Art Music as a Universal Language: Youth Orchestras' Reaction to Social Conflict

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Abstract

This article identifies the role art music plays in orchestra projects that deal with social conflicts of youth populations. I argue that art music serves well in this context because it is a universal language that allows for an alternative method of communication and expression between the young musicians themselves and with others. I apply metaphysical explanations, studies from cognitive neuroscience, and philosophy of language in three specific youth orchestra contexts: the Retiro Youth Orchestra, El Sistema, and the West-Eastern Divan Orchestra. These different lenses help uncover why and how art music positively impacts the development, both socially and personally, of young musicians in a healthier or alternative manner.

Keywords

Retiro Youth Orchestra, El Sistema, West-Eastern Divan Orchestra, art music, universal language, Arthur Schopenhauer, semantic range, neurocognitive approach, N 400 Study, P600 Study

Introduction

The world of classical music, also known as art music, is often treated as a dying one, yet there is a niche within it that seems to be growing. The world of youth orchestras is defying the trend because different communities around the world are deploying art music as an alternative approach to target disadvantaged youth populations who are burdened by socio-economic, political, or cultural tensions.

From September 2012 through May 2013, I volunteered at the Retiro Youth Orchestra in Buenos Aires, Argentina, as part of my fieldwork, and as an occasional substitute cello teacher. This youth orchestra is a municipally-funded program that specifically targets the youth of Retiro, home to *Villa 31*, one of the largest shantytowns in the city. Although insufficiently funded, the project borrows the musical talent of arguably some of the best musicians in Argentina. The director himself, Nestor Tedesco, is a cellist of the Orquesta Estable (Permanent Orchestra) of the Teatro Colón, a professor at the Instituto Universitario Nacional de Arte (National University of the Arts), and a recipient of a Fulbright Scholarship. Stanimir Todorov, the primary cello teacher, is another highly accomplished musician who began his musical studies in his homeland of Bulgaria and traveled around the world to study with prominent cellists, join various orchestras, and learn multiple languages including English, Spanish, French, and German (to name a few).

I also grew to know some of the students themselves, like Carlitos and Marisol. 17-year-old Carlos "Carlitos" Rios had been playing cello for four years and always took a bus to Villa Lugano after his own Saturday rehearsals to help another youth orchestra. His favorite subject was English, and he always watched the Disney film *High School Musical*; he loved it so much that he and his friends memorized all the lyrics. From there, his interest moved beyond the film to the English language and music in general; he aspired to be a musician or a public translator. 15-year-

old Marisol Zarate joined the orchestra after she discovered it was the reason why her best friend had become so busy on weekends. Like Carolitos, Marisol also loved English and preferred to learn from American pop artists like Demi Lovato and Miley Cyrus instead of in the classroom. Together in rehearsal, without fearing any language barrier, there we were: four porteño[26] teenagers, a Bulgarian professional cellist, and a Japanese American college student, practicing Jean Sibelius' "Finlandia" and Queen's "We are the Champions" in Buenos Aires, Argentina. As I worked closely with and observed both these young musicians and their teachers during these rehearsals, I began to wonder where the influential power of these youth orchestras came from and how the music was influencing these disadvantaged youths.

The Retiro Youth Orchestra is one example of the growing number of youth orchestra projects throughout the world. One of the most well-known examples is a large network of youth orchestras in Venezuela known as El Sistema, whose goal is to give children of impoverished neighborhoods the opportunity to be socially included in a safer and healthier community.

Another example is Daniel Barenboim and Edward Said's West-Eastern Divan Orchestra, which helps youths of Israel and those of the Arabic countries learn to re-identify the humanity in the "other."[27] In each of these organizations, music carries a most powerful value as it helps the musicians transcend socioeconomic barriers and inspires them to try and understand each other. My research identifies this "something" as art music's inherently connective nature and its function as a universal language.

While many may consider art music as "just another" expressive medium, I argue that its unique ability to communicate and represent experiences in both a metaphysically and linguistically different way than conventional language or other forms of art helps explain the

[26] Used to refer to the citizens of Buenos Aires, porteño means 'person of the port'.
[27] Daniel Barenboim and Elena Cheah, *Music Quickens Time* (New York, NY: Verso, 2008), 52.

transformative nature and success of these youth orchestra projects. It is precisely this all-encompassing, communicative and affective nature of art music which helps the young musicians find deep connections with both the music itself and each other regardless of skill or social background. With theories and approaches from metaphysics, cognitive neuroscience, and philosophy of language, I will provide possible explanations as to how art music is a universal language and where it stems from, which in turn will explain its function in the youth orchestra projects.

Before I begin, it is important to explain what I mean when I claim that art music is a universal language. It is not to say that art music is the only universal language that exists, it is simply a distinct kind. Because art music is not a language in the natural and formal way (such as French, Japanese, Spanish, etc.), I am not suggesting that art music should or is capable of substituting or replacing any preexisting language. Art music is not a language in the strict sense that there is a signifier and a signified.[28] This is not to say that musical phrases and pieces cannot transfer any semantic content; only that they do not do so in the same structured, rule-driven way typical language does. Though art music as a universal language shares some of the same defining characteristics of natural and formal language, it does not fall under either category. I claim that art music is a language in the sense that it is a way to share, exchange, and communicate thoughts and emotions, and that it enhances understanding between two individuals or a group of individuals. Although this may be done in a very general and vague manner, art music causes the inevitable transference and exchange of thoughts and emotions. It is necessary to maintain such a broad definition of language because the "language" that is being taken into consideration is

[28] The signifier is the form that the sign takes, whereas the signified is the concept that the signifier represents. For example, the word "hard" is the signifier for the concept of something that is solid and firm. This concept which "hard" refers to is then the signified.

relatively atypical and one that is not often considered strictly communication. Yet, this is precisely why this idea holds particular relevance: it brings forth a new idea and a new understanding of what can be considered as a communicative tool.

Another element that requires clarification is the definition of "art music." Although most readers will understand what the phrase "classical music" refers to (the wide variety of predominantly Western music styles from the 9th century to the present), many will agree that it would be inaccurate.[29] The more appropriate term suggested is "art music," an umbrella term to refer to the musical traditions implying advanced structural and theoretical considerations as well as a written musical tradition.[30]

The specific definition of "art music" for this thesis will be restricted to solo and ensemble instrumental works and will therefore exclude repertoire that involves vocals or other kinds of performance. Therefore, works such as operas, ballets, and musicals are not considered within the scope of this thesis.

Swain's Semantic Range

As the German philosopher Arthur Schopenhauer wrote in his metaphysical understanding of art music, the universality of music comes from expressing, "[not a] particular and definite pleasure, this or that affliction, pain, sorrow, horror, gaiety, merriment, or peace of mind but joy, pain, sorrow, horror, gaiety, merriment, peace of mind *themselves*, to a certain extent in the abstract, their essential nature, without any accessories."[31] Art music's ability to reference in this abstracted manner is precisely what allows each listener and performer to find both universality and subjectivity simultaneously. While abstraction can cause miscommunication due to the

[29] "Classical" technically refers to the period in Western music from about 1730 to 1820.
[30] Denis Arnold and Percy Alfred Scholes, "Art Music, Art Song," in *The New Oxford Companion to Music*, vol. I, (Oxford, UK: Oxford University Press, 1983), 111.
[31] Arthur Schopenhauer, *The World as Will and Representation* (New York: Dover, 1969), 1:261.

ambiguity in the semantics, the kind found in art music also creates the freedom and space to "personalize" the universal experience to make it one's own. Exploring this abstract metaphysical characteristic of art music through a linguistic lens can help us better understand its unique semantic nature.

One of the strongest criticisms of considering art music a language is that music cannot represent or symbolize an object or idea in the same way natural or formal language does. Susanne Langer, a renowned 20th century philosopher of mind, is a strong proponent of this position. Langer argues, "[Music] is not, logically speaking, a language, for it has no vocabulary [...] for tones lack the very thing that distinguishes a word from a mere vocable: fixed connotation, or 'dictionary meaning.'"[32] Along with other critics, such as Eduard Hanslick and Etienne Gilson, Langer claims that music does not establish semantic relations between musical patterns and any kind of object or idea. On one hand, this claim is persuasive. No piece of music, as we know it and as it exists presently, can refer to a chair in the same way the word *chair*, *silla*, or *isu* does. On the other hand, it only takes a slight change in perspective to understand that Langer's claim is not completely true. Joseph P. Swain's examination of the semantic nature of art music reveals that art music and language have much more in common in their linguistic characteristics than may be initially perceived. In his essay "The Range of Musical Semantics," Swain defends music from claims that there is no *logical force* that supports the representations that we find and make between music and imagery or music and ideas of the external world.

This concept of logical force in language is the crux of his defense of music as a language. Many "conventionalists" argue that "there is nothing at all natural about listener associations between the darker emotions and the minor mode or between a dotted rhythm trumpet figure and

[32] Susanne Langer, *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite, and Art*, 3d ed. (Cambridge, MA: Harvard University Press, 1957), 228-229.

a sword."[33] This claim is certainly true; the common association between the minor key and sadness is not natural or inherent to the musical pattern itself. However, as Swain points out, this claim also holds true for virtually all words in any natural language. Contrary to intuition, there is in fact no predetermined, natural, or logical explanation that justifies the relation between the spoken word *chair*, *silla*, or *isu* and its referent in the world, the physical object of the chair. The association that seems so obvious and intuitive is, just like between the minor key and sadness, a result of convention and repetition.

To substantiate the way in which an association is established in art music, Swain discusses examples where the relationship between a musical pattern and its referent has been well established and accepted as commonplace, nearly as much as the words that we use in natural language. A storm "appears" in Vivaldi's *Four Seasons*, in Beethoven's *Pastoral Symphony*, and in Wagner's *Die Walküre*. Here we have examples of German and Italian composers across a Baroque violin concerto, an early Romantic symphony, and a mid-Romantic opera, spread between the early 18th to the early 20th century. Each used very fast notes set in a minor key in their compositions to connote a storm. Other common pairings are trumpet fanfares that bring forth images of a battle or military, or long, drawn, grandiose chords imitating an organ to symbolize the church.[34] These marked patterns, which arose from distinct regions and time periods, show that semantic associations can be established in music the same way they are established in the natural languages: not through logic, but through time.[35] With certain patterns in art music having

[33] Joseph P. Swain, "The Range of Musical Semantics," *The Journal of Aesthetics and Art Criticism* 54, no. 2 (Spring 1996): 136.
[34] Recommended listening: Pyotr Ilyich Tchaikovsky's 1812 Overture in E-flat minor, Op. 49, about 3:30 in Gioachino Rossini's William Tell Overture, Finale Felix Mendelssohn's Symphony No. 5 in D minor, Op. 107 4th Movement, Modest Mussorgsky's "Pictures at an Exhibition," "Great Gates of Kiev."
[35] Swain, "Range of Musical Semantics," 136.

consistent associations across a variety of different countries and cultures, semantic associations seem to be more universal in nature than most other natural languages.

Despite addressing the way in which associations develop in art music, there remains the issue of their strength. While a variety of conventional associations between musical patterns and referents have been loosely established, they still seem significantly more abstract or vague than the associations that exist between words and their referents in natural language. Does this disqualify art music as a language? Certainly not. According to Swain both forms of language reference objects and ideas in the same way, simply at different *degrees*.

Semantic range is the concept that one reference, whether it be a musical pattern or a word from natural language, can be associated with multiple referents. A reference's semantic range can be visually imagined as a circle that includes its various referents. Therefore, the wider the reference's semantic range, the larger this imaginary circle. Those who criticize the vague nature of associations between musical patterns and their referent often fail to notice that the same vague nature can be found in the semantics of natural language. To illustrate this similarity, Swain lists the various meanings of the word *floor* thought of by his class of college freshmen: part of the building that one walks on, the level of a building ("seventh floor"), a bottom surface: ("ocean floor"), a minimum value ("salary floor"), to astonish ("he was floored by the announcement"), and to accelerate a car as fast as possible.[36] This list of half a dozen meanings demonstrates semantic elasticity, the flexibility or vagueness that allows *floor* to reference such a variety of referents. The higher the semantic elasticity, the greater the semantic range and the larger the number of referents that are associated with a particular reference. As Swain points out, even in the realm of natural language where semantic relations seem concrete and established, the specific

[36] Swain, "Range of Musical Semantics," 138-9.

reference-referent association can only be successfully identified through examining the context in which the reference is used. Therefore, without context and as an isolated term, *floor* proves to be much more semantically abstract than may be initially perceived. These same ideas of semantic range and elasticity can be applied to make sense of art music as a language. Just as a single linguistic reference of natural language has a particular semantic range depending on its semantic elasticity, so does a single musical pattern (a note, melody, chord, passage, etc.). The only difference is that the semantic range and elasticity of art music is far greater than those of language, thus creating a relative "vagueness."

We can examine a specific passage of art music to better understand the similarities. When listening to the first two bars of Chopin's Prelude in E-minor, listeners can easily identify the sadness (as opposed to joy or anger) due to the minor key. However, if asked to be more specific, some may respond that they imagine "somebody they love who is no longer with them" or "a grave," whereas another may identify "suffocation."[37] When these interpretations are placed in the larger context of the piece (the fact that this Prelude is in the minor key and was chosen by the composer himself to be played at his funeral), all of these responses make sense. These three referents are all contained within the semantic range of the two opening bars of the Prelude, the reference.

Ultimately, through examining the origins of reference-referent associations, their semantic range, and semantic elasticity, Swain's approach allows us to see that the linguistic difference between art music and natural language is not one of category, but of degree. The

[37] These examples are inspired by reactions to the entire piece by professional musicians. The first example is based upon Benjamin Zander's description of the Prelude in his TED Talk, which can be listened to in full at this link: http://www.youtube.com/watch?v=l1OWaAJdNt0. The second is based upon the epithet "above the grave" given by Alfred Cortot, a Franco-Swiss pianist and conductor of the late 19th and 20th century. The third ("suffocation") is the epithet given by Hans von Bülow, a mid-late 19th century German conductor, pianist, composer, and devotee of Chopin.

inherently communicative natures of both languages have deep, underlying similarities that help support the idea of art music as a kind of language. This view and theory do not simply exist in isolation within the realm of linguistics; in fact, they can be substantiated by neurocognitive studies that have been conducted to better understand ways in which the human brain processes and tries to make sense of the musical patterns (references in linguistic terms) in art music.

A Neurocognitive Approach

Investigating the idea of music as a universal language through studies in cognitive neuroscience reveals the similarities that underlie music and language processing by the human brain. The purpose of exploring this lens is two-fold. First, exploring the similarities through a hard science further substantiates the understanding of art music as a language beyond the purely metaphysical and semantic explanations explored up to this point. Second, this neurocognitive approach demonstrates the universality of art music as a language through identifying biological characteristics.

Within the past two decades, the study of the cognitive neuroscience of music has grown significantly. This subfield of neuroscience focuses upon the brain-based mechanisms that play a part in the cognitive processing of music. Unlike other related branches such as music psychology or cognitive musicology, this field of study is based upon direct observations of the brain using various techniques such as electroencephalography (EEG) and magnetoencephalography (MEG) amongst others. Specialized organizations and institutions focused specifically on research of music perception, cognition, and/or neuroscience have begun to develop and increase in numbers over the recent decades.

Three key technical terms need to be defined in order to ensure clarity when discussing the results and significance of the studies examined in this section.

- **EEG – Electroencephalography:** A method of reading brain activity, the recording of electrical activity along the scalp that results from voltage fluctuations from ionic current flows within the neurons of the brain. EEG is read visually on charts as waveforms.
- **MEG – Magnetoencephalography:** The magnetic counterpart of EEG. Electrical activity necessarily creates correlating magnetic fields which are the data for MEG. MEG is also read visually on charts as waveforms.
- **ERP – Event-Related (Brain) Potentials:** Brain responses to a known sensory, cognitive, or motor event. Specific ERPs are identified through the averaging of EEG readings from multiple trials in which the known and controlled event occurs. ERPs are characterized by four key elements: 1. Polarity (positive or negative) 2. Latency (amplitude maximum) 3. Scalp distribution (location of activity) 4. Functional significance (previously established significance associated to activity).

An identified and established ERP is "named" by its polarity (N or P for negative or positive) and by a number, indicating its latency in milliseconds. For example, the N400 is a negative ERP with a latency of 400 milliseconds.[38]

The N400 Study

Even if some were willing to admit that a listener may *intuitively* associate musical patterns or passages to a referent, there was no *physiological* link to prove this. However, one of the prime focuses of one particular N400 study was to provide neurophysiological evidence to prove just this. The N400 is an ERP that establishes this physiological link between musical patterns to a referent through comparing the semantic priming effect of linguistic stimuli and musical stimuli

[38] Stefan Koelsch, *Brain and Music* (Chichester, West Sussex: Wiley-Blackwell, 2013), 47.

separately.[39] The semantic priming effect is the significant increase of ease with which an individual will process a word if preceded by a semantically related context.[40] For example, the phrase "She sings a song" facilitates and eases the processing of a semantically related word such as "music," yet does not do so for semantically unrelated words such as "sock." It has been previously established that the N400 is weaker for words that are preceded by semantically relevant context.[41] For instance, if placed in the context of the previous example, the N400 reading would weaken if the phrase "She sings a song" is followed by "music" but would strengthen if followed by the word "sock."

In this N400 study, parallel linguistic and musical methods were used in order to compare the N400 as it reacted to a sentence (linguistic stimuli) and musical excerpts (musical stimuli). The experiment ran as follows: The primer (linguistic or musical stimuli) was played on loud-speakers followed by showing the visual representation of a target word. Once the target word disappeared, the participant indicated whether the prime and the target were meaningfully related or unrelated by pressing one of two buttons. Half of the target words were concrete nouns, such as "needle" and "stairs," while the other half was abstract nouns, such as "wideness" and "narrowness." Results of these methods were measured in two different ways: 1) The participants' categorization of the stimuli as related or unrelated, and 2) EEG readings of the N400.[42]

[39] This study was conducted by Stefan Koelsch, Elisabeth Kasper, Daniela Sammler, Katrin Schulze, Thomas Gunter, and Angel D. Friederici.
[40] Hildur Elisabet Halliday Schilling, "Semantic Priming by Words and Pictures in Lexical Decision and Pronunciation Tasks" (PhD diss., University of Massachusetts Amherst, 1998). https://www.proquest.com/docview/304430100.
[41] Stefan Koelsch, Elisabeth Kasper, Daniela Sammler, Katrin Schulze, Thomas Gunter, and Angela D Friederici. "Music, Language and Meaning: Brain Signatures of Semantic Processing," *Nature Neuroscience* 7, no.3 (March 2004): 302-03.
[42] Ibid.

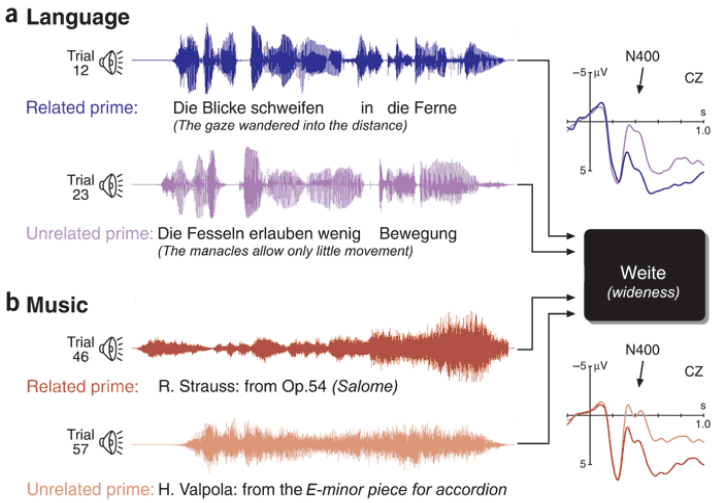

Fig I. Examples of the four experimental conditions preceding a visually presented target word, which in this case is "wideness." (a) Examples of language stimuli for a related prime (blue) and unrelated prime (purple). The graph immediately charts the grand-averaged ERPs elicited; the purple (unrelated prime) returns to a much higher point than the blue (related prime). (b) Examples of music stimuli for related prime (red) and unrelated prime (orange). The graph to its right shows that the brain reacted to related and unrelated musical primes in the same way it did to related and unrelated language primes.[43]

As Figure I shows, the results indicated that both musical and linguistic primes succeed in priming target words. Of the participants' responses, 92% of target words were categorized correctly as related or unrelated when presented after a sentence, and 80% were categorized correctly after a musical excerpt. The ERP in question also behaved as expected. As hypothesized, the N400 was larger when the target word was presented after semantically unrelated linguistic and musical stimuli. In addition, the observed N400s did not differ between the language and music domain with respect to latency, amplitude or scalp distribution, nor did they differ in location, orientation, or strength. This particular neurocognitive comparison suggests that the human brain semantically processes music in a very similar, if not the same way than it processes natural language.

[43] Ibid.

What conclusions or implications can be drawn from these results? The purpose of examining neurocognitive studies such as the N400 experiment is to provide a possible explanation of how art music is a universal language: first by proposing that art music is semantically rich and therefore linguistic in nature, and second by establishing its universality by identifying a biological commonality that exists amongst all human beings involving the processing of art music. Therefore, the goal of this study and of the neurocognitive approach is not to prove that art music and natural language have the same semantic systems, or to prove that art music contains fixed semantic content in the same way natural language does. These kinds of conclusions would be extrapolations and illogical assumptions that the evidence does not support. What can be concluded is that music can transfer much more semantic content than previously thought. Because of this, the human brain tries to process, make sense of, and assign semantic meaning in the same way it processes, makes sense of, and assigns semantic meaning to natural language, making art music meaningful.

The P600 Study

Another important ERP in the study of the cognitive neuroscience of music is the P600. Unlike the N400, which is elicited when the brain processes *semantic* incongruities, the P600 is elicited when processing *syntactic* incongruities in both language and music.[44] The goal of this study was to determine whether the P600 is a language-specific ERP or whether it can be elicited by a nonlinguistic (but rule-governed) sequence, such as music, also.

To better understand the experiment and its results, we must define "syntactic incongruity." Something that is syntactically incongruous refers to words that are structurally difficult to

[44] Aniruddh D. Patel, Edward Gibson, Jennifer Ratner, Mireille Besson, and Phillip J. Holcomb, "Processing Syntactic Relations in Language and Music: An Event-Related Potential Study," *Journal of Cognitive Neuroscience* 10, no. 6 (1998): 717, https://doi.org/10.1162/089892998563121.

integrate into meaningful sentences. While the N400 study examined the human brain's ability to recognize the *meaning (semantics)* of a music sequence, the P600 study examined the human brain's ability to recognize the *structural (syntactical) nature* of a musical sequence. What does this mean? For example, the sentence "The horse raced past the barn fell," forces the reader to reinterpret the meaning after reading the word "fell." The sentence could be "The horse raced past the barn [and] fell," or "The horse raced past the barn [that] fell." But in fact, because there is no "and" or "that" before "fell," the actual meaning of the sentence is "The horse – [that] raced past the barn – fell." Because these syntactic incongruities elicit the P600, it can be understood as an ERP that indicates the brain is (re)checking whether one's original perception or interpretation of information was correct.[45]

This particular P600 study showed that harmonically and melodically deviant notes played at the end of a musical excerpt elicit the same P600 ERP, which was observed in Lee Osterhout & Phillip Holcomb's 1991 studies of the brain's reaction to linguistic stimuli. The mirroring of the P600 ERP between the Patel et al. as well as the Osterhout & Holcomb studies is important as it shows how the human brain processes musical stimuli in the same way it processes linguistic ones. As in the N400 experiment, in the Patel et al. P600 study, musical and linguistic stimuli methods were structured in parallel ways to allow for a direct comparison between the two. For the linguistic stimuli, the structural content before a fixed target phrase was manipulated so that the target phrase was either easy, difficult, or impossible to integrate. Below is a set of examples:

A. Some of the senators had promoted *an old idea* of justice. (easy)

B. Some of the senators endorsed promoted *an old idea* of justice. (difficult)

C. Some of the senators endorsed the promoted *an old idea* of justice. (impossible)

[45] Koelsch, *Brain and Music*, 67.

Although sentence B is harder to integrate, because C is both ungrammatical and hard to integrate, it should generate the largest result.

The musical stimuli were phrases of chords created based upon the musical "grammar" of the circle of fifths.[46] Instead of a target phrase in the linguistic stimuli, the musical stimuli had a target chord which was either in key, nearby out of key (three steps clockwise on circle), or distant out of key (five steps clockwise on circle) which were either easy, difficult, or impossible to integrate into the preceding context. Because of the particular way in which the circle of fifths is structured upon the harmonic relationships between the twelve notes, the note that is located five steps clockwise to any tonic note will always be more dissonant than the note that is located only three steps clockwise. This harmonic grammar of music was used in this study in order to determine the syntactic congruity or incongruity of the target chord.

Ultimately, both the musical and linguistic experiments ran as follows: The participant listened to the stimulus, then they were asked to judge whether it was a) Acceptable – sensible and grammatically correct/sounding normal, or b) Unacceptable – semantically bizarre or grammatically incorrect/sounding odd.

Just as in the N400 study, the results of the linguistic and musical experiments were very similar. Although the percentages at which subjects judged the sentences or musical phrases as acceptable differed slightly (as shown in Fig. II), the overall trend was the same for both. The more difficult the integration of the target phrase or chord, the less it was likely that the subject would judge it acceptable. Yet more importantly, the principal result of this P600 study was that the ERP elicited by syntactically incongruous words in language and harmonically incongruous chords in

[46] The circle of fifths is a concept in music theory which establishes the relationship between the 12 tones of the chromatic scale as a sequence of harmonically perfect fifths and helps create the foundation for the general structure of music.

music were statistically indistinguishable in amplitude and scalp distribution. For both domains, the more difficult the integration of the target phrase or chord, the stronger the P600 was elicited.

Linguistic Experiment		**Musical Experiment**	
Ease of Integration	**% Judged Acceptable**	**Distance of Key**	**% Judged Acceptable**
Easy	95%	Tonic	80%
Difficult	61%	Nearby out of key	49%
Impossible	4%	Distant out of key	28%

Fig. II Results of P600 Study[47]

This data suggests that the P600 is an ERP that reflects the general process of knowledge-based structural integration, and therefore, is not language specific. Just as it was concluded in the N400 study, the statistical insignificance of the difference between the EEG readings of the linguistic and musical experiments does not imply that music and language have the same syntactic systems or are equivalent or interchangeable in any way. However, it can be concluded that the syntactical way in which music and language are structured are similar enough that the human brain attempts to make sense of them in the same manner.

Although only two studies were examined in this section on the neurocognitive approach, there have been various other components that have been examined to compare the human brain's processing methods of music and language. These include the Early Right Anterior Negativity (or ERAN, an EEG reading), the mERAN (the MEG equivalent of the ERAN) which are affected by syntactic irregularities specifically related to the disruption of musical or linguistic structure or

[47] Patel et al., "Processing Syntactic Relations," 724.

expectation, and the N5 which reflects general syntactic integration. In each of these studies, researchers concluded that many of the processes that were previously thought to be specific to natural language are not; they are also responsible for processing and making sense of music.[48] This neurocognitive approach, which differs so starkly from the other methods used throughout this thesis, helps ground the discussion of art music as not just a language, but a universal one. These studies are based upon empirical evidence that comes from an established field of science; they are not metaphysical interpretations or linguistic theories. They provide facts that support the universality of art music as a language, because they prove the existence of the biological ability in all human beings to process and make sense of music.

The Lived Experience of Art Music

Whether the children live in *Villa 31* in Buenos Aires, struggle for stability in Barquisimeto, Venezuela, or struggle daily with the physical and ideological violence of the Israeli-Palestine conflict, the potential capacity to learn the universal language of art music exists in everyone with access to youth orchestra projects around the world.

Tricia Tunstall is a writer and music educator who interviewed members of El Sistema's youth orchestra programs to better understand the function that art music plays in their lives. She tells the story of Fernando, a trumpet player, who describes the harmonizing effect of music in an orchestra. Fernando notes that, "When children are playing music together [...] all the differences in class, in race, everything – they disappear. They don't exist anymore. For a child, it gives the

[48] Koelsch, Stefan, Erich Schroger, Thomas C. Gunter, "Music Matters: Preattentive Musicality of the Human Brain," *Psychophysiology* 39, no. 1 (2002): 38–48, https://doi.org/10.1017/S0048577202000185; Burkhard Maess, Stefan Koelsch, Thomas C. Gunter, and Angela D. Friederici, "Musical Syntax Is Processed in Broca's Area: An MEG Study," *Nature Neuroscience* 4, no. 5 (May 2001): 540–545.

message that unity and harmony in the world are possible."[49] Alejandro Carreño, a violinist and former El Sistema member, explains how the young musicians come from distinct towns and cities throughout Venezuela, "But when you are sharing music with people from all over the country […] The spirit of the whole country becomes your own spirit. You learn how to love each city, each town."[50] For these Venezuelan musicians, music gives them access to a unique, shared experience, one with a strong sense of unity and hope where they are not divided by their economic struggles or conventional social constructs.

Daniel Barenboim, Director of the West-Eastern Divan orchestra, also denotes a similar phenomenon in the context of his musicians of Israeli or Arabic origin. He shares an anecdote on Ramzi, a Palestinian who grew up in a refugee camp in Ramallah, a city located in the central region of the West Bank. At the age 17, Ramzi began to play the violin and embarked on a month-long workshop with Barenboim that began the transformation of his identity and personal perspective. Barenboim describes how "music became [Ramzi's] opportunity to go beyond the walls, borders and roadblocks in his environment, both literally and figuratively […] and allowed him to think outside of the limitations of the Israeli-Palestinian conflict, and to transcend the political and social restrictions of his surroundings."[51] Becoming involved in the world of art music, Ramzi was, for the first time, becoming aware of the social possibilities that existed outside of the tension and conflict-ridden world that he had grown up in. Art music introduced him to a different perspective, one that allowed him to see and think beyond the "borders and roadblocks" that had previously restricted both his physical and ideological freedom.

[49] Tricia Tunstall, *Changing Lives: Gustavo Dudamel, El Sistema, and the Transformative Power of Music* (New York: Norton, 2012), 102.
[50] Tunstall, *Changing Lives*, 116.
[51] Barenboim, *Music Quickens Time*, 77.

Whether to escape conventional academics, overcome class and race barriers, or reach ideological freedom, Carlitos and Marisol of Argentina, Fernando and Alejandro of Venezuela, and Ramzi of Palestine illustrate the lived experience of art music as a universal language. With our brain's capacity to process it as we do everyday conversation and its linguistic similarity to spoken language, art music exists as an accessible and powerful method to create a deep and valuable impact on children and youth whose daily lives are filled with social conflict, tension, and instability.

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