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MUSICAL APTITUDE AND SCHOOL PERFORMANCE: CASE STUDY ON THE MEMBERS OF THE PROGRAM OF SYMPHONIC BANDS OF CALDAS (COLOMBIA)

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Abstract. Children and young people have different challenges as they progress in their school development, one of them is the maintenance of high ranks in academic performance, music as a tool to improve sensory skills has been shown to have a positive influence when combined with In the educational field, the present research, based on this premise, set itself the objective of determining the academic performance of children and young people with musical aptitudes belonging to the Caldas Symphonic Bands Program. For this purpose, a methodology with a quantitative approach and a non-experimental transactional correlation design was used. Out of a total of 1,926, a sample was selected by conglomerates in a simple stage, of 482 instrumentalists (282 men and 200 women). For the rest, the Seashore Music Skills Test was chosen for the assessment of musical aptitudes, whose most relevant results showed that the correlations among all the variables that evaluate the musical aptitudes are all positive, besides being all significant with a significance of 5%. The highest is between the time and tonal memory (0.4991), while the most incorrect is between the intensity and timbre (0.1478). In summary, it could be determined that women present better grades in Spanish and mathematics than men, while the opposite occurs with respect to tonal memory

Keywords: Fitness, academic performance, music, Spanish, mathematics.

Introduction

Generally, music education has proven to contribute positively to IQ, including mathematical and language skills (Development Bank of Latin America, 2012). In this regard, different studies have been developed that establish how much music influences academic performance, given that this is considered fundamental for the development of society and the quality of life of the population in general.

Different studies and theories show that by strengthening skills linked to the arts, music, or sports, school performance may be improved. Consequently, musical psychology and other associated disciplines insist on the importance of learning music to develop skills that not only serve to play an instrument, but for life as a whole: discipline, creativity, the ability to abstract signs to convert them into sounds or melodies, all this strengthens the abilities of a student to be a better reader, solve mathematical problems, or adapt to social pressure when introduced to the job market, complying with routines, schedules, and so on.

While a person's musical abilities may be innate, there are others, such as the ability to discriminate chords, which are only formed as the subject grows and comes into contact with musical creations that enable them to refine their skills through practice. In this sense, the ability to recognize chords would be an artificial or acquired skill, to name it somehow. From this we can deduce that there is a decisive factor for the production of musical abilities, that is, the environment in which the child develops:

When the biological predisposition, even if high, does not develop on a favorable environment of musical experiences, innate aptitudes cannot evolve. From any standpoint, it must be borne in mind that these aptitudes are present in the musical behaviors of all cultures and at all times. (Lazaro Tortosa, 2015, p. 66)

Music production is such a human aspect that it is an intrinsic part of all cultures. While it is true that there are fundamental differences between all the very different types of music generated within human communities, it is also indisputable that there is no community or culture in the world in which there is an absence of musicians or occurrences of this type. This leads us to think that music and the skills necessary for it are part of the human condition. In this way, it is reasonable that a percentage of musical aptitudes are not inscribed in the genetics of the child but are produced within the family and the culture to which the child belongs.

On the other hand, broadly speaking, among the most important musical aptitudes are those described by Seashore, Lewis and Saetveit (2008): tone, intensity, rhythm, time, timbre and tonal memory.

Initially, regarding tone as a musical aptitude based on some studies, it is stated that “tonal discrimination shows a constant increase throughout the ages studied, with the majority of subjects capable of discriminating differences of up to half tone” (Vera Tejeiro, 1989, p. 1).

In general, according to the Real Academia Española (RAE) (2017), the word comes from the Latin *torus* and this in turn from the Greek *τόνος* tónos; which means 'tension' itself. Tone is defined as “the quality of the sounds, depending on their frequency, which enables them to be ordered from bass to treble” (Real Academia de la Lengua Española, 2017). Although this definition is correct, it is a little incomplete due to the fact that tone is defined by the human ear’s perception in differentiating different sound frequencies. This in turn is defined in physics as: “a longitudinal mechanical wave, which propagates in a medium taking advantage of its elastic properties. It is the vibratory and longitudinal movements where the direction in which it propagates is parallel to the direction of vibration” (Serway & Jewett, 2015, p. 98).

Now, due to the constitution of the human ear, the brain can receive information according to the vibrations of different sound waves. In this sense, the main characteristic of a sound wave is frequency. Frequency is a magnitude that measures the number of repetitions per unit of time, which, for sound waves, is measured in hertz or Hz, in honor of the German physicist Heinrich Rudolf Hertz, whose advances enabled the development of technologies mediated by the use of electromagnetic waves.

The term tone should not be confused with frequency. Frequency is the physical measurement of the number of oscillations per second. Tone is a psychological reaction to sound that enables a person to place sound on a scale from high to low or from treble to bass. Therefore, frequency is the stimulus and tone is the response. Hence, the measure of a hertz is the frequency of an event or phenomenon repeated per second and the fundamental frequency of a note, the inverse of its period of vibration, which can be measured by a frequency analyzer (Serway & Jewett, 2015). Other authors such as Vaseghi (2007) consider that tone is a frequency that constitutes an auditory sensation, which is perceived by the auditory system and the human brain. Here it is important to further understand that the sensations of prominent sound frequencies are understood as the tone of a specific sound. In this sense, a high tone sound will correspond to a high frequency and a low tone sound to a low fundamental frequency. Now, the harmonics of a fundamental frequency, according to the cited author, are their integer multiples. This is why combinations of frequencies that are not whole multiples, in the case of a fundamental frequency, will end in noise.

On the other hand, related to musical notes, these are considered as symbols or signs that represent the frequencies, durations and times of elementary musical sounds. That is, musical notes allow musical compositions to be represented by means of symbols, in such a way that they can be read by musicians and, therefore, interpreted. However, musical note systems facilitate the standardization of musical instruments and their tuning frequencies. Such a procedure can be observed below (Table 1).

Table 1.
Musical notes, frequencies and semitones

Notes	**First**		**Second**		**Third**	**Fourth**		**Fifth**		**Sixth**		**Seventh**
Natural	C	C#, Db	D	D#, Eb	E	F	F#, Gb	G	G#, Ab	A	A#, Bb	B
Latín	Do	Do#, Reb	Re	Re#, Mib	Mi	Fa	Fa#, Solb	Sol	Sol#, Lab	La	La#, Sib	Si
Frequency (Hz)	261.63	277.18	293.66	311.13	329.63	349.23	369.99	392.00	415.30	440.00	466.16	493.88
Semitones	1	2	3	4	5	6		8	9	10	11	12

Note: Source: Vaseghi, 2007

As you we can see, musical notes in Occident the West use the following nomenclature: C, D, E, F, G, A, B, and their equivalents in Latin are: Do, Re, Mi, Fa, So La, Si.

However, talking about the hash '#' symbol, it represents a high note. That is, it is a semitone higher than the fundamental note, which is also called Sharp. From another sense, it would be √(12&2) multiplied by the frequency, which would be equivalent to the fundamental note.

So, the sign 'b' represents a flat note, and is known as flat, the clear version of a note, in other words, is the equivalent frequency of the divided fundamental note, √(12&2)

From this perspective, it must to be like:

C = 261.63 Hz = C

$C * \sqrt[12]{2} = 277.18$ Hz = C# = C Sharp

D = 293.66 Hz =D

$D / \sqrt[12]{2}$ = 277.18 Hz = Db = D-flat

As you we can see, when you we increase a semitone starting from C, you we have a C Sharp; and if you we decrease a semitone starting from D, you we get a D-flat, which is equivalent to a C Sharp. That is to say that √(12&2) is the step to advance in each semitone, which will give provide a total of 12 semitones to complete an octave. Moreover, an octave is equivalent to 12 semitones or 7 musical notes. It should be noted that the human ear can only perceive on average a range of less than 10 octaves (Vaseghi, 2007).

Related to intensity, according to Serway and Jewett (2015), it has been found that since sound waves are longitudinal and also travel with great speed through a compressible medium. In in relation to the elastic and inertial properties of that medium, that speed of sound in a liquid or gas that has a volumetric modulus B and density S will be: v= √(B/p)

From this position, the intensity is defined as the rate of energy flow in an area of unit in which 〖(ΔP〗 _max) is the amplitude of pressure.

$$I = \frac{(\Delta P_{max})^2}{2pv}$$

The speed of sound waves in the air is usually used constantly: v=343 m/s and air density being p = 1.20 kg/m³. Following the author's aforementioned statement, through this relationship, we find that the loudest sounds that the human ear can tolerate, comprises a pressure amplitude of 28.7 N/m².

Bearing this in mind, it can be inferred that the intensity of a wave, or the power per unit area, refers to how quickly the energy carried by the wave is transferred through a unit area A, perpendicular to the direction of the wave's travel. (Serway & Jewett, 2015)

In terms of timbre, according to Serway and Jewett (2015) the human perceptive response is associated with different harmonic mixtures, which is known as sound quality or timbre. That is to say, the sound of the trumpet, for example, is perceived with a "shrill" quality. However, it is precisely this quality that makes it possible to distinguish the sound of the trumpet from other similar instruments such as the saxophone, the quality of which, on the contrary, is perceived as "reeded". Similarly, since the clarinet and oboe have air columns moved by reeds, they are alike but they have mixtures of similar frequencies. However, here it is more difficult for the human ear to distinguish them on the basis of their own sound quality.

According to this, the timbre is a quality that makes it easy to distinguish two sounds of equal intensity and tone, produced by two spotlights or sound generators that are different. Another case is that of two violins that, for example, having different manufacturers, produce a different timbre even playing the same note. In this sense, the timbre is related to the fact that a sound almost never corresponds to a single sound wave, but that there is usually a fundamental frequency to which most of the energy of that sound belongs to and other frequencies which carry their respective amount of energy, which are called harmonics; these are those which superimpose themselves on the wave corresponding to the fundamental frequency. That is to say, sounds can be characterized by several elements as tone, volume or timbre. This last one includes the characteristics of the sound that enable the human ear to distinguish the sounds that have the same tone and volume or intensity (Mariano Merino & Muñoz Recipo, 2013).

According to the above, the timbre is determined by its harmonics and it includes some dynamic characteristics. In addition, the timbre perception has to do with complex mechanisms that the brain carries out from the stimuli that come from the neurons affected in the organ of Corti, by the different harmonics of a complex sound, as Mariano and Muñoz (2013) claim.

However, the timbre recognition depends not only on the spectral composition, but also on its temporal evolution; i.e. from the moment it begins until it becomes extinct, as shown in Figure 1 below.

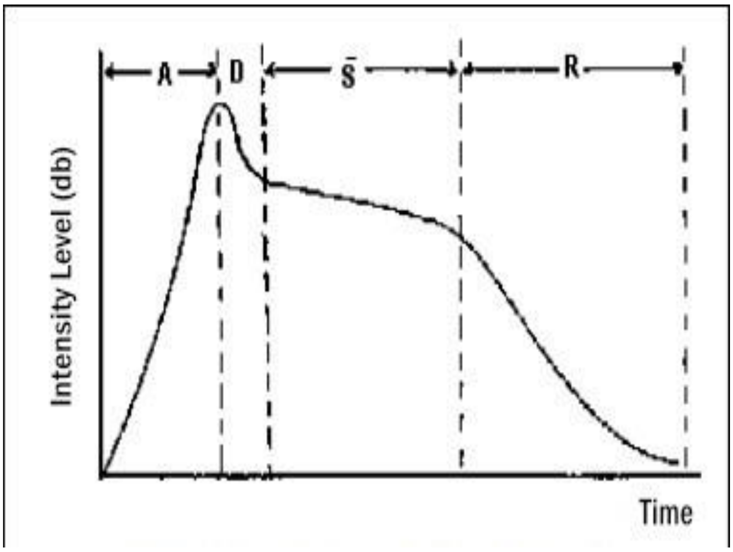

Figure 1. Structure of the surrounding sound intensity from its emission to its extinction. A. attack; D. decay; S. sustenance; R. relaxation

Note: Source: Mariano and Muñoz, 2013

The figure shows how all sound undergoes changes in intensity over time, as is evident: the intensity starts at zero at maximum intensity, which is known as Attack (A). Then, it briefly decays (D), the sustenance of the sound (S), followed by extinguishing into Relaxation (R). However, according to the authors, this evolution of intensity depends directly on the type of instrument that emits the sound; they expound the case of harmony, in which sound grows softly (A) up to a maximum height and then decays abruptly passing through (D)(S)(R) in a very short time.

Moreover, the temporal evolution of the intensity described above, in addition to the spectral composition, makes it possible to differentiate the timbre of a particular sound in relation to another. Finally, it is important to mention that in general the timbre that an instrument emits in its different notes is not the same, since each note has its own fundamental frequency and has its own individual characteristic timbre (Mariano & Muñoz, 2013).

With respect to rhythm, according to the RAE, Royal Spanish Academy, (2017), this term comes from Latin. *rhythmus*, in Greek ῥυθμός rythmós, derivate from ῥεῖν reîn meaning 'flowing'. Its definition is understood as the rhythmic order in the succession or occurrence of things, but in music, it refers to the proportion kept between emphasis, pauses and repetitions of different duration in a musical composition (Real Academia de la Lengua Española, 2017).

In general, rhythm is characterized by a pattern of short and long sounds and silences. According to authors such as Custodio and Cano (2017), this is the final result of establishing a time, i.e. the length of time that the sound or musical work lasts, using a pattern of accents with equidistant distances as a base.

From this perspective, the perception of continuity of patterns in a musical work or sound is what generates rhythm. There is even evidence that music can incite changes in emotions, in the nervous system, in some motor expressions such as smiles, as well as tendencies to dance, to sing, applause or to play an instrument. This happens because there are zones in the brain that process components such as tone, vibration, harmony, while the cerebellum itself is responsible for rhythm, say Custodio and Cano (2017).

In general terms, rhythm is a flow of movement, which is usually controlled or measured, either sound or visual, says Perez (2012). It is usually produced by an order of different elements of the environment. It is itself a basic feature of all the arts, especially music, poetry and dance. However, this same author affirms that it can also be observed in natural phenomena, that is to say, in activities carried out by living beings, since these are related to the rhythmic processes of geophysical phenomena such as ocean tides, solar days, lunar months and the changes in seasons (Peréz Herrera, 2012).

In relation to the sense of time, Correa, Lupiáñez and Tudela (2006) explain that the representation of time is still complex to solve, even from a neurobiology-based approach. However, there are some psychological, cognitive, philosophical and sensorial approaches, among others, in which we try to define how the human being generates a perception of time, and what are the mechanisms that generate this perception. Many authors such as Eric et al. (2000), sustain models based on neural networks, which are distributed by the cortex and intrinsically capable of processing temporal information. These same authors express the idea that attention "deforms time". The idea itself is that the degree of attention we pay overtime alters our perception of duration. From this perspective, the appearance of a brief stimulus in a spatial position or in an attended modality could be analyzed, with respect to which, according to the same cited authors, it is perceived as more lasting in comparison with the unattended position or modality.

However, this is also evident if attention is focused on establishing a reference point taking into account some interactions of the medium or rhythmic patterns such as speech, muscle movements or memories of a known pulse. Nevertheless, when the person is confronted with musical sounds, it is easy to orient themselves almost automatically in the music, even without having any musical training, because the human being has the ability to make quick judgments about the music, starting from very short examples, such as determining the style of the music, the performer, the rhythm, the complexity and the emotional impact.

In summary, the sense of time, although it is not easy to define, is possible to evidence as being rooted in the sensory practice of the events that we perceive, to make use of these events later in order to make a metric applied to the activities that require continuity and temporal approximation.

Finally, regarding tonal memory, several writers and music theorists such as Francés (quoted by Vera, 1989) have presented proposals for the way in which music is "understood", or in which a listener "senses everything". Almost all of these proposals have arisen out of an interest in adopting a more perceptual stance so as to include aspects of real-time thinking, retrospection or perceptual limitations in their theories of music, say Francés (quoted by Vera, 1989). For the rest, these authors explain, by comparing musically formed adults with untrained subjects, that it has been shown that untrained subjects have "as much listening experience of musical intervals as those who had received music education” (Vera, 1989).

Other authors have considered that tonal memory is the ability to recognize the characteristics of a sound that has been previously heard, which can be acquired through musical teaching. That is, according to Vidal Varela (2010), musicians usually develop a great capacity to keep musical information in their memory, both short and long term, with the most basic type of memory being musical memory of tone, melodic or tonal, say the same authors. In addition, there are a number of in-depth studies on the subject, of which only a few will be mentioned.

In Madrid, research was carried out that relates musical training with higher cognitive functions such as attention and verbal work memory. In this study, it is stated that "musical training prolonged from infancy can produce profound changes in the structure and functioning of the brain" (Jurado, 2016, p. 2). In addition to this, it explains how there is research that shows how musicians have an advantage in terms of certain cognitive skills. Another work by Carrillo, Viladot, and Pérez (2017) resulted in "a conceptualization of the impact on music education that goes beyond the measurable aspects associated with educational reform policies" (p. 61).

On the other hand, González Moreno (2013) emphasizes that, despite the low consideration that music as a subject has among students, since it is perceived as useless or lacking in importance for the development of skills that allow the student to place them self socially as a productive element, the positive results in terms of academic performance are obvious: they are always more competitive, with better grades who, besides going to school or college, also dedicate some hours to learning music, compared to those students who only dedicate themselves to traditional school tasks, without belonging to any musical formation process. However, in the study by Reyes (2011), it was determined that music has a great influence on the intelligence of students, which facilitates the creation of connections from their inner being, allows them to work on mathematical and linguistic concepts, or knowledge that has to do with the environment, as well as benefiting fine motor skills, motor control and plastic capacity. In other words, music education is an important basis for education in general; however, it is necessary to break with the patterns formed in traditional education, in which the development of the arts as important areas for education is limited.

Method

This research uses the methodological non-experimental transactional correlational design, the research does not intend to make changes of an experimental type: it will be limited to making a study of reality, studying the different factors and variables that may intervene in the different results for students. The population that participated in the study was made up of all the titular bands that make up Caldas' band program. The sample consisted of a total of 482 instrumentalists including 200 girls and 282 boys. Two instruments were taken into account for data collection: the report card, through which the population’s academic performance was analyzed, and the Seashore Musical Aptitude Test for the assessment of the other variable of the study: musical aptitude. In general, this test offers separate measures with respect to 6 tests for: tone, intensity, rhythm, sense of time, timbre and tonal memory. Finally, as for data analysis, this was carried out with a significance of 5% through the use of IBM SPSS Statistics statistical software, the data was filtered taking into account the uncontrolled variables of: age, sex, time of musical experience, band and grade, and statistical measures such as the mean and percentile of the test were taken into account.

Results

With regard to the demographic characteristics of the population, in relation to age it was found that the student with the lowest age within the sample was 9 years old, while the maximum age recorded among instrumentalists was 19 years old. In terms of grade, eighth grade students represent the highest percentage with 18.46%, i.e. 89 students; on the other hand, the lowest percentage is 0.41%, which corresponds to 2 students in the third grade. However, regarding the geographical location, it was found that the majority belong to the eastern and central regions of Caldas, of the 31.74% that belong to the eastern region of the department, 9.13% belong to the municipality of Victoria; and of the 25.31% that belong to the central region of the department, 9.54% of the instrumentalists are from Manizales. In addition, 8.92% are from Ríosucio, 7.26% from Viterbo, and 4.98% from the municipality of San José de Caldas.

However, as for the correlations between all the variables that evaluate musical aptitudes by means of percentiles, it was found that they are all positive, in addition to being all significant with a significance of 5%. The highest is among the time and tonal memory aptitudes (0.4991), while the most uncorrelated is among the intensity and timbre aptitudes (0.1478). Likewise, with respect to the areas of Spanish and Mathematics, it was found that they are correlated with each other (0.5832), but these areas do not present a correlation with any of the variables that evaluate some type of musical aptitude. It was also found that the variables of age and academic grades are directly correlated (0.8364), which explains the logic that as age increases, one ascends in the academic grades studied. On the contrary, as the age of instrumentalist students increases, their grades in Mathematics and Spanish (negative correlation values) decrease. It should also be noted that the variables used to evaluate musical aptitudes of intensity and timbre are isolated from the others. In other words, those two variables (intensity and timbre) measure a different aspect than the other variables. Similarly, it was found as a result that girls have better grades in Spanish and Mathematics with respect to boys, while the opposite happens with respect to tonal memory. Likewise, it was found that high values for *musical dexterity* (DM) are associated with low grades in Spanish (C) and Mathematics (M), although this association is very low.

On the other hand, as a research added value, the Spanish language and Math subjects were not only analyzed, but the other academic fields as well, finding that, as the Academic level in which the instrumentalists are increases, their grades in Natural Science and Arts are reduced, whereas the artistic component and English are not affected. Similarly, the instrumentalists who have high percentiles in tone, timbre and tonal memory present low grades in Natural Sciences, those having high percentages in the timbre aptitude have low grades in English and, as the grades in the percentiles of the tonal memory variable are reduced, the grades in Natural Sciences, English and Arts are reduced.

In addition to this, in a tacit comparison which can come from teaching experiences themselves, and examining holistic factors resulting from the historical analysis of the students´ development, it is necessary to consider that not only does understanding the curricula's content development improve, as can be seen above, but the behavioral development is what also attracts attention. Behavior that at one point could be considered as inappropriate or even aggressive, were reduced with the inclusion of music in the learning environment. It should be said that, in a personal way, these were the first empiric experiences enshrined with the application of music in the educational environment, and they are also the main reasons why the research project was started; then, the statistical check is part of the foundation of an already established hypothesis.

Finally, a comparative analysis between bands regarding musical aptitudes was developed, finding that, regarding tone, the person who has higher average mark belonged to the Villamaria group, with the average mark statistically the same for this group as the Victoria, Salamina, Samana, San José de Caldas and Chinchina ones. The Manzanares group, which has the same average percentile for the tone as the Viterbo, San Felix, Arauca, Manizales, Anserma and la Dorada bands, present the lowest percentile regarding the variable being analyzed. La Dorada band, with the average percentile for this group being the same as in the Salamina, San Félix, Manizales, Chinchina, Pensilvania and Villamaria bands, has a higher average mark in the intensity percentile regarding the intensity. The Anserma group represents the lowest percentile regarding the variable analyzed. Which represents the same average percentile of intensity as the San Bartolomé Pacora and Manzanares groups. For its part, the San Bartolome Pacora band represents the highest average mark in the rhythm percentile regarding rhythm, with the average percentile for this band statistically the same as the Samaná and Manizales groups. The lowest percentile regarding the variable being analyzed is represented by the Viterbo band, which represents the same average percentile regarding rhythm as the Manzanares, Arauca and Anserma bands. Regarding time, the San Bartolomé Pacora group has the highest average time percentile, not sharing any statistically identical percentage with any of the other bands in this assessed aspect. The lowest percentile regarding the variable being analyzed is represented by the Arauca group, which represents the same average percentile regarding rhythm as the Manzanares and San Félix bands. Regarding timbre, the Manizales group has higher mark in the timbre percentile, sharing a statistically identical average in this aspect with the Villamaria, Victoria, La Dorada and San Bartolomé Pacora bands. On the other hand, the Arauca group has the lowest percentile regarding the variable being analyzed, which represents the same average percentile regarding timbre as in the Manzanares Samaná, Anserma and San Félix bands. And finally, regarding timbre, the Victoria band has higher mark in the memory percentile, sharing a statistically identical average in this aspect with the Villamaria, San Bartolomé Pacora and Salamina bands. On the other hand, the Pensilvania group has the lowest percentile regarding the variable being analyzed, which has the same average percentile regrading memory as the Arauca band.

Discussion and Conclusions

The general objective of this research was to determine the academic performance in children and young students with musical aptitudes belonging to the Caldas Symphonic Band Program. After applying the instruments, it was found that, regarding the Spanish language and Math subjects, these instruments are correlated, but these areas are not correlated to any variable assessing any type of musical aptitude. Regarding this, what Gonzales Moreno (2013) says when he points that the students who receive musical education are generally more competitive and have better grades is not quite true, since almost all musical aptitudes assessed in this research showed that the higher they were, the lower the students´ grades were. However, it was determined that women have better grades in Spanish language and Math regrading men, whereas the opposite happens in tonal memory.

On the other hand, we could corroborate that, while age increases, their academic grades increase and, on the contrary, while the band-playing students´ age increases, their grades in Math and Spanish language decrease. It is possible that it is due to the fact that their musical education was begun very late in the case of this sample population, because only until when they enter superior grades, since these students achieved becoming part of these bands only after entering higher grade levels. Thus, if they would have been encouraged in this aspect at a younger age, more satisfactory correlation results might have been achieved.

training begin during childhood, in order to produce changes in the structure and the way the brain works. This is done with the interest that students become biologically stronger as they get older and more effectively respond to the academic processes that they undergo. This is why Carrillo et al. (2017) points out the need for educational policies that guarantee musical training starting from childhood, so as to create a positive impact within their general education and the student's academic performance.

To summarize, although the results from this study do not show a significant correlation evincing the fact that development of musical aptitudes contributes in the improvement of academic performance, given that the Math and Spanish areas are correlated among themselves, since these areas do not present a correlation with any of the variables that evaluate some types of musical aptitude, we can, however, conclude that musical education is an important basis for general education. Still, it is important to break away from those frameworks created in traditional education where the arts have limited importance in education. Behavioral development is also understood as driving the musical training that currently has been studied with no little or no eagerness in Colombia. Breaking away from said things is difficult for teachers, since they themselves were educated under such parameters. Thus, to break with this system, where music is perceived as something supposedly very important, but in reality, ends up having very little weight in classroom or educational policies, will take much more than a legislation. This requires real training and awareness around the positive effects of music as a fundamental part of the individual's training, as well as a constant assessment of the skills that individuals acquire in relation to their academic performance. Lastly, it should be noted that there were some constraints to this study's development. It was initially difficult to get the Secretary of Education's permission to conduct the research. By understanding the study's objective, they later agreed with pleasure and admiration due to its interest in that population. On the other hand, as there were too many schools, the field became difficult to work in, with many rectors and band directors reluctant to the process; in the case of Chinchiná, for example, though the study managed to proceed, it did so with a very small sample. Furthermore, it was complicated to obtain the report cards from some schools. In the end, they were only obtained with the Secretary of Education's help and the legal guardian's informed consent.

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