

Locating the Melodic within Pre-Compositional Frameworks

Annotation

For composers using algorithms, “found” materials, or any otherwise predetermined patterns of harmonic or temporal organisation in their pre-compositional planning and subsequent working process, the composition of strictly melodic material can often resemble a sort of archaeological endeavour, as potential melodic or proto-melodic structures are gradually uncovered during the exploration of pre-existing compositional frameworks. These “discovered” structures of interest may later be highlighted or otherwise further manipulated for use as melodic or primary thematic material in the finished work. This seemingly straightforward process of assigning melodic status to specific found materials (often with little or no additional alterations) is intimately related to fundamental questions surrounding the ways in which composers frame their core conceptions of melodic possibility, in addition to how we as listeners may impose our personal and cultural melodic conceptions upon “non-musical” everyday sonic experiences. Crucially, it raises additional issues surrounding the interrelationship between the rhythmic and harmonic structures in composed melodies and thematic material, and why their fundamental parameters, duration and pitch, can be so difficult to disentangle. This paper will examine these issues from a personal perspective, illustrating various processes of “revealing” latent melodic and thematic content in the pre-compositional patterns of my recent work. Further, it will seek to illuminate the potentially complex network of underlying motional forces created between the two layers of my harmonic and temporal pre-compositional frameworks, and investigate how they themselves may have a role to play in the subsequent location of melodic and primary thematic material in the creative moment.

Keywords: algorithmic composition, harmonic permutation, perceptual grouping, long-range polyrhythms, pareidolia.

1. Pre-compositional frameworks, perceptual organization and *pareidolia*

This paper represents an initial investigation into the fascinating (and often confounding) relationships that obtain between certain types of *pre-compositional frameworks* and finished musical textures. We can define a pre-compositional framework as any sort of “found” material that the composer subsequently crafts (or, in some cases, simply *frames*) through the compositional process. In keeping with the theme of this conference, today we will focus our gaze on how *melodic* material can be created by working in this manner, in addition to various thematic features that may contribute to the perception of musical material as being melodic, such as melodic contour (Schmuckler 2009). We will mainly focus on material from three of my recent pieces as illustrative examples, applying particular emphasis on certain sections of the works, which feature varying types of melodic content that was developed directly through the creative interaction with a chosen pre-compositional framework. In addition, we will attempt to generalise these observations in order to situate them within a larger sphere of music practice, as well as within the broader scope of other disciplines, such as the visual arts.

As many composers who work with pre-compositional frameworks will know, the question as to whether pre-compositional structures are actually “found” (as in the case of the star charts which were used by John Cage to construct *Etudes Australes*) or whether they have been created by the composer themselves can often be immaterial, as both types of structure may often result in similar working methods, with the composer simply responding directly to the pre-compositional framework throughout the creative process. In my own recent practice, the creation of such frameworks has typically been done using layered rhythmic networks, patterns of harmonic or duration order permutation, polyrhythmic divisions of the temporal space, or various superposed combinations of these. Though these pre-compositional structures have always been fully designed by the composer (myself, in this case), we can still think of them in some ways as being “random” or “found” in the sense that the *interactions of the unfolding parallel processes* are sufficiently complex to ensure that potential musical outcomes cannot be fully known in advance. To be clear: what we are interested in here are not simply finished musical textures, which are created by direct mappings or other familiar algorithmic techniques (Doornbusch 2002: 145–156), but rather the detailed exploration of these pre-compositional frameworks, where the composer is (consciously or unconsciously) trying to locate material or patterns of interest, thus *perceptually grouping selections* of these elements in potentially meaningful ways in the creative moment.¹ Before we begin

¹ See Doornbusch (2002: 145–156) for more information on composers’ attitudes to pre-compositional planning and more or less strictly-interpreted algorithmic formulae. I have spoken to many composers to whom this idea of ‘fiddling’ with a strict background framework (whatever this might constitute in individual cases) is anathema. I remember asking one such composer if he felt free to ‘compose around’ the time points in his background structure, starting a bit earlier or later than was scheduled in the formal plan, as the needs of the music dictated. “Oh no, never; because otherwise this [gesturing at a sketch of the formal plan] is meaningless.” Of course, there are other ways to think about the expression of background structure. To take certain works of visual art as an example: experience tells us that we may observe a ‘hidden’ ordering of certain elements, which may be comprised of geometric shapes, strong lines, or any number of other organizing forms that live in the background, giving structure to

to examine how I have responded to my pre-compositional material during the creative process, I believe it may be of value to bring in the well-known psychological phenomenon of *pareidolia*. This term denotes the natural human propensity for perceiving meaningful patterns in complex sensory information where none may actually exist. From an artistic perspective, pareidolia has been recognized as a powerful creative tool at least as far back as Leonardo da Vinci, who included this description of the phenomenon in the collection of writings that later became known as his *Treatise on Painting* (published posthumously in 1651):

“I shall not refrain from including among these precepts a new aid to contemplation, which, although seemingly trivial and almost ridiculous, is nonetheless of great utility in arousing the mind to various inventions. And this is, if you look at any walls soiled with a variety of stains, or stones with variegated patterns, when you have to invent some location, you will therein be able to see a resemblance to various landscapes graced with mountains, rivers, rocks, trees, plains, great valleys and hills in many combinations. Or again you will be able to see various battles and figures darting about, strange-looking faces and costumes, and an endless number of things *which you can distil into finely-rendered forms* [my emphasis]. And what happens with regard to such walls and variegated stones are just as with the sound of bells, in whose peal you can find any name or word you care to imagine.” (Kemp and Walker, 1989: 222)

We can easily imagine that, for the composer in the midst of the creation of a new work, pareidolia may inevitably occur in a variety of ways both auditory and visual, as the composer integrates and groups selections of the complex relationships presented in the pre-compositional material. To set the scene in terms of my own music practice, let us briefly examine my approach to the construction of pre-compositional frameworks in detail.

2. Creating pre-compositional frameworks

If we repeatedly subject a collection of pitch sets to some order permutation operation (see Fig. 1) we can create long “fields” of harmonic raw material in a manner similar to what Messiaen referred to as the “Interversion of Notes”² in his classic *Technique de mon langage musical*. Although in this chapter Messiaen was primarily concerned with the use of permutation as a generator of melodic development the harmonic fields, which we construct by subjecting a *collection of pitch sets* to a similar operation takes this idea a step further.



Figure 1. Two permutations of the collection (1, 2, 3, 4, 5) create a new harmonic ‘field’

These resultant fields represent complex patterns of harmonic interrelationships; intricate networks of intervallic tension and release which can then be composed in some way into the structure of a finished work. In a similar way, my work with polyrhythmic space can be viewed as the temporal analogue to the permuted ‘harmonic fields’ just shown, in that they create complex patterns of *durational* interrelationships through a section of music; intricate networks of temporal tension and release (see Fig. 2). Again, it is the composer’s task to uncover the interesting “hidden” potentialities latent in these simultaneously-unfolding harmonic and temporal structures. By working within a polyrhythmically-divided temporal canvas I have gradually become aware of how the very act of composing with two or three layers of discrete pulse streams – streams which can often affect one another locally in, at times, quite unexpected ways – can produce a very unique and often unpredictable sense of forward motion, one that is naturally reflected in the more complex local and global temporal relationships between the elements of the polyrhythmic limbs.³

the foreground elements. Certainly these background shapes are as ‘present’ in the overall affect as the elements in a painting’s foreground, though they need not be *precisely* delineated by the foreground. Rather, they are hinted at; used to provide general structural underpinning for the whole. It follows that the background temporal structure of a composition need not necessarily rely on the *absolute* delineation of each structural/formal time point by the foreground material, and that the composer should feel free to sharpen or weaken the listener’s perception of any underlying structures as she sees fit.

² The French term “interversion” can serviceably be translated as “reversal”, which, in the context of his example, we can take to mean a sort of “order permutation”. Messiaen (1944/1956: 35).

³ In a discussion of his Etudes for Piano, Ligeti refers to low-integer polyrhythms: ‘The ratio 5:3 is of course mathematically simple, but perceptually very complex. We do not count the pulses but rather experience two qualitatively different tempo levels.’ Ligeti (1988: 5–6).



Figure 2. The 35-bar and 15-bar formats of the polyrhythm 21:25, as used in *Border Sea*

To illustrate how these pre-compositional frameworks have been used in my own practice, consider the example (Fig. 3) taken from the opening of my piece *Border Sea* (2013) for flute, viola and piano. From the standpoint of temporal architecture, the piece was composed around a polyrhythmic structure of 21:25, which operates in the background as a medium-range formal determinant. Notice that the opening of the piece actually corresponds with Bar 15 of the structural polyrhythm, where an interesting maximally-out-of-phase gesture occurs just before its mid-point. In this example, the music almost completely articulates the highest level of the polyrhythmic background; that is to say, the “background” polyrhythmic structure simply *becomes the local rhythmic structure*. From a melodic standpoint, the pitches in this opening section derive from an ongoing order permutation pattern based on five chords that unfold in parallel with the polyrhythmic pattern. During composition, individual pitches were selected from this unfolding harmonic stream to create the characteristic opening.

Figure 3. Opening bars of *Border Sea*

Now we arrive at the question which is so difficult to fully address: having established parallel harmonic and temporal frameworks, how does the composer locate and develop the strongest material which is, after all, already present in some latent form in the overlapping background patterns of time and tone? From a composer’s perspective, the most typical response to this question would likely reference some process of improvisation, experimentation, or “trial and error” that, while undoubtedly correct, does not actually tell us very much about what is happening in the creative moment. It is here that I would like to bring the cognitive phenomenon of pareidolia back into the picture, as I believe that viewing this improvisatory process from the standpoint of an *ongoing pareidolic interaction* with the material can tell us more about how we extract musical forms from the “uncarved block” of our pre-compositional structure. As I began to compose *Border Sea*, I remember first

noticing the interesting out-of-phase section at Bar 15 of the polyrhythmic structure, and decided to begin the piece from that point. Choosing the major seventh interval for the piano as the first gesture, I through-composed the first ten bars, keeping the rhythms of the background structure in the front of my mind a few beats at a time, choosing pitches from the unfolding harmony pattern. Working in this way, I had the very real sensation of gradually feeling my way through an unfamiliar landscape, picking out certain forms from countless other rejected possibilities to finally arrive at a beautiful, unexpected opening melodic gesture. For me, this process of uncovering pre-existing or latent material bears a strong resemblance to da Vinci's observation of "walls soiled with a variety of stains", in that one is simultaneously *observing and inventing* – taking some form of pre-existing material, assigning it melodic status, and then "distilling it into finely-rendered forms", to use Leonardo's phrase. I believe it is important to bear in mind that these distillations are not auditory or visual illusions; we are not hearing or seeing things, which *are not actually there*. Rather, they are *spontaneous perceptual organisations* of stimuli that very much *do exist*, and we are making on-the-spot creative orderings of more-or-less random sensory information into meaningful musical gestures. This sort of "creative listening" can be as engaging for listeners as it is for the composer, as the listener becomes intimately involved with the unfolding work through their own *active* ongoing perceptual organisations of the material. It is clear that the process of composing the melodic opening of *Border Sea* as just described is in strong contrast with composing melody (or any musical gesture) within frameworks which we have already internalised to a high degree, such as the traditional tonal harmony that many of us will have assimilated from childhood, and subsequently learnt more-or-less rigorously during our formal musical training. In the opening ten bars of *Border Sea*, the pre-compositional framework was almost completely distilled into a single melodic line, which is articulated in turns by the three players. Our next example shows another approach, with the completed musical surface left to be considerably more complex, thus allowing a measure of *ongoing pareidolic interaction* with the end listener.

3. Creating textures which lend themselves to pareidolic hearings

At the beginning of Part II of my recently-completed orchestral work *Perfect Information* (2015), cascading figures from the preceding section yield to a quiet restatement of the main harmonic field by the strings, utilising a much finer, more granular shattering of the rhythmic surface. During the compositional process, I came to refer to these intricate rhythms as *decimation patterns*, as the initial conception of the texture in these sections was of some pre-existing material, which had been somehow "decimated" or shot through with irregular silences, interfering with the original continuity of the harmonic movement.

These decimation patterns (used almost constantly from Bar 148 to the end of the work) were composed intuitively, using a roughly four-bar cyclical structure to define eight layers of intricate rhythmic surface.

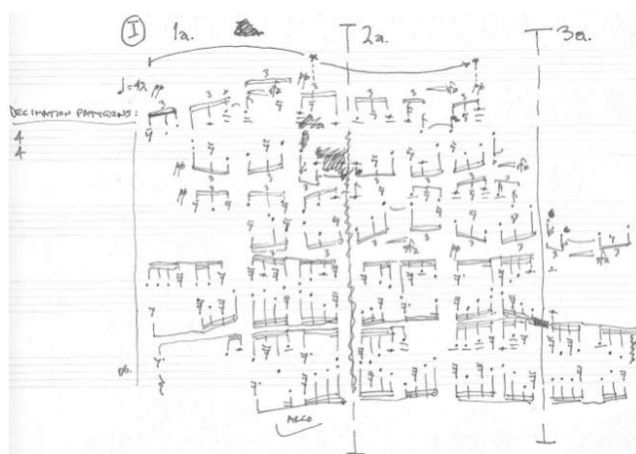


Figure 4. Sketch page showing the 'decimation patterns' used in the second half of *Perfect Information*

The sketch page shown in Fig. 4 shows the precise construction of the rhythmic texture, but this sketch was only intended to hint at general melodic curves, as the final pitch information would be distributed through the texture only during composition, again following the unfolding background harmonic permutation field.

This particular approach differs from that which we saw in *Border Sea*, in that the interest for me here was in how a more or less random distribution of the constituent pitch elements could, through their own individual melodic movements, create a fantastic sense of hyper-polyphony. As the strings, and subsequently the woodwinds, weave this complex melodic texture, the sense of a kind of melodic tangle is heightened by the use of occasional dynamic swells, which briefly rise above the cacophony and establish their own melodic profile that rises above and penetrates through the entire ensemble. Again, in contrast to *Border Sea*, it is actually *the listener* who is presented here with a dense amount of potentially melodic musical information that they must perceptually organise in their own individual ways.

Taking the general idea of the encoding and decoding of written text as a starting point, *YAMAHA/ENIGMA*, for disklavier and electronics (2011), utilizes several classic techniques from the world of codes and cryptography and sets them in motion over 14 minutes. The music of *YAMAHA/ENIGMA* is built upon three discrete, yet interacting layers of activity:

1. Order permutations of a 5-by-6 collection of pitch sets, iterated in various ways by the Disklavier.
2. A pre-recorded soundtrack edited together by hand, splicing 600 short tape fragments into 120 duration-permutational segments.
3. A voice layer, tied at various stages to the piano, soundtrack, or an algorithmic process of the computer.

In Section 1 of the piece, as well as in other sections where the piano material occurs, the harmony permutations were intentionally left to be quite ‘mechanical’ sounding, with no variation in register, dynamics, or tempo. The soundtrack was constructed from a recording of a free improvisation recorded earlier in 2011 with Milana Zaric (harp), Miguelangel Clerc (guitar), Mei-Yi Lee (percussion), Igor Maia (mixing desk), and Chad Langford (electric double bass). This digital recording was edited to 14 minutes, transferred to ¼-inch tape, and then segmented by hand following the convention shown in Figure 5. The length of the piece as a whole is determined by the cycle duration of this duration set (the set [1, 2, 3, 4, 5] shown in Fig. 5). Each permutational cycle lasts 7 seconds, resulting in a combinatorially-complete performance lasting 14 minutes.

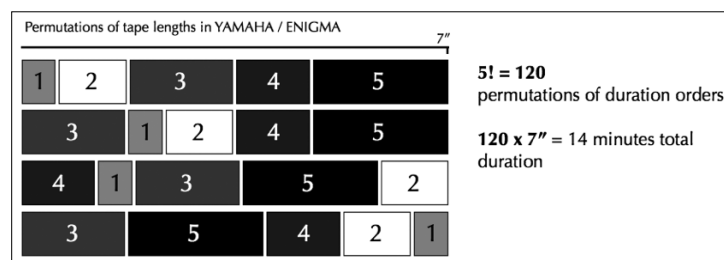


Figure 5. Duration permutations used for the tape soundtrack in *YAMAHA/ENIGMA*

This example is likely the most extreme, in the sense that the texture of the opening section was intentionally designed to create such a dense multi-temporal atmosphere that most casual listeners to the work would not consider the opening section to be melodic at all. One could certainly argue that to be the case as the music, rich in layered references and overlapping types of highly-contrasting sound material, seems to have been shattered in some way, creating a sense of “tuning in” to several different information streams simultaneously. Surpassing what Cohen (2005) terms “optimum complexity”, the density of the texture requires the listener to continually scan the various layers for meaningful relationships whilst the music is unfolding. I reference this piece here as the music does have, to my ear, an extremely strong atmosphere of *melodic potency*, as fragmentary and undeveloped as the whole may appear on first hearing. In a certain sense, this is the composer creating a complex pre-compositional framework and simply presenting it to the listener, with the pre-compositional structure intentionally designed to be a vehicle for pareidolic listening. The main feature that contributes to this effect is the equal weight generally given to each layer of material throughout the section. Typically, none of these layers is highlighted or otherwise pushed into the foreground in any way, creating a real sense of discrete, parallel processes (perhaps unrelated) that are being simultaneously observed. Despite this, there is actually a high degree of interpenetration between layers, blurring the lines somewhat as to which “instrument” is playing what. The transient melodic fragments that emerge from the complete auditory scene quite spontaneously, formed by bits of piano, the instrumentalists in the recorded soundtrack, and the occasional feedback created by the performer operating the mixing desk, are a product of our own cognitive groupings and associations, which we are making in real-time as the music unfolds.

4. Summary and directions for further research

For composers who choose to actively manipulate or otherwise interact with their chosen pre-compositional materials during the creative process, the question as to whether the pre-compositional materials are “found” in the strictest sense, or are rather constructed by some means, can often be functionally irrelevant in terms of subsequent working methods. In most cases the composer is trying to locate material or patterns of interest, and is thus perceptually grouping selections of these elements in potentially meaningful ways in the creative moment. Given pre-compositional materials of sufficient complexity, it seems logical to assume that the psychological phenomenon of pareidolia has at least some role to play in the identification of emergent structures during composition. In addition, given that composers’ choices during this initial “uncovering” process are likely to be highly indicative of their individual aesthetics, it also seems reasonable to conclude that the process of assigning *melodic* status to certain of these uncovered materials can often represent the most critical working-out of this approach, as the chosen melodic material will be, by definition, asked to occupy pride of place within the musical texture and may indeed serve as a primary cognitive focal point for the work. Put simply: for composers who place value on melody and who consider their work to be “overtly melodic” in some way, the manner in which they locate and refine pre-compositional materials which they perceive to be potentially melodic reflects most intimately not only the composer’s individual conception of *melodic possibility*, but also their deeper aesthetic predilections. Just as we recognise the existence of certain types of visual textures which are more or less given to pareidolic effect (perhaps depending on the distribution and morphology of the “random” shapes and patterns manifest in the texture), we recognise that there are likely to be concrete approaches to the creation of audio textures that lend themselves to pareidolic listening.

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Melodinės medžiagos lokalizacija prekompozicinėse struktūrose

Santrauka

Kompozitoriams, kurie prekompoziciniame darbo planavimo etape (o neretai ir vėlesniuose kūrybos etapuose) pasitelkia algoritmus, „susirankiotą“ medžiagą ar dar kokius nors gatavus harmoninius bei ritminius darinius, melodinės medžiagos komponavimas primena archeologinius kasinėjimus, mat potencialios melodinės ar protomelodinės struktūros atsidengia laipsniškai, ieškant galimų panaudoti kompozicinių struktūrų. Darbo eigoje „atrastos“ ir kompozitorių sudominusios struktūros vėliau gali būti išryškinamos ar įvairiai transformuojamos kaip melodinė ar pagrindinė užbaigto kūrinio teminė medžiaga. Tuo atveju, kai prekompozicinė medžiaga gana sudėtinga, atrodytų logiška prielaida, kad identifikuojant komponavimo procese ryškėjančias struktūras tam tikras vaidmuo tenka *pareidolijos* reiškiniui. Negana to, ypač turint omenyje, jog kompozitorių pasirinkimus šioje pirminės atrankos stadijoje veikiausiai nulemia jų individuali estetika, galima daryti išvadą, kad *melodijos* statuso suteikimas tam tikrai atrastai medžiagai dažniausiai parodo patį kritiškiausią tokio metodo taikymo atvejį, nes pasirinktai melodinei medžiagai pagal apibrėžimą skiriama garbingiausia vieta visoje muzikinėje faktūroje, ji gali tapti vienu svarbiausių kūrinio kognityvinių centrų. Paprasčiau tariant, jeigu kompozitoriai suteikia ypatingą reikšmę melodikai ir savo kūrinuose vienaip ar kitaip pabrėžia „akivaizdų melodiškumą“, būdas, kuriuo jie aptinka ir išgrynina prekompozicinę medžiagą, galinčią tapti melodine, ryškiausiai atspindi ne tik tai, kaip jis individualiai suvokia *melodikos galimybę*, bet ir gilesnes jo estetiškes nuostatas.

Straipsnyje šie klausimai nagrinėjami remiantis asmenine patirtimi ir iliustruojami pavyzdžiais iš naujausių autoriaus kūrinių, siekiant parodyti, kaip pasitelkus įvairius procesus „aptinkamas“ prekompoziciniuose dariniuose slypintis melodinis ir teminis turinys. Taip pat siekiama atskleisti galimai sudėtingą kompozicinius procesus grindžiančių traukos jėgų tinklą, susidarantį tarp dviejų prekompozicinės sąrangos lygmenų – harmoninių ir laiko struktūrų, ir patyrinti, kokį vaidmenį šios struktūros atlieka lokalizuojant melodinę ir pagrindinę teminę medžiagą kūrybinio akto metu.