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## The morphological and audiative interconnectedness of sound: Equivalence in a multidimensional soundscape

### Abstract

This paper draws on the author's recent theoretical and practical research into the morphology of sound and audiation. In particular, it explores the notion of equivalence in a multidimensional soundscape. Correlations between the interconnectedness of sound-based morphologies emanating from extended guitar techniques and comprehending internal auditory imagination when sound is not physically present will be assessed. To express an all-encompassing mental and visual image of apprehending the value of sound from a morphological and audiative perspective, three-dimensional topological diagrams will be evaluated – a development of previous two-dimensional visualisations. In regard to morphologies, topics of interest are spectromorphology, spatiomorphology, spectral quality, performance space, and performance aspects. Studying these topics will help in the understanding of morphological value. Learning to comprehend morphologies in relation to the listening experience will deepen all round musical abilities. We will therefore investigate audiation through encompassing deep listening, reduced listening, inherent and external qualities, psychological experience, imagination, and improvisation. As more mutual inclusivity is discovered we can start to contemplate more adventurous pedagogical tools from which future nurturing of musicians may be drawn.

### Keywords

morphology, audiation, listening, imagination, improvisation

### Cover Page Footnote

Lecture-recital given at The 21st Century Guitar Conference 2021.

# The morphological and audiative interconnectedness of sound: Equivalence in a multidimensional soundscape<sup>1</sup>

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This paper draws on the author's recent theoretical and practical research into the morphology of sound and audiation. In particular, it explores the notion of equivalence in a multidimensional soundscape. Correlations between the interconnectedness of sound-based morphologies emanating from extended guitar techniques and comprehending internal auditory imagination when sound is not physically present will be assessed. To express an all-encompassing mental and visual image of apprehending the value of sound from a morphological and audiative perspective, three-dimensional topological diagrams will be evaluated – a development of previous two-dimensional visualisations. In regard to morphologies, topics of interest are spectromorphology, spatiomorphology, spectral quality, performance space, and performance aspects. Studying these topics will help in the understanding of morphological value. Learning to comprehend morphologies in relation to the listening experience will deepen all round musical abilities. We will therefore investigate audiation through encompassing deep listening, reduced listening, inherent and external qualities, psychological experience, imagination, and improvisation. As more mutual inclusivity is discovered we can start to contemplate more adventurous pedagogical tools from which future nurturing of musicians may be drawn.

The underlying purpose of this paper is to discuss issues that can inform pedagogical practices and processes. I will be reporting on related topics from my research into deconstructing recent improvisations and examining the occurrences. In particular the investigation is grounded on recently produced videos of sound-based guitar improvisations.<sup>2</sup> Here we will concentrate on the music, which centres on particular extended guitar morphologies, multiphonic harmonics, snare drum, nut side, for instance; these are among techniques discussed in my book *Sculpting Sound on the Classical Six-String Guitar* (see Vishnick, 2015, p. 180).

To enable the exploration behind the equal worth of sound values that function within multilayered settings, I will draw on my recent theoretical research into the morphology of sound and audiation. To understand guitar morphologies we look at the archetypal attack/resonance model, which forms the basis for classifying certain extended techniques as archetypes or variants of the archetype; pitch material occurs as either linear or refracted. In my studies, morphologies are treated as sound objects that engender a spectral continuum. The music is based on the idea of strategically placing and integrating morphologies in a temporal setting (for a more detailed description, see Vishnick, 2015, p. 192).

We can think of learning to comprehend morphologies in relation to perceiving sounds that are produced after and before we hear them, and audiative activity as internally generated musical ability. This may be explained through the following musical exercise. Choose a specific sound on your instrument, or voice. Before sounding the morphology describe the detail of the sound you are going to hear in relation to the archetypal attack/resonance. This could be by writing the description, making a simple voice recording, or relating your thoughts to others. Then play the sound and report your accuracy; in doing so, connections

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<sup>1</sup> Lecture-recital given at The 21st Century Guitar Conference 2021.

<sup>2</sup> The improvisational examples can be found at <https://youtu.be/5Pbx4WSkpi4>.

from your imagination are formed. Furthermore, think about how you would portray the sound. In addition, improvise using the sound to develop deeper connections and understanding. The focus here is on correlations between the interconnectedness of sound-based morphologies emanating from extended guitar techniques, and comprehending internal realisation of the senses to hear and feel when sound is not physically present. To express an all-encompassing mental image of apprehending the value of sound from a morphological and audiative perspective, diagrams that possess a three-dimensional topological landscape are evaluated in order to relate to the concept of *equivalence in a multidimensional soundscape*.

## Key ideas

The two main concepts that underpin my research into sounds are *morphologies* and *audiation*. Firstly, the notion of morphology is used as an experiential tool. Expressing guitar music in terms of morphologies means a spectral and structural approach. For example, a morphology may be described as the spectral detail of a sound through time; put another way, morphologies are sound objects that engender a spectral continuum. From a spectrotemporal perspective these two mutually inclusive aspects, a spectrum and activity through time, provide a framework for understanding and experiencing music's temporal flow. Secondly, the morphologies I am interested in form spectra that do not necessarily follow the archetypal guitar sound convention of attack followed immediately by a stable (though slowly decaying) resonance comprising as much pitch material as possible.

In my music, compositional and improvisational structures are developed through manipulating the placement of consecutive, merged, and combined morphologies. This is tied to the relationships that occur in shaping phrases, being aware of pitch relations, and exploring dynamic levels. Musical contours are mostly derived from the archetypal model mentioned above. However, with the creation of variants, this archetypal attack/resonance model can be developed further through actions that alter the progress of the spectral content whether by refraction, extension, dampening, or interruption. Taking 'Snare drum' morphologies as an example, refraction and damping occur through manipulation and intervention of the resonance phase, extension by varying the preparation stage timing, and stopping the resonance prematurely produces an interruption (see Vishnick, 2015, pp. 200, 266). Moreover, combining morphologies into phrases results in the integration of spectral components, creating more complex sound qualities.

Performing morphologies means engaging with the interrelations of sound components and resonance values during the temporal flux of the music. Improvising involves capturing and maneuvering the spectral content involving elements of freedom. Composing for me is the process of depicting the morphologies in order to produce a score.

To *audiate* is to use listening, in all its facets, towards creativity; recognising how auditory perception impacts on the senses and developing a deeper awareness in regard to sonic life experiences. Models of creative thinking in music can be built from the exploration of sound through instruments, sound manipulation, and environmental elements; and studying relationships between imagination and invention by linking to sounds.

As areas of mutual inclusivity are discovered we start to contemplate more adventurous pedagogical tools, and further the idea of an arena that is interconnected, from which future nurturing of musicians may be drawn. Therefore, the diagrams highlight morphological relatedness that reflects the way I hear sounds.

## Morphologies in action

The principles of developing a musical discourse have changed since the mid 20th century. Consider, for example the note-based and sound-based music dichotomy. Many modern genres incorporate much sound-based music. Leigh Landy (2007) tells us that, “sound-based music typically designates the art form in which the sound, that is, not the musical note, is its basic unit” (p. 17). However, most works in the contemporary guitar canon are grounded on notes, and constructed on the standard Western paradigm, fixed on a grid system. Trevor Wishart (1998) calls it a “Lattice” system; however, he reminds us that “music does not have to be lattice-based at all” (p. 11). Music based on sound is rooted in timbres heard every day and includes sounds that fall between the standard Western notes.

This artistic route is clear to see in compositions for classical guitar. The vast majority of works that include an amount sound-based material – and therefore incorporate extended techniques – are constructed around standard notes. For example, Cristóbal Halffter’s *Codex 1* (1963) and Angelo Gilardino’s *Abreuana* (1971) include only short sections based around extended techniques within a note-based soundworld. In contrast, there is a range of durational extended technique usage on other works; from the forty-two seconds in *La Espiral Eterna* (1971) by Leo Brouwer, to the eleven minutes of *The Squirrel* and the *Ricketty-Racketty Bridge* (1971) by Gavin Bryars (for a more detailed exploration, see Vishnick, 2015, pp. 30–120).

Although I concentrate on creating music comprised entirely of extended techniques in my research, in reality an amalgamation of the two systems is inevitable when working in the field. Musical structures based around sound are incorporated into so many genres at present. For example, in my current listening environment I hear a significant presence of sound-based material in Popular, Classical, and Improvised music.

In the process of my improvisational journey, I have discovered that the idea of a tonality can fit into the sound-based arena. A number of devices can be used to accomplish this. For example, in my piece *E minor 11* scordatura is used among a mixture of note-based and sound-based morphologies.<sup>3</sup> However, the pitches of an E minor chord form the basis for the whole piece.

Pure sound-based instrumental music procedures focus on creating texture from extended techniques, and strategies are built by managing tension and relaxation in unconventional ways. For example, textural ambiguity within the transformed sound event, caused by the qualities inherent in the morphology of the extended technique, is often intentional in the musical movement. Investigation into how pressure and dissipation are accomplished becomes important; the interplay between expressions of uncertainty and lucidity can manifest in various ways.

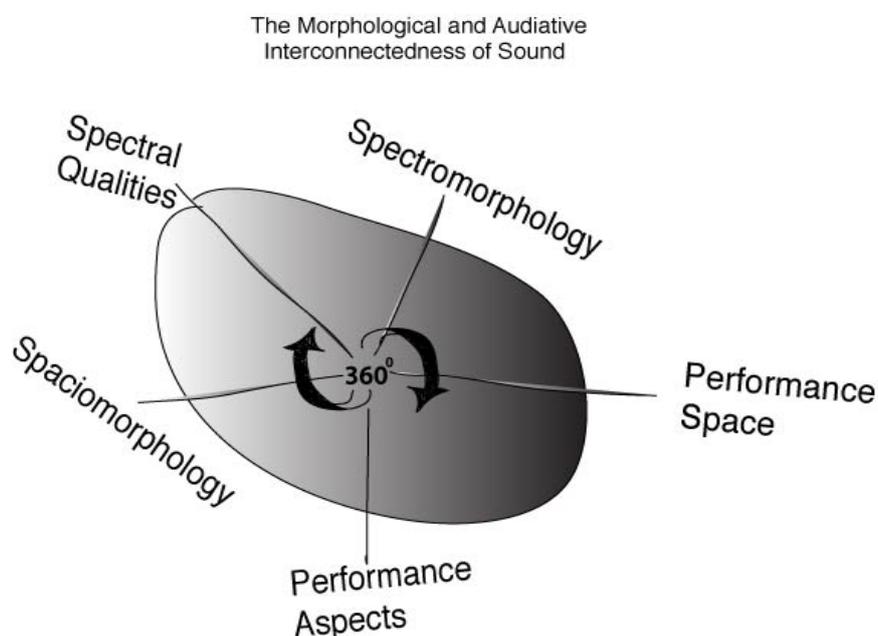
From a fundamental pedagogical point of view, the reason for learning to play and control extended techniques is that these sonic designs help musicians create textural motion during performance; to my way of thinking, creating textures to help aid musical outcome is why extended techniques exist in managing goals. Supporting this point, in *Free Composition* Heinrich Schenker (1979/2001) mentions: “The goal and the course to the goal are primary. Content comes afterward: without a goal there can be no content” (p. 5). In my performances, a musical event begins and instinctively I feel drawn forwards, anticipating and allowing textures to unfold.

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<sup>3</sup> A video of E minor 11 can be found at <https://www.youtube.com/watch?v=tW-VmhP9Wog>.

For the musician or listener who is not used to sound-based music the detail of morphological description may be difficult to follow. However, there is a vast amount of exciting work in this genre. Two good examples in the guitar repertoire are Azio Corghi's *Consonancias y Redobles* (1974) and *Toccata Orpheus* (1990) by Rolf Riehm. Morphological thinking is concerned with the perception of spectral energies and shapes in space, their behaviour, motion, and growth processes, plus their relative functions in a musical context. A fundamental principle of music based on spectral morphology may be easily understood as being founded on our experience of sound apprehension. However, some extended techniques' morphologies can sound remote from the source. We can see that this derivation is from a shared common base that provides a framework for individual and cultural research. Examining these links is important for all concerned and the language needs to be discovered and defined within a shared natural-cultural basis to make sense.

To enable a study of the morphology of sound we need to look into the meaning behind the various areas of morphological interest from a sound-based perspective. These fields of concern are featured in Figure 1.



**Figure 1** Morphological Interconnectability. Copyright 2021 by Martin Vishnick.

In order to help understand why and how the music exists, the workings of a sound-based discourse must be explained; this will also enable a means of articulating problematic reactions to particular work. This is especially important to a music that is strange to comprehend immediately to a lot of listeners, particularly since traditional instrumental and vocal gesture are often absent or not immediately apparent.

Creating textures in the sound-based music arena that may or may not be fulfilled by internal representation can cover a wide range of associations; therefore, human agency is required to create narrative interest. Furthermore, for me a narration involves at least some sort of indeterminacy to create suspense, which serves the characteristic musical attributes and processes of shaping outcome, and is

played out within the various aspects of stylistic improvisational convention and normative practice to serve either deterministically or teleologically; it is here that we garner significant discursive attention.

## Spectromorphology

To describe the perceived sonic footprint of a sound spectrum as it manifests in time Denis Smalley (1986) coined the term *spectromorphology* as a descriptive analysis of sound. Fundamentally, he defines spectromorphology as “an approach to sound materials and musical structures which concentrates on the spectrum of available pitches and their shaping in time” (p. 61). Typically, the term is sometimes employed in the study of electroacoustic music,<sup>4</sup> especially acousmatic music; however, it also has relevance in acoustic music settings.<sup>5</sup> It refers to the apprehension of morphological developments in sound spectra over time, and it implies that the *spectrum* cannot exist without a *morphology* – a sound has to be shaped and therefore must have sonic content.<sup>6</sup>

In his theoretical framework of spectral typologies, Smalley (1986) defines three different groups that exist in what he calls the noise-note continuum. These are subdivided further into three principal elements:

- 1) the *noise*,
- 2) the *note*, which is in turn subdivided into *note proper*, *harmonic spectrum* and *inharmonic spectrum*, and
- 3) the *node*, which is an event having a more complex texture than a single pitch.

Smalley (1986) has also developed a conceptual framework of morphological archetypes (p. 67):

- *attack-impulse*: modelled on the single detached note, it is a sudden onset which is immediately terminated. In this instance the attack-onset is also the termination.
- *attack-decay*, closed and open: this archetype is modelled on sounds in which the attack-onset is extended by a resonance that quickly or gradually decays towards termination. The closed form represents a quick decay which is strongly attack-determined. The open form reflects a more gradual decay where the ear is drawn away from the formative influence of the attack into the continuing behaviour of the sound on its way to termination.
- *graduated continuant*: modelled on sustained sounds, its onset is graduated, settling into a continuant phase which eventually closes in a graduated termination. The onset is perceived as a much less formative influence than in the other two archetypes. Attention is drawn to the way in which the sound is maintained rather than to its initiation.

For my work it is extremely useful to apply Smalley’s theoretical typological and morphological principles to the usage of extended-technique guitar morphologies; especially as motion and structuring processes are key to his theoretical system. Smalley embraces the total framework of sound through time. Moreover, it gives us a means of describing perceptually related real or imagined physical and gesturally sourced sounds. His terminology is now a widely referenced framework for the classification of sound types and their potential musical functions, and I have yet to find a better explanation for morphological musical theory.

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<sup>4</sup> *Electroacoustic music* is a general term used to describe a broad range of modern classical electronic music. It often explores the interaction of natural and electronically generated sounds and effects. The term *electroacoustic* refers to a process that happens in any microphone or loudspeaker – sound is transformed into electrical signals, and then transformed from electrical form back to sound; a procedure that turns sound into something that can be shaped using electronics and computers.

<sup>5</sup> *Acousmatic music* is a form of electroacoustic music that is specifically composed for presentation using speakers, as opposed to a live performance. It stems from a compositional tradition that dates back to the introduction of *musique concrète* in the late 1940s.

<sup>6</sup> There have been numerous publications relating to the term Spectromorphology, and a number of extensions by other scholars within the field of electroacoustic music. Smalley (1997) published a revision of his chapter, which is available in both French and Italian.

We can now amalgamate the standard pitch and timbre domains into the concept of a *spectrum*, encompassing all perceivable frequencies. It also becomes obvious that the spectral aspect is integrally connected to a temporal evolution: “spectra are perceived through time, and time is perceived as spectral motion” (Smalley, 1986, p. 65). This equates to the wide-ranging field between pitch and noises; a concept I have used as a foundation for developing a range of Studies. In order to establish a basis for building compositional strategies, the archetypal and variant extended guitar techniques sounds are incorporated into more morphological complex structures based on my development of morphological structuring principles; to express guitar music in terms of a spectral and structural approach I use the term *guitar morphology* (see Vishnick, 2015, p. 324).

I define *archetypal morphology* as an attack force followed immediately by a resonance that decreases in spectral richness as the sound decays through time. With the creation of variants, this archetypal attack/resonance model can be developed further in various ways. See below. Although a single morphology can be regarded as a sound object in its own right, by combining successions and combinations of morphologies musical pieces are formed.

Compositional and performative strategies can be developed to form pedagogical approaches using Smalley’s spectromorphological structural functions vocabulary. Moreover, this can be seen as a methodological practice comparable to pitch-set theory or Schenkerian and Lerdahl analysis for students.<sup>7</sup> In addition, advancements of these procedures could be used as tools to aid player decision-making.

### **Spatiomorphology**

Smalley (1986) invented the term *spatiomorphology* to conceptually highlight the special concentration on spatial properties used in his compositional process. Spatiomorphology is concerned with spatiotemporal elements, the existence of both space and time; the synchronous possession of spatial extension and temporal duration. We can think about exploring the distribution of spectra emanating from an acoustic instrument to points in a defined space using a network of speakers. This is similar to Robert Normandeau’s (2009) description of the technique he called *timbre spatialization*: he states that the spectrum of a sound may be, “recombined only virtually in the space of the concert hall” (p. 278). Furthermore, Smalley (2007) mentions that the discussion of space is strongly connected with spectromorphological content: “We needed to know about spectromorphology before we were in a position to understand space” (p. 53).

Here my thoughts turn to the potential of managing the diffused sound spectra through the nature of its own topographical structure, and exploring the morphology of such a distribution. For me, working with the notion of spatiomorphology offers an opportunity to immerse the listener into an intimate personal soundworld. Also, this concept leads to various areas of research that could be addressed, such as developing effective frameworks for controlling timbre spatialisation, evaluating the potential scope for morphological modelling as sound shapes and spatial texture evolve, plus methods of organising and directing loudspeaker configurations.

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<sup>7</sup> Heinrich Schenker (1868-1935) was an Austrian music theorist whose insights into the structural hierarchies underlying much of 18th- and 19th-century music led to a new understanding of the laws of melodic and harmonic construction and form. Fred Lerdahl’s (b. 1943) *Tonal Pitch Theory*, among other works, develops musical theories further (Lerdahl, 2001). His work is having an impact on our understanding of how music works and how music is understood. It sketches a theory of enormous potential, with which theorists and cognitive scientists should be concerned for decades hence. These studies and observations have undoubtedly stemmed from the analysis of tonal repertoire. However, some work has been extended to atonal repertoire.

Although the language within the field of spatial audio is fairly broad, there is still much to do in regard to developing a definitive vocabulary. Existing terminologies encompass conceptual writing, from acousmatic practice to the scientific and quantitative writing about panning algorithms and psychoacoustics. I would encourage the advancement of a language that borrows from various fields of related music, perception and cognition, audio engineering, psychoacoustics, sound synthesis, computer programming, mapping, and mathematics, for instance.

### **Spectral qualities**

The spectral quality of a sound resides in areas of spectral space. Smalley (2007) explains: “Each piece of music will have its upper and lower boundaries within which spectromorphologies act” (p. 44). Morphologies behave in various ways; for example, they may remain stable or evolve, flowing through ranges and frequencies with varying degrees of energy in a controlled or unpredictable manner. Also, they may proceed facilely within a narrow range of activity, or in leaps.

The word *spectrum* is used to refer to the internal components which make up sound, noting that we may actually hear these components or not. For an instrumentalist, the design of the spectrum is directly related to all aspects of their own personal technique, the instrument, the performance space, and level of musicianship.

Another facet of spectral quality is that we may also think about the factors that influence the creation of proximal space; do the sounds have a perspective of being close or far away? Taking dynamic level as an example, when we normally have experience of the movement of a sound from distal to proximate space a change in the spectral resolution of the sound is involved. Although I can create spectra with an impression of close by or far away, the listener will hear this as some kind of movement in space. Spectral space is about controlling the perception of space and spaciousness.

Manuella Blackburn (2009) explains this concept by employing visual shapes and symbols. Some of her diagrams, “indicate ‘snap-shots’ of spectral space where time corresponds to the horizontal axis and frequency to the vertical. In these visualizations, shape corresponds to amplitude and timbre, while relative positioning of shapes corresponds to spectral occupancy” (p. 2). We can consider these ideas as compositional aids that present possible starting points for the expansion of sound materials, events, and structures.

### **Performance space**

It is evident that performers have an essential role in bringing the music to life by introducing gestural qualities, enhancing musical structures (micro and macro), and providing a personal interpretation. Careful consideration of the performance space is an area that warrants further investigation; therefore, it was included in Figure 1.

This is in line with the thinking of Pauline Oliveros (2007), where she expounds a contemporary view of the acoustic relationships in auditoria: “The relationship of spatial acoustics and the acoustics of musical instruments is a complex matter that needs more attention and investigation by all concerned” (p. 2). Oliveros leads the way by explaining about the importance of using the sensitivity of our hearing, voices, instruments, technology, and multi-channel systems, as well as shared experiences and perceptions to achieve acoustical explorations.

Morphologies may be transformed by carefully listening within natural spaces in various ways, like rehearsals involving listening meditation before sounding the space. Oliveros (2007) tells us: “Listening

brings about new possibilities and feelings. Listening to space changes space. Changing space changes listening” (p. 4). Interestingly, this phenomenon Oliveros terms the *listening effect*.<sup>8</sup>

Equally important is Simon Emmerson’s (1998) application of the notion of *frame*: a delineated area of interest that can be applied progressively from the largest to the smallest scale from a landscape bounded by the acoustic horizon, an arena within which we find a stage to frame an event. By using technology, we can think about developing more subtle levels of sound: “For the sound artist using contemporary technology the process may continue, bringing the microscopic levels of sound into closer focus within the event. At the other extreme, electronics allows ‘superframes’ such as the radiophonic soundscapes” (p. 138).

Advancing this idea further, Emmerson (1998) talks about the various possibilities open to the composer using the notion of frame, for example, landscape/arena, landscape/stage, and arena/stage. Landscape/arena is where the sound landscape is projected into the listening space and becomes a new perceptual environment for the listener. In landscape/stage, the word *stage* suggests a new virtual environment, “an area of clear perception from which we receive detailed information-rich signals and to which we devote maximum attention” (p. 138). Here we are free to create and manage our own stage, by body movement to relocate our attention to particular areas of the soundscape. However, the composer may include helpful directives. Some of the Cage installations are representative of arena/stage, where there is no clear distinction between stage and arena. Good examples are *Living Room Music* (1940), and *Water Walk* (1959),

The idea of bringing spatial design and localisation of sound is a feature that I intend to develop in my work. From a holistic view, any sound-object can be regarded as having spatial identity from more than one perspective. In my mind the holistic trace of the outer limits of a sound object forms a spectrum that can be thought of as a space, and space may also be structured in a frame.

### **Performance aspects**

Here we cover technique, tone production, and style. It is physical activity, along with gestures, that produces sound-making on the guitar, a causal chain linking action to source; morphological consequences through human agency are the result. My sense of touch, whether applying nail, fingertip or an implement becomes the supplier of energy. Smalley (1997) explains: “A gesture is therefore an energy–motion trajectory which excites the sounding body, creating spectromorphological life” (p. 5). From the perspective of performer and observing listener three elements are occurring, the visual, tactile, and aural; processes concerned with muscle pressure and relaxation, exertion, and resistance.

For me, the gesture process is bidirectional. For example, I play an extended technique on my guitar causing a resultant morphology. Conversely when I listen to the morphology the human element behind is heard, caused by the gestural activity; intentional acts and emotive elements are present throughout the process, including imagination. Relatedly, Smalley (1997) says: “Everyone uses this spectromorphological referral process when listening to recordings of instrumental music” (p. 5). We listen to the music and automatically gain a wealth of psycho-physical information by decoding the human activity behind the morphological information.

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<sup>8</sup> Composer and pioneer Pauline Oliveros founded the practice of Deep Listening in 1998. It is a way of listening in every possible way to everything possible.

The dynamism behind a musician breathing life into contemporary music, which he calls animation, forms part of Gilbert Biberian's (2012) exploratory book *Liber*. He tells us: "A rich and daring imagination (is) of paramount and fundamental importance" (p. 15). In this work Biberian explores the vast subject of articulation.

Furthermore, when listening to a recording, or situated far from the performer at a concert, the sounds heard may be difficult to decipher. We might be uncertain how the sounds behaviour was made. For example, we may be unsure of how the pitch trajectory was accomplished. My hope is that it will become possible for composers to create guitar music where the gestural cause–source relations are even more adventurous and imaginative. For me, this remote order of invention is a rich area for compositional and improvisational exploration.

### Audiative Interconnectability

Figure 2 shows audiative interconnectability attachment to relevant areas. These topics are Oliveros' deep listening phenomena and Smalley's reduced listening principles, inherent and external qualities in terms of sound perception, psychological experience in relation to learning, how imagination connects to morphology and fantasy, and improvisatory manipulation of spectra.

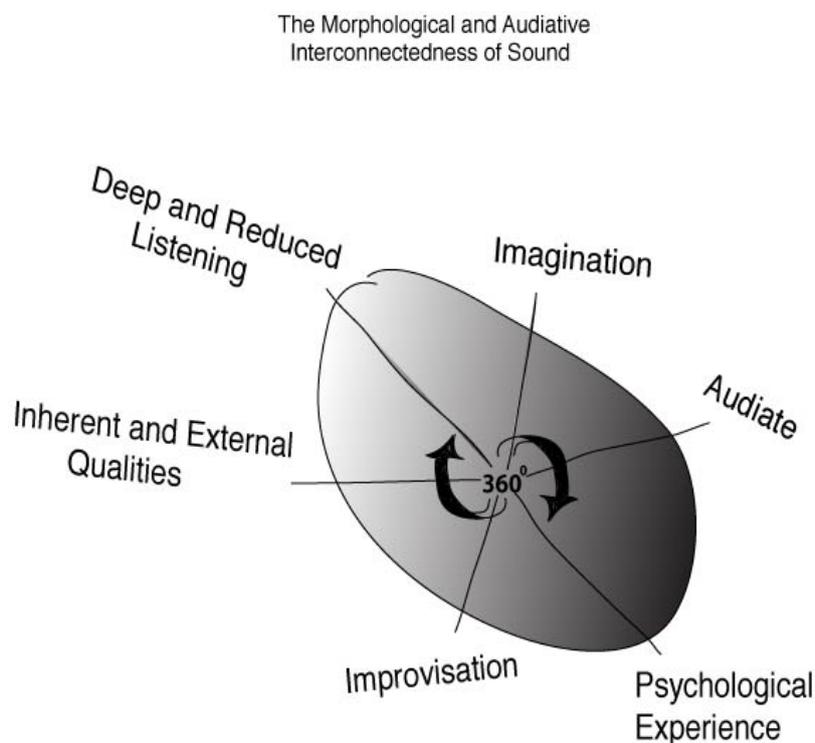


Figure 2 Audiative interconnectability. Copyright 2021 by Martin Vishnick.

The point will be to work toward forming a method for aurally recognising small alterations in timbre and emphasising the importance of the whole sound when a single morphology, or groups of morphologies occur in various combinations. The aim is to develop a forward-thinking pedagogical audiative system that

embraces a storehouse of specially selected techniques as equal in value; hence equating to the concept of equivalence in a soundworld that has the capacity to become intricate or unusual.

Music educators are expected to teach the complex undertaking of helping pupils to be creative. Therefore, an ever-developing set of tools is essential for pedagogical improvement; instructions that will help students to bring out and realise their inner potential. Knowing the details of a sound from one's mind, or inner ear, before physically hearing is undoubtedly extremely useful. Teaching students to hear and comprehend music rooted in the imagination is key.

According to Gordon (1989), "unless one can audiate what is seen in notation before he[*she*] produces sound on an instrument as dictated by the notation, what he(*she*) is reading will have only theoretical meaning for him[*her*]" (p. 5). The result is an academic rather than a musical meaning; the player will learn a lot more about the music itself by developing a sense of the musical sounds before interpreting the notation.<sup>9</sup>

This raises the notion of learning to audiate before learning to read music. For first principles, I would advocate teachers using various improvisational methods and helping the student to understand creative performance; however, discussion on improvisation and creative performance methodologies is out of the scope of this paper.

My belief is that studying the aspects arising from audiation will help anyone interested in sound to develop a higher sense of awareness in regard to sonic life experiences from childhood to the present. Moreover, I would encourage music lovers to engage in future personal sound experiments. For example, organise listening trips in various environmental situations.

### **Inherent and external qualities**

My main focus here is on comprehending the subtle detail of existing and newly discovered classical guitar techniques. Concentrating on particular techniques, the aim is to extend awareness of sound apprehension. For instance, can we hear the minute changes inherent in these sounds through time and chart differences in the spectra?

There are two aspects to guitar morphologies, inherent and external. In my research I explain sound events along with their intrinsic relationships within musical pieces. However, Smalley (1997) reminds us, "a piece of music is not a closed, autonomous artefact: it does not refer only to itself but relies on relating to a range of experiences outside the context of the work" (p. 4). Therefore, as a cultural construct, a fundamental external basis is necessary so that the inherent can have meaning. The important point is that "the intrinsic and extrinsic are interactive" (Smalley, 1997, p. 4).

For acousmatic music an expression has been invented that describes this connection. Smalley uses the term source bonding to represent the activity of morphologies from inside the work to the sounding world outside. His definition relates to the natural tendencies of sounds sources and causes, and the relationships of sounds to each other, as they give the impression to have mutual or associated origins. Moreover, the link between fundamental morphological qualities and external referential sound association of acoustic instruments is encompassed in Smalley's descriptions.

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<sup>9</sup> For further clarification on the meaning of audiation, see Gordon (1989).

Through cultivating methods of apprehension unhindered by preconceptions, Oliveros (2005) tells us: “One of the Deep Listener’s goals is to listen to each and every sound exactly for what it is, nothing more, nothing less” (p. 4). The important aspect for me is to examine how source bonding and extended techniques can be applied to a pedagogical approach by discovering musical links for future teacher-performer-composer communication.

In terms of pedagogical development, my contention is that source bonding should be more clearly brought into the instrumental music arena. It is present in guitar playing and may be discovered through the various physical activities that occur in sound-making; put another way, when human agency is involved source bonding will occur.

### **Deep listening and Reduced listening**

Engaging with Pauline Oliveros’ *Deep Listening* principle we can learn to, “remove cognitive filters in order to experience deeper forms of audition” (Oliveros, 2005, p. 4). My intention is to develop tools to describe the features of perceived sounds and explain how they work in the context of the music.

For an all-inclusive approach, a method for aurally recognising small changes in timbre is useful. Here we can tap into existing electroacoustic research, in particular the concept of *reduced listening* (Schaeffer, 1966). This type of concentration occurs through focused and continual listening. For Smalley (1997), “it is an investigative process whereby detailed spectro-morphological attributes and relationships are uncovered” (p. 5). In order to pay full attention on refining the detail and quality of sounds, the listener tries to suppress any distractions: “reduced listening is therefore an abstract, relatively objective process, a microscopic, intrinsic listening” (Smalley, 1997, p. 5). Therefore, concentrating on the characteristics of the sound is essential.

Smalley and Oliveros concur, as they focus attention on how listening is an act of cognition; it can shape perception. This form of perceptual scrutiny is generally employed in the creative process. I believe it is important to bring this type of listening into the performer-listener and audience-listener arena. A basis for moving towards a pedagogical audiative system is formed when we combine the reduced and deep listening concepts in Smalley’s writings on spectromorphology and my thinking behind guitar morphology combined with inherent and external listening.

Meaning is embedded in the musical syntax, which is directly related to the workings of the inner and outer ear, as well as the source bonding aspect. It is our job as educators to really understand these three aspects and teach them to our students, enabling an all-encompassing view of the morphology of sounds in general.

### **Psychological experience**

The knowledge of effective contemporary guitar pedagogy has moved forward a pace in recent times. Ice B. Risteski (2006) remarks that, “the psychology of student development and learning has become more sophisticated in its ability to provide an intelligent and informed context for guitar teaching decision-making” (p. 92). My philosophy has always been that best practice should meet the needs of each individual student (recent didactic books have emerged – see Appendix).

Until recently music study has tended to concentrate on theory, writing notation, and analysis. There is little research on how human gestural activity impacts on musical performance. This may be because it is customarily expected. For example, a sound-based phrase played on the guitar incorporating pitch

content can sound like it sings, echoing a vocal presence. This can have a psychological as well as physical effect on the listener. Interpreting the source-bonding threads and extracting meaning is an eventual goal of this line of thinking, alongside the expressive and emotional significance of inherent and external musical qualities. Describing musical gestures through morphological value will help musicians enhance interpretive skills, and listeners to identify significant behaviours.

Earlier we have seen how spectral quality is connected to spectral space and proximal space. From a pedagogical standpoint, training and experience in listening to music can strengthen one's capability to connect and interpret the structural relevance of spatial information in many situations.

In regard to personal space and territory, psychological and sociological influences feature in performance and listening scenarios. They are key components in the perception of space as a communicational element. Spatial depth and distance are central components in defining the aspects of virtual space, where proximal articulations in spatio-musical structures can engage with psychological space and personal distance. Learning to listen deeply in a given space is an effective means of developing interpretative skill.

### **Imagination**

Musical imagination is a vast subject. Therefore, here I will focus on making a few observations that relate to my research, touching on morphological sound source, illusion and imagery, as well as pitch-to-noise structures.

When thinking of the millions of people who have experienced listening to guitar music, it is obvious that an underlying process of conscious and unconscious visual and aural training has occurred; it may be referred to as a culturally acquired familiarity of sounding gesture. However, in much contemporary guitar music that contains passages of extended techniques the sound-making becomes remote from the generally recognisable.

The playing of extended techniques can transform the source, the ear becomes dubious about the cause; the morphological nature takes us into the realm of the imagination. All musical endeavours are both an empirical and a creative process requiring imagination and technical knowledge, and we can link this to articulation of sounds in a particular space when dealing with spatial musical elements. We must also consider that perception of this attribute often requires fantasy.

By using extended techniques in musical spaces, we can think about alluding to the imagination of the listener. When we invent sounds in our imagination it involves drawing on experiences and recombining them in various ways. Moreover, the multifarious role that imagery can play links to auditory experience if the music is actually sounding or imagined. This audiative connection is important for many forms of experiences that take place in the inner ear in respect to musical understanding.

It is obvious to me that my memory and imagination are constantly adding to hearing sensations. This constant internal activity appears to mean every sound that comes along is filled with associations and meanings that accord to a given context; creatively enabling a poetic exploration of personal imagination, where improvisation plays a significant role.

### **Improvisation**

Here we have the idea of apprehending and manipulating spectral content involving elements of freedom. From my experience, in its basic form improvisation can be described as spontaneous, extemporaneous

musical creation. However, we must factor in inherent patterns involved in the cultural context. For example, a dissonant complex chord may still be associated with a specific tuning type embedded in a particular familiar culture.

Extended classical guitar techniques are used frequently today in works that incorporate improvisatory elements; a variety of styles are employed. On occasion the works might include historical references. For example, in *Consonancias y Redobles*, Corghi (1974) incorporates passages that involve bi-tones – including those that transform into mute taps –, seeking to blend imperceptibly from one state to another. Figure 3 shows the relevant score sections.

The image displays a musical score for 'Consonancias y Redobles' by Azio Corghi. It features several distinct sections and techniques:

- Top-left:** A musical quote in treble clef with a 3/2 time signature, showing a melodic line.
- Top-right:** A section titled 'LH mute taps' with a wavy line above the staff. Below it, a guitar diagram shows fret positions I and XII on the right hand (RH) and fret XIX on the left hand (LH), with a 'barrée P' (barred P) instruction.
- Bottom-left:** A section titled 'Bi-tones' with a guitar diagram showing fret positions I, II, IV, and V on the right hand (RH) and frets 4 and 6 on the left hand (LH).
- Center:** A 'Transform section' with a wavy line and a guitar diagram showing frets III and VI on the right hand (RH) and frets 4 and 6 on the left hand (LH), with 'last.' and '(elouffé)' markings.
- Bottom-right:** A section titled 'Mute taps' with a wavy line above the staff and a guitar diagram showing fret positions III, IV, VII, and IX on the right hand (RH) and frets 4 and 6 on the left hand (LH), with 'last.' and '(elouffé)' markings.

**Figure 3** Azio Corghi's bi-tone to mute tap transformation in *Consonancias y Redobles*. The musical quote (top-left) is from Luis Milán's (c. 1500-c. 1561) *El Maestro* (1535), on which the Corghi's work is inspired. Reprinted and adapted with permission from *Consonancias y Redobles* (p. 6) by A. Corghi, 1974, Sugarmusic S.p.A. – Edizioni Suvini Zerboni.

For my pedagogical approach, I encourage the developmental learning of elements of freedom within the area of structuring consecutive, merged, and combined morphologies as this will help towards enrichment of improvisational skills. The key musical point is forging a method for expressing spectral content temporally.

In the initial pieces written specifically for my research, elements of freedom occur in passages where decisions need to be made about choosing fret positions, dynamic levels, placing of morphologies in the time continuum, or a mixture of the three; in the more advanced scores the player can build their own phrases based on the given material. The musician learns to start building phrases by establishing a method for making apt performance decisions.

We can now engage with an ontological meaning and the dynamics of discussing interplay in the improvisation arena. When improvising the musician is immersed in a real-time exploration of, and investigation into, the relation between the symbolic and the aesthetic; translating into the problematic artistic areas of representative identities working on many levels, for example, expressive, poetic, emotive, indicative, and mimetic.

## Conclusions

In this contribution I have drawn on my recent theoretical research into sound and audiation. Thus enabling the exploration behind the equal worth of sounds that function within multilayered settings. The focus has been on presenting a teleological journey that will aid guitar performers, composers, and researchers. Figure 4 presents Figures 1 and 2 side by side forming a holistic view that enables observation into equivalence in a multidimensional soundscape more easily. The objective is to develop a pedagogical system that gives equal weight to all of the topics mentioned.

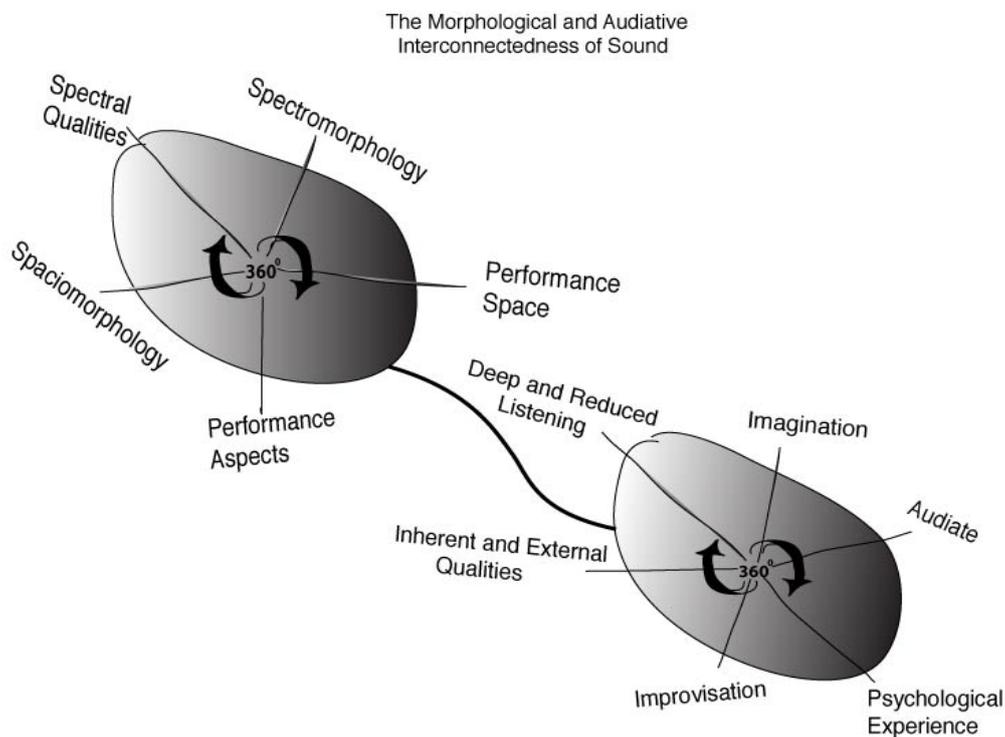


Figure 4 Combined Morphological and Audiative Interconnectability. Copyright 2021 by Martin Vishnick.

To better reflect on personal sound perception abilities, I have tried to convey the idea of a third dimension in the diagrams; designs that convey an idea of three-dimensional objects on a two-dimensional surface. For the future I can envisage development of explanatory figures that encompass further dimensions; one example being the demonstration of four-dimensional designs that appear as holographic spatial visualisation.

In order for a morphological approach to work, educators will have to notice the importance of the whole sound that is produced. I would advocate a paradigm shift, a move away from pitch emphasis, giving equal emphasis to the morphology of sounds, alongside spectral qualities and other factors such as style,

technique, tone production, performance space, and psychological experience. The figures mentioned above show the interconnectedness of the considerations involved. The goal is learning to comprehend all aspects of what is heard and understood when a musical sound or gesture occurs. Not only for guitar sounds, this model can be extended to all instruments and audible events in the environment. The research will lead to the development of pedagogical tools.

An in-depth discussion on sound and image interaction will be for a future study. My intention will be to look into how perception of visual music will impact on one's senses, by concentrating on the sound that originates from within the film. For example, the impact of apprehending both aspects may feel it has a linear or non-linear communication. Raising the question, does the discourse possess a unified and coherent narrative, or the suggestion and the possibility of an alternative yet still viable narrative? Moreover, in a showing of the films we may perceive the visual and sound as a oneness, or a separation if the speakers are remote from the images.

I would like to put forward the idea that morphological musical thinking is a dynamic activity that involves perceiving spectral energies and configurations in space. Once thought about, it is a straight-forward experiential principle. As we have seen, many hear sounds and associates those sounds with experiences from life. This fits my core belief in musical dedication and imagination. Moreover, it has helped me to develop a general philosophy that fits into my world, namely, the musical poetry of everyday life.

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## Appendix

### Recent important books that concentrate on guitar pedagogy

- John Schneider's *The Contemporary Guitar* (Rowman and Littlefield, 2015) traces the extraordinary rise of the instrument in concert music over the past century.
- *The Techniques of Guitar Playing* by Seth Josel and Ming Tsao (Bärenreiter, 2014) provides a comprehensive survey of contemporary performance techniques on the classical guitar.
- Michael Frengel's book *The Unorthodox Guitar: A Guide to Alternative Performance Practice* (Oxford University Press, 2017) presents details on extended performance techniques and instrumental preparations, as well as innovative ideas about sound projection in live contexts.
- Martin Vishnick's *Sculpting Sound on the Classical Six-String Guitar*, Volume's 1 and 2 (Create Space, 2015). Volume 1 presents a critique and exploration of the way extended techniques with particular sound properties are used and notated in the contemporary repertoire for the classical six-string guitar. In Volume 2, a set of practical exercises provide both instrumentalists and composers with a way to perceive, think through, and use a repertory of sounds based on developed and newly invented extended techniques.