 participants (all aged 8) who were included in the experiment; half of them were trained to differentiate prelinguistic sentences with pitch differentiations, whereas the other half only had the opportunity to

participate in listening to music activities and oral production. The conclusions show that using musical tasks for even a short period of time positively influences the ability to perceive and distinguish individual phonemes of the language.

In addition, there are researchers who have found that pupils who have more advanced musical aptitudes improve faster than their classmates. Eterno (1961) established a direct relationship between musical aptitude, musical training and foreign language pronunciation. Although the teachers in the study showed the same material to all students in the same manner, the ones with more advanced musical aptitudes acquired the language better than the rest of their classmates thanks to the use of songs. In a similar study, Slevc and Miyake (2006) found that those adult students with more advanced musical aptitudes spoke English with better pronunciation than those with less developed aptitudes.

Melodies, rhythms, timing and measurement of sentences in songs are elements that can help students memorise vocabulary and grammatical structures because "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" (Falioni, 1993: 101). Moreover, Jolly (1975: 13) assures that it is not difficult to find appropriate songs that include structures dealt with in our coursebooks.

### 4.2. **Effects of listening to instrumental music**

Another way of approaching music in the classroom is through the use of instrumental music, without lyrics. Instrumental music in the educational context provides a relaxed atmosphere, helps in the development of the creative process and isolates pupils from noises from the external environment (Fonseca-Mora, 2002b). Hallam and Price (1998) examine the effects that background music has on students with behavioural and emotional problems, observing an improvement in maths, increased cooperation and a decrease in the levels of aggressive behaviour.

The effect of music is deeply engrained in human emotions. People relate to music in accordance with their present and past emotions because listening to music "causes changes in blood pressure, blood flow, posture, respiratory rate, pulse rate and general activity" (Bancroft, 1985: 7).

Reduction of anxiety and boredom related to work routines are also direct results of music enjoyment (Devereux, 1969). Appropriate selection of music and its incorporation in lessons can be beneficial for students. Lively music at nine o'clock in the morning can energize students whereas relaxing music in times of stress can help them calm down. Benenzon (1997:35) summarises some of the influences that music has on human beings:

- According to rhythm patterns, muscular energy can increase or decrease.
- It can cause acceleration in the respiratory system.
- Pulse and blood pressure can be modified.
- It can decrease impacts from different sensorial stimuli
- It can reduce fatigue
- It can help when typing, painting and other activities.

Waisburd and Ermenger (2007:44) investigate feelings that arise from music, art and language. Their studies show that the combination of music and art allows for a release of feelings and emotions that can't be expressed verbally. Moreover, they maintain that those students who study art are usually better thinkers, better in problem solving and in language, and they conclude that if the school incorporates dance, music, visual art, drama and creativity in everyday activities, better academic results will be achieved and behaviour problems will decrease.

The so-called "Mozart effect" has been studied by diverse researchers as it has been said that listening to Mozart may induce a temporal improvement on the performance of certain kinds of mental tasks, as for example spatial reasoning (Ivanov and Geake, 2003; Hallam, 2000). However, there have been other studies that have found that listening to Bach or Schubert provide the same spatial reasoning effects as listening to Mozart. So, it seems spatial-temporal reasoning is not improved by listening to one composer but rather is due to repetitive musical patterns which cause positive brain reactions.

McDonald (1975: 872) confirms that "one of the curricular areas where music is particularly useful is in the development of language and reading skills". Hall (1952) examined 278 students from grade 8 and 9 and found many benefits were attained by listening to background music while reading. Nicholson (1972) wanted to investigate if music influenced reading ability. She carried out an investigation over 16 weeks in two groups with 50 slow readers from 6 to 8 years old. In both groups use of musical activities was incorporated. However, in the experimental group movement and reading

activities carried out with music were added, and the learners sang and listened to certain songs. At the end of the first week, differences in learning became apparent and by the end of the project the children in the experimental group had increased attention spans and there were improvements with regard to discrimination of letter pairs and reading in general.

Turnipseed (1976:1) affirms that "auditory discrimination has been found to be the 'leading factor' in reading". Wolff (2004) replicates the findings of his colleagues, announcing that use of music produces an increase in academic reading levels, improves perceptual-motor capacity, aids creative thought and encourages increased participation in the classroom. A more recent study carried out by Moreno et al. (2009) and his team at the Mediterranean Institute for Cognitive Neuroscience (INCM) shows that musical training influences reading abilities in eight-year-old children.

Campbell (1998) cites a longitudinal study with 7.500 university students where it was confirmed that learners who had music as a compulsory subject obtained better reading results than those who did not. Fonseca-Mora (2002a) also studied the effect music has on reading comprehension of university students and found three main benefits: the effect of music with respect to the rhythm of the text; easier identification of feelings that the text produces and easier recognition of the text macrostructure as music improved the ability to identify different parts within the text.

## 5. Impact of a musical intervention program for foreign language learning: An empirical study

The incorporation of songs in the foreign language classroom is, as we have seen, a good resource for the improvement of linguistic ability, since the union of music and language not only appeals to the emotional side of the listener but also helps in the memorization process. A conscious and structured use of music should provide great benefits in the classroom. Toscano-Fuentes (2010) carried out an educational intervention project based on the incorporation of musical activities and tasks. This study investigated if there are problems which arise due to dissimilarities in the auditory language perception of adolescent students. The main aim of the study was to observe if continuous auditory input provided by use of diverse musical exercises with songs and instrumental music would benefit all pupils in foreign language learning or only those with a high level of musical development.

49 students aged 11 to 13 participated in the study. All the participants were 6th grade primary students in the academic year 2008-2009.The main researcher worked in the school as an English teacher so her presence in the class would not influence students´ behaviours as that of an outside researcher could. Permission to do the research was requested and granted by the school administration and parents. None of the students declined to collaborate in the project. Although anonymity was maintained in all cases, each student was given a number in order to trace individual progress.

In this research auditory input was emphasised through the introduction of musical activities, songs and instrumental music. The students´ book was adapted and new teaching units were created where music was introduced on a daily basis. For example, at the beginning and at the end of the lessons students sang jazz chants. During the lessons, instrumental music was played in order to change the pace, that is to say, to relax, improve concentration or to energize learners.

Data collecting instruments selected for this study were an initial and final English proficiency level test, Pimsleur´s language aptitude battery, Seashore's musical test, Gardner and Lambert's Attitude and Motivation Test Battery (adapted from Diaz, 2006) and a questionnaire to evaluate attitudes towards the music activities. Direct observation of lessons was a further instrument.

### 5.1. Data analysis

There were three hypotheses linked to this research:

Hypothesis 1: Students with more advanced auditory abilities will learn the second language more effectively.
*Simple Linear Regression and Correlation* based on the Pearson lineal correlation test was implemented to test both variables: students' auditory skills and proficiency levels. The statistical significance was 0,000 so the results show that there is a significant relationship. Students with higher auditory skills also had better results in English language learning.

Hypothesis 2: Pupils with advanced auditory abilities also show a high level of musical intelligence.
Data analysis concentrated on results of those students who had advanced levels of auditory ability in test 5 and 6 of Pimsleur´s language aptitude battery and correlated the results with those students who had a high level of musical intelligence as ascertained from the Seashore musical test. The results show a correlation of 0,290, associated to a significance level of 0,043, which is evidence of statistically

significant positive relationship between both variables, thus showing that students with higher scores with respect to musical intelligence also have higher levels of auditory skills.

Hypothesis 3: The use of music in the language classroom will affect some language skills more than others
The analysis of students' English proficiency levels shows that there was a positive evolution, especially as regards the auditory skill. The average improvement in speaking marks was 2.1786, in writing 1.1327, in listening 3.6959, in reading 2.7112, while in grammar it was 1.8418.
So, in general, students improved their L2 proficiency level with this musical intervention program for foreign language learning, but the receptive skills: listening and reading show a higher level of improvement.

The analysis of students'satisfaction with this musical approach to language learning (see table 1) proves that, in general, students enjoy singing and working with songs and music in the foreign language subject.

| **SINGING SONGS** | **1 Totally disagree** | **2 Partially agree** | **3 Totally agree** |
|---|---|---|---|
| 1. I like singing | 4% | 8% | 88% |
| 2. I like singing English songs | 4% | 0 % | 96% |
| 3. I like singing in the English lessons | 6% | 16% | 78% |
| 4. Singing songs improve my level of English | 6% | 8% | 86% |
| 5. I listen to foreign language songs at home | 24% | 0 % | 76% |
| 6. I prefer to learn English with music than other ways | 2% | 2% | 96% |

**Table 1. Like / dislike of singing songs**

Their attitudes towards foreign language learning (see table 2) clearly illustrate that nearly all students showed an increase in levels of motivation at the end of the academic year which was could be attributed to the incorporation of musical activities, songs and instrumental music.

| **ATTITUDE TOWARDS THE LANGUAGE LEARNING THROUGH SONGS** | **1 Totally disagree** | **2 Partially agree** | **3 Totally agree** |
|---|---|---|---|
| 7. I ike listening to the songs presented by the teacher | 2 % | 4 % | 94 % |
| 8. I like learning English with songs | 0 % | 2 % | 98 % |
| 9. Learning English with songs is a challenge for me | 51 % | 3 % | 46 % |
| 10. I like learning English this way more than other ways | 2 % | 2 % | 96 % |
| 11. I am able to speak English more now than at the beginning | 2 % | 6 % | 92 % |
| 12. I like the fact that the teacher uses music in the lessons | 4 % | 2 % | 94 % |
| 13. I love to work in groups | 2 % | 2 % | 96 % |
| 14. I am more motivated to learn English now than before | 2 % | 4 % | 94 % |

**Table 2. Attitude shown towards language learning through incorporation of songs**

## 6. Conclusions or the relationship between the linguistic ability and the musical intelligence in the foreign language classroom

Although everyone is capable of learning a second language to some degree of competence, some learners are better equipped than others. People with a high verbal-linguistic intelligence are those that have the ability to use language effectively both orally and in writing, that is to say, those who have a high level of sensitivity to sounds or phonology, sentence structure or syntax, meaning or semantics and illocutionary force or pragmatics. Skehan (1998: 201) reviewed empirical research done on language aptitude, and defined this human capacity as a triarchic concept based on auditory ability, linguistic ability and memory ability. As a general conclusion, Skehan (1998) affirms that exceptional foreign language learners are those that in a relatively short period of time (about three years) become fluent speakers and exhibit a highly developed memory ability, that is to say, learners who are very good at assimilating large quantities of new material and at retrieving it while interacting. Research has shown

that memory is not a unitary construct and that different areas of the brain participate in the encoding and retrieving tasks. Melodies in language learning contribute to the durability of memory and later effectiveness of recall as has been explained throughout this paper.

Most of the mechanisms of perception that make up the musical intelligence have been located in the right hemisphere in right-handed people who are not students of music. The neurological location of language ability has always been considered to be in the left hemisphere, in the areas of Broca and Wernicke. Damage in these areas produces different types of aphasia. However, today, with the use of devices to scan the human brain, it has been observed that the right hemisphere is also involved, although to a much lesser degree than the left, in the cognitive processes required for the implementation of this intelligence.

The musical-rhythmic intelligence has to do with the ability to perceive and appreciate rhythm, pitch and melody, elements also crucial in the language learning process. Melodies in caretakers' or teachers' discourse affect language in several ways: pauses between thought groups become more obvious, musical rhythm causes a slowing down in speech production and musical melody guides the speaker's pitch variation. Melodies help to slow down the verbal input which helps language learners in the processing of incoming information.

Research done on the effects of music in the classroom shows that students who had received musical education or those that had been frequently exposed to classical/baroque music had higher academic results. Music also has physical effects such as the adaptation of breathing to the musical rhythms, the impact on muscular energy and psychological effects as seen in its ability to induce a certain type of mood. As was also observed in Toscano-Fuentes' study with a musical intervention program for foreign language learning, students improved especially their L2 proficiency level in listening and reading. Melodies in the foreign language classroom also generated a sense of community and the emergence of collaborative relationships. Therefore, more oral contributions in the target language were observed as learners exhibited interest in expressing their feelings and thoughts.

Arnold points out '…we learn better that which attracts our attention, and emotion automatically makes us pay attention' (1999: 260). This is what music does in a language learning program. It is not only about matching prosodic verbal elements with musical stimuli; in order to promote language acquisition it is also necessary to reach the meaning level. Speaking a language is not solely a question of retrieving verbal material based on systemic knowledge of the language but also of connecting it with contextual and schematic knowledge, as no interaction is context-free. Music and lyrics seem to leave a particularly deep trace in our memories; this could be due to the fact that they are connected to affective and unconscious factors. It could also be related to the hypothesis that work incorporating music is less energy demanding because musical perception starts before birth.

From a broader point of view, melodies in language teaching provide a rich-sounding environment. This means that the melodic approach is at least a plausible educational alternative that can enhance the EFL learners' awareness of sounds, rhythms, pauses, and intonations. In general, it can be affirmed that the a musical intervention program in the foreign language classroom can have benefits such as helping students to concentrate and connect with their inner self, stimulating creative processes, cutting out the black noise, that is to say, eliminating distracting sounds from in or outside the classroom, and, above all, fostering a relaxed but motivating and productive classroom atmosphere. As language performance is memory and accessibility dependent, in classroom language learning using activities related to musical intelligence can provide a basis for developing more effective communicators in the target language by helping learners to connect with the learning activities and to activate linguistic information stored in memory.

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