

Projecting Text to Musical Materials: Mapping as a Creative Process

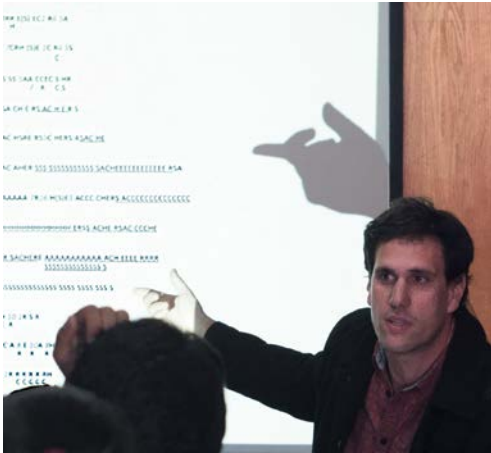
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Abstract

Participating as an underlying presence throughout the composition process, a text can provide several elements, both semantic and structural, capable of informing a correlative musical work, through the use of encoding and enciphering techniques that allow to derive musical materials such as pitches, rhythms, timbres and formal schemes from the multiple facets of a text – from its typographical structure to its literal meaning –, setting forth a type of constructive process where the text functions as a starting point, a configurator of materials, a formal organizer and a creative catalyst. Without being associated to a particular sonority,

what characterizes this creative method, based on an act of projection, is a certain type of constructive thought, which operates in constant relation to an extramusical textual element, and presents traits of creative self-constraint and generativity.

1. Historical Background

At the very moment of the invention of Western musical notation, 11th century monk Guido d'Arezzo took the solfège syllable names for each note of the diatonic scale from the first syllable of each phrase of the hymn *Ut queant laxis*: Ut (later named *Do*), Re, Mi, Fa, Sol, La. Unknowingly, by establishing a link between notes on a score and syllables traceable to a parallel text, he created the conditions for the development of a peculiar and long-lived text mapping practice, persistent throughout the history of Western art music. An early example is found in the *sogetto cavato* technique, developed by Josquin des Pres (ca. 1450-1521) to derive the melody for the cantus firmus of his *Missa Hercules Dux Ferrariae* from correspondences between the vowels in the text and those in Guido's solmization syllables, thus "carving out" a melody from the text in the following manner: *Her*=re, *cu*=ut,

les=re, Dux=ut, Fer=re, ra=fa, ri=mi,
ae=re.

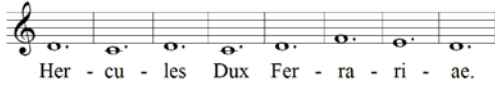


Figure 1. Josquin's sogetto cavato for the Missa Hercules Dux Ferrariae

In subsequent centuries, and in the medium of instrumental music (i.e. without a vocal part containing sung or spoken text), composers have found ways to insert secret semantic content by resorting to *music cryptography*, a practice usually devoted to the transformation of words into recognizable motifs, obtained by reinterpreting alphabetical letters as letter-names of notes from different traditions, and often used either as a musical signature or as a way to pay homage to fellow composers. Notable examples have included: Bach (B \flat -A-C-H[B \natural], in *The Art of Fugue* – see Figure 2), Schumann (A-S[E \flat]-C-H[B \natural]; As[A \flat]-C-H[B \natural] and S[E \flat]-C-H[B \natural]-A in *Carnaval*), Berg (A-B \flat -H[B \natural]-F in *Lyrical Suite*), Shostakovich (D-S[E \flat]-C-H, in his *Violin Concerto No 1*) and the group of twelve composers who participated in the homages to music patron Paul Sacher commissioned by cellist Mstislav Rostropovich in 1976, which included Luciano Berio, Pierre Boulez, Benjamin Britten, Henri Dutilleux, Alberto Ginastera, Hans Werner Henze, and Witold Lutoslawski, among others (S[E \flat]-A-C-H[B \natural]-E-Re[D], see Figure 3).

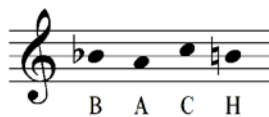


Figure 2. BACH Cryptogram.



Figure 3. SACHER Cryptogram.

Leaving behind the traditional use of text mapping techniques as generators of short melodies, a more expansive approach can be proposed, in which texts are employed as providers of multiple semantic and structural influxes, from which a number of musical materials can be derived – not only in the parametrical field of pitch, but also in others such as rhythm, timbre, form, etcetera –, potentially establishing a situation in which the entirety of the materials that conform a given piece could come from a parallel text.

Cases of an expansive use of text mapping can be found in the French tradition, in a line of development that includes François Sudre's (1787-1862) artificial "Solresol" language, designed to achieve fluent communication through musical instruments, and the encryption method employed by Maurice Ravel (1875-1937), to compose his *Menuet sur le nom d'Haydn* (1909), expanding on the German letter-names (A to H) by creating a matrix where all other letters of the alphabet were assigned notes as well [1]. In 1969, Olivier Messiaen would elaborate a musical alphabet (see Figure 4) containing not only notes, but also durations (note values), in order to "write" extended quotes from St. Thomas Aquinas' *Summa Theologica* in the score of the organ piece *Méditations sur le mystère de la Sainte Trinité*, by replacing letters in the text with the corresponding pitch and duration established in his alphabet.



Figure 4. Musical alphabet used by Olivier Messiaen in *Méditations sur le Mystère de la Sainte Trinité* (1969)

In the case of this piece by Messiaen, since long portions of music have resulted from the projection of textual elements into the score, the resource of text-mapping can be thought of as the basis for a compositional method, which in the case of *Méditations* was called *langage communicable* by Messiaen himself, and whose workings are detailed in the score for the piece. It can be described as a sort of alphabetical version of the numeric *serial* method, that which establishes an order for pitches and other musical parameters in sets, predetermining the content of a musical work, to be deployed in a relatively automatic manner. It is worth noting that Messiaen himself paved the way for the development of serialism with his piece *Modes de valeurs et d'intensités* (1949), as an experiment stemming from twelve-tone technique, that would motivate his students Pierre Boulez and Karlheinz Stockhausen to develop further exploration into total serialism, a composition method that would mark the aesthetic of the influential Darmstadt school [2].

2. Separating Music from Language

In addition to his musical alphabet, usual resources from Messiaen's compositional arsenal are displayed in *Méditations*, such as *leitmotifs* and transcribed birdsong. Messiaen's body of work is crammed with insertions of this kind, bearing a symbolism generally intended to infuse his music with religious meaning, and whose presence was often didactically revealed by the composer in performance notes (on the scores), program notes and even in explanatory speeches delivered before the performance of his pieces. This way of approaching the inclusion of extra-musical content gave way to a controversy known as *le cas Messiaen* [3], involving the ongoing dispute on the relationship between music and language, where an ideal of absolute music, dissociated from any specific textual or symbolic content, is tensed by practices such as program music, in which the performance of an instrumental piece is accompanied by a text contained in the concert's program (hence the name *program* music), exposing the work's narrative or poetic content, and thus revealing its author's intentions while functioning as a guide for the listener. In this sense, Messiaen can certainly be inscribed within the tradition of program music.

Another student of Messiaen, François-Bernard Mâche (n.1935) has developed a way of composing based on what he calls sound models, being devoted in the 1960s to linguistic models in particular, from which he extracts both phonetic and structural traits to be projected onto his works. Unlike Messiaen, Mâche is not particularly interested in revealing the

semantic content of his texts; in the words of organist and Messiaen scholar Andrew Shenton:

“Mâche has deliberately side-stepped all the semantic questions posed by the text itself and by the methods through which the words are incorporated into the music. Far from being an important part of the composition, the text has been relegated to a compositional device that is essentially of no value to the completed piece.” [4]

Regarding the relationship between music and language, Mâche has stated that “the confusion of the musical and the linguistic represents a state of thought from which Europe detached itself a long time ago, except very occasionally in opera. (...) For Europe, music is the experienced sense acquired counter to (and not in addition to) the (communicated) meaning. For everything to be clear, there must be no message to be deciphered.” [5]

Despite Mâche's aversion to the parametric thought [6] that defines the twelve-tone aesthetic defended by philosopher Theodor Adorno, one can find a common point between both thinkers in the differentiation of music and language, as pointed out in Adorno's essay *Music, Language and Composition* from 1956, where he states:

“...the musical content is the wealth of all those things underlying the musical grammar and syntax. Every musical phenomenon points beyond itself, on the strength of what it recalls, from what it distinguishes itself, by what means it awakens expectation. The essence of such transcendence of the individual musical event is the "content": what happens in music. If musical structure or

form, then, are to be considered more than didactic schemata, they do not enclose the content in an external way, but are its very destiny, as that of something spiritual. Music may be said to make sense the more perfectly it determines its destiny in this way - not only when its individual elements express something symbolically. Its similarity to language is fulfilled as it distances itself from language.” [7]

Following Adorno's approach, it becomes possible to reconsider Messiaen's work, along with the entire tradition of program music, from the position of a listener who takes the liberty of discarding the narrative in the program to focus on the materiality of music – multisignificant, not directly communicative. In such a case, the program can be relegated to the instance of the composition process, that is, to the creative moment involving the composer and his/her materials, wherein a parallel narrative can be helpful in steering the process towards the materialization of completely new, and even revolutionary sonorities. As an example (and there are many), we can consider the highly unusual timbres and chords devised by Richard Strauss to portray the bleating of an army of sheep in Variation II (*Der siegreiche Kampf gegen das Heer des großen Kaisers Alifanfaron*) of the symphonic poem *Don Quixote* (1897). A second case, of particular historic relevance, is the fourth movement of Arnold Schoenberg's *String Quartet No 2* (1908), where the intention of representing the opening phrase “I feel air from another planet” (*Ich fühle Luft von anderem Planeten*), from Stefan George's poem *Entrückung* (Rapture), led the composer to create a completely revolutionary atonal music which,

according to Theodor Adorno, marked the emergence of the new harmony, from which twelve-tone and serial music would develop [8]. Although not an example of program music, since its text is included in the work itself by way of a sung vocal part, this piece by Schoenberg illustrates the extent to which the projection of semantic content can impact the composition process.

3. Creative Self-Constraint and Generativity.

Returning to text-mapping, we find that not only can the semantic content of a text act upon the creative process, but also its structural features – the order in which letters appear in each word, for example –, opening up a process where textual *materials* are transformed into musical ones. A reference point can be found in non-textual mapping processes employed in music creation (i.e. those in which semantic content is not an issue), such as the one carried out by John Cage, which involved tracing dots on several star maps by Czech astronomer Antonín Bečvář onto a piano score for his *Etudes Australes* (1974-75), producing a sort of sonic translation of the night sky. These kinds of mapping practices have proliferated in the last decades, and include the non-musical concept of *sonification*; the sonic graphing of data. As a current case, we can consider the sonification of the Covid 19 genome, carried out by Mark Temple at the Western Sidney University [9].

In procedures of this kind, the decision to tie the composition process to an extramusical element – a textual one, in

the case of text mapping – entails an act of creative constraint, while implying a generative trait. Despite constituting a basic condition for any artistic creation, and being present in all arts through fixed forms such as the sonata, the sonnet, etcetera, the potential of creative constraint was consciously exacerbated in diverse artistic practices of the 20th century, becoming central in the development of composition methods devised by composers in a post-tonal context. In other artforms we find similar operations, notably in literature, by way of the French group Oulipo, devoted, precisely, to the design and development of literary constraints. An Oulipian constraint called *beau present*, which consists in writing a dedicatory poem using only the letters in the dedicatee's name, bears a close resemblance to the salutatory use of musical cryptograms. At the same time, in the branch of the Opeinpo, which extends the group's literary approach towards the painting medium, we find Tristan Bastit's "transposition of coherence" method [10], where the spatial composition of a non-artistic (extra-pictorial) image, along with other structural and conceptual features, are projected onto a new painting, thus bearing similitudes with the projective operations found in expansive text mapping processes, such as those used by Mâche and Messiaen.

As options are drastically reduced by a decision of creative self-constraint in text mapping, the artistic process develops a generative trait, i.e., it moves forward with a certain degree of autonomy. For example, by establishing arbitrary correlations between notes and letters, aiming at the projection of a text into pitch material, a grid of pitch relations is

automatically set, exceeding the scope of the composer's control, and surpassing his/her expectations, given the relatively unpredictable complexity with which letters are combined throughout a text. This degree of autonomy is also present in the compositional practice of serialism, as in the chance experiments of John Cage. Nevertheless, it is to be noted that in cases such as Messiaen's *Meditations*, or in Mâche's pieces based on linguistic models (such as *Safous mêlé* [1959], *La peau du silence* [1962], *Le son d'une voix* [1964], *Canzone III* [1967] and *Canzone IV* [1967]), what is generated more or less autonomously are the compositional materials, which are then to be arranged, or even modified, in a further stage we can identify as the composition process itself. Even a chance enthusiast such as John Cage deemed it necessary to enhance the material obtained automatically from traced star maps, embarking on a subsequent stage of adding chords to specific notes [11]. Although the placement and the internal characteristics of these chords were decided through chance operations (involving the I-Ching), the necessity to complement the star-map-derived materials with foreign ones reveals a degree of intentionality that reacts to the autonomy of this type of creative process, in a kind of dialectic between the composer and the material.

Aesthetic license in a deliberately limited creative environment can go as far as betraying self-imposed constraints, as one can detect in Messiaen's free manipulation of his *langage* at certain points of *Méditations* [12], and is even identified as a legitimate possibility in the conceptual world of the Oulipo, where the resource of deviating from a

constraint for aesthetic purposes is known as *clinamen* (from the deviation of atoms described by Epicurus and Lucretius) [13]. In the *Oulipo Compendium*, a helpful manual for navigating the literary group's work, we find the following definition of this concept:

"For Oulipians, the *clinamen* is a deviation from the strict consequences of a restriction. It is often justified on aesthetic grounds: resorting to it improves the results. But there is a binding condition for its use: the exceptional freedom afforded by a *clinamen* can only be taken on the condition that following the initial rule is still possible. In other words, the *clinamen* can only be used if it isn't needed. (A number of Oulipians, notably Italo Calvino, have felt that the *clinamen* plays a crucial role in Oulipian theory and practice.)" [14]

4. Research/Creation.

In the context of my own compositional output, I have explored text mapping with a research/creation approach. Unaware of the existence of musical cryptography or other forms of text mapping, my first exercises with this kind of resource resulted from a quest to make texts participate structurally in compositions, having experienced how, in vocal pieces, a text could suggest sonic ideas and act as a driving force for musical creation on the written medium.

I was particularly drawn by the idea of having a text participate as an underlying presence in the creative process,

providing several elements that could inform different aspects of a correlative musical composition. These elements could stem from various facets of the text, such as its semantic content (e.g., sonically suggestive concepts and images), its inherent prosody (rhythm, stress [accents] and intonation [pitch contour and dynamics]), its grammatical structure (phrases, clauses, word types, etc.), its typographical structure (for example, the number of lines in a paragraph), and/or its letter frequency (the percentage with which each letter of the alphabet appears in a given text).

An early application of this idea can be found in my orchestra piece *In a Medium-Sized Bowl* (2009), based on a cooking recipe, and performed by the Vancouver Symphony Orchestra during the 2010 Jean Coulthard Readings. I began by assigning a pitch class from the chromatic scale to each letter of the Spanish alphabet (see Figure 5), giving special predominance to those assigned to vowels, as a way of handling harmony by omitting consonant-derived pitch classes in several passages. To obtain rhythmic materials, I transcribed the speech rhythms from my own reading of the text, while the form of the piece resulted from a direct projection of the recipe's typographical structure, established as a succession of numbered cooking instructions, which turned into a succession of well-defined musical moments (each signaled by a short solo gesture on the harp representing the number of each instruction).

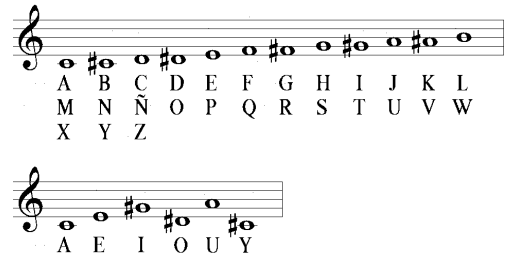


Figure 5. Musical alphabet used in my orchestra piece *In a Medium-Sized Bowl* (2009)

A subsequent piece entitled *The Tiger Fell* (2010) – for clarinet, female jazz singer, harp and percussion, and performed by CYE Ensemble in Malmö, Sweden in 2010 – featured a more refined text-to-pitch mapping system that required calculating the percentage of frequency of each letter in the text as a factor that would affect the level of recurrence of assigned pitches, thus allowing a greater control of harmony by enabling me to select which pitch-classes would be assigned to the most prominent letters. The vocal part was constructed using only the five vowel-derived pitches, thus arriving at a generative method for producing melodies that relies on the presence of one or more vowels (and occasionally, the letter y) in each syllable. As the text, a poem of my own creation, was delivered clearly by the vocal part, its semantic content played an important role in the composition, which came to be structured as a succession of vocal interventions followed by musical commentaries of the poem's meaning.

Further approaches from this early stage in my exploration of text mapping included the use of *presto possibile* Morse code rhythms in the two-piano piece *Semilla Astral* (2011) (a resource

also used by Pierre Boulez in his Sacher homage *Messagesquise* [1976-77], as I would later discover), and the consideration of the syntactic function of words assigned to specific gestures in *Artisanal Spacecraft* (2012) for seven guitars, a piece which also featured written text in the score, to be delivered with the same uneven rhythm as one would speak it, but hitting the body of the guitar, once per syllable.

For *Returned Message* (2013), a miniature for chamber ensemble performed by Dissonart Ensemble in Thessaloniki, Greece, I developed a text mapping process wherein a pitch-class, a duration and a direction – ascending or descending from the previous note – are assigned to each letter in the text (only vowels in this case – see Figure 6, where arrows indicate direction), producing a succession of pitches that move in several directions within a large chromatic range, which, when trimmed into sections and superposed onto each other, generate a complex polyphony. The 30-second miniature that resulted from this process features a dispersion of short (staccato and pizzicato) notes on the parts of the flute, clarinet, violin, cello and double bass, while a toy piano delivers a one-key Morse code transmission of the very text that motivated the composition of the piece, a worldwide call for miniatures. Thus, the piece's title, *Returned Message*, reveals the gesture of transforming the call into the response, as in emails that bounce back when an addressee is not reached.



Figure 6. Text mapping method devised for *Returned Message* (2013)

The next development in my work of research/creation was *La polilla de Madrid* (2014), conceived as a wordless chamber opera based on a short play (an *entremés*) by Francisco de Quevedo (1580-1645), and performed by Ensemble Paramirabo in Montreal, Canada in 2014. To project the play's characters into the sonic plane, each received a different treatment, being assigned distinctive instrumental combinations and techniques within the chamber ensemble, different pitch-classes to map their specific lines, a certain speech tempo in which to deliver rhythms transcribed from my reading of the text, and a pitch range, or *tessitura*. When put into relationship by the structure of the dialogue, the succession of diverse sonic complexes makes up a sort of timbral dramaturgy, following the plot which determines the form of the composition.

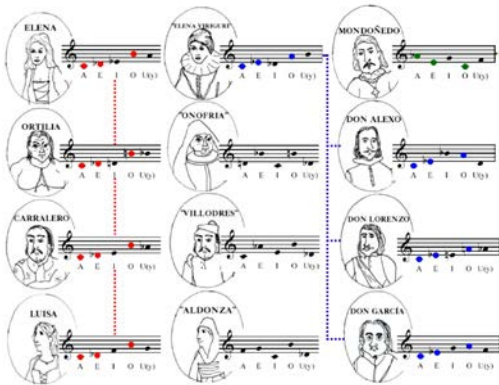


Figure 7. Assignment of different pitch-classes to each character's vowels for the wordless opera *La polilla de Madrid* (2014).

As a final example of my exploration of text mapping methods for composing, I would like to mention the work *Ocho Estudios* (eight etudes) for piano (2020), performed by pianist Dante Sasmay in Santiago, Chile, in 2021. The pieces are built upon the syntactical structure of a text, with each word class (nouns, verbs, adjectives, adverbs, pronouns, etcetera) receiving a different mapping treatment. In terms of linear development, the strategy is similar to the one used in *La polilla de Madrid*: different mapping methods are applied to specific fragments of the text – there according to characters in the play, here according to word classes – and then deployed linearly following their subsequent apparition in the text. The alternance of different kinds of recognizable sonorities is what sustains this approach to musical discourse, which in the case of the *Ocho Estudios* results as a projection of textual syntax, that is, of common discourse.

Once again, I used Morse code, this time to obtain measured rhythmic patterns of

short (16th note) and long (8th note) durations, corresponding to dots and lines in the code, respectively. Unlike in *La Polilla*, a single alphabet was used in *Ocho Estudios*, covering all letters. The mapping process is a combination of both Morse code and pitch-class assignment, as exemplified in the strategy used for nouns, exposed in Figure 8 with the word “COMUNIDAD”. Vowel-derived pitches O, U, I and A are assigned to the right hand (top staff) while those corresponding to consonants C, M, N, D, and D are on the left hand (bottom staff). For each letter, the Morse code determines a rhythmic pattern, and each hand moves in contrary motion; the right hand ascending and the left descending. Finally, instead of deploying each letter separately, they are grouped in syllables, which is why the final two consonants, D and D, are played simultaneously; they belong to the syllable “DAD” (as in *co-mu-ni-DAD*):



Figure 8. Mapping of the noun “comunidad” in *Ocho estudios para piano* (2020).

As usual, and as a conclusion, the text mapping process for *Ocho Estudios* has been carried out in four subsequent stages: (1) choice of text, (2) choice of mapping strategy, (3) projection of text onto musical materials and (4) composition. Generativity is concentrated

mainly on the stage of projection (3), which often produces a preliminary product requiring the aesthetic adjustments made in the composition stage (4), where, once in a while, and very discretely, one must resort to *clinamen*.

References.

- [1] Sadie, S., & Tyrrell, J. (2001). *The New Grove dictionary of music and musicians*. New York: Oxford University Press. Page 756.
- [2] See Forte, A. (March 01, 2002). Olivier Messiaen as Serialist. *Music Analysis*, 21, 1, 3-34. Page 39.
- [3] See Shenton, A. (2017). *Olivier Messiaen's system of signs: Notes towards understanding his music*. Pages 44-45.
- [4] Shenton, A. (2017). *Olivier Messiaen's system of signs: Notes towards understanding his music*. Page 92.
- [5] Mâche, F. B. (1992). *Music, myth, and nature, or, The Dolphins of Arion*. Chur, Switzerland: Harwood Academic. Page 67.
- [6] See Mâche, F. B. (1992). *Music, myth, and nature, or, The Dolphins of Arion*. Chur, Switzerland: Harwood Academic. Page 29)
- [7] Adorno, T. W., Leppert, R. D., & Gillespie, S. H. (2002). *Essays on music*. Page 405.
- [8] Adorno, T. W. (2006). *Escritos musicales I-III: Obra completa, 16*. Madrid: Akal. Page 663.
- [9] Temple, M. (January 01, 2020). Real-time audio and visual display of the Coronavirus genome. *Bmc Bioinformatics*, 21, 1, 1-16.
- [10] Mathews, H., Brotchie, A., & Queneau, R. (2005). *Oulipo compendium*. London: Atlas Press. Page 313.
- [11] See Haskins, R. (2016). *Classical listening: Two decades of reviews from the American Record Guide*. Page 109.
- [12] See Shenton, A. (2017). *Olivier Messiaen's system of signs: Notes towards understanding his music*. Page 90.
- [13] See Walker, E. (April 01, 2014). Scaffolding. *Log*, 31, 59-61. Page 59.
- [14] Mathews, H., Brotchie, A., & Queneau, R. (2005). *Oulipo compendium*. London: Atlas Press. Page 126.