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“The Application of Memetic Analysis to Electroacoustic Music”

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THE APPLICATION OF MEMETIC ANALYSIS TO ELECTROACOUSTIC MUSIC

Dr Mathew Adkins

Abstract

Richard Dawkins' concept of the meme was first formulated in his book *The Selfish Gene* (Oxford, 1976). In *The Memetics of Music: A Neo-Darwinian View of Musical Structure and Culture* (Ashgate, 2007), the first substantial text applying the concept of memetics to music, Steven Jan proposes a theory of music and an associated analytical method centred on the meme. For Jan, memes are a multitude of musical 'units' or 'replicators' that are transmitted by imitation both within, and across genres of music. Jan's study focuses primarily on the application of memetics to the analysis of classical music. This paper will assess the contribution of memetic analysis to electro-acoustic music.

The artist and sculptor Eduardo Paolozzi wrote that, 'all human experience is just one big collage' [1]. This idea is given a more rigorous grounding in the writings of memetic theorists such as Dawkins (1976/1989), Dennett (1990), and Jan (2007), who maintain that our culture is essentially an interconnecting network of memes. The all pervasiveness of the meme is clearly demonstrated by Richard Dawkins in *The Selfish Gene* where he writes that, 'examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or building arches...' [2] and that the three characteristics for the successful meme are its copying-fidelity, its fecundity, and its longevity.

Memes are neuronally-encoded cultural information and their phenotypic products (behaviour and artefacts) spread through a process of imitation from one individual's memory to another. The neuropsychologist, Paul Broks maintains that,

the harder one stares into the machinery of the brain, the starker the realisation that there is no one in there. There is no inner sanctum of the self. Neural networks have a life and logic of their own. There is no one running the show. The self is a shadow-puppet shaped by the firings of a hundred billion brain cells. [3]

Broks' writing strongly echoes Susan Blackmore's concept of the self as a vast collection of mutually compatible memes, or a memplex, that she terms the 'selfplex' [4] and Daniel Dennett who writes that the 'haven all memes depend on reaching is the human mind, but a human mind is itself an artefact created when memes restructure a human brain in order to make it a better habitat for memes.' [5]

Memetics thus challenges our idea of the composer and original conscious intentionality or agency. Jan writes that, 'memetics maintains that conscious intentionality, the fundamental attribute of the human mind, is not some unitary presence, but the resultant construct of a multitude of memes in constant competitive interplay.' [6] Jan also states that the identification of memes can tell us much about 'both local issues of musical structure and organization, and global issues of musical style configuration and its diachronic change.' [7]

In attempting to define the meme in music we need to identify what exactly is being replicated. When listening to baroque or acousmatic music, or free improvisation there are clear musical and gestural patterns that allow us to differentiate clearly between them. Similarly, it is possible to identify small units of sound material that occur in a number of works by different composers. Jan has identified such units in the music of Mozart, Haydn and Beethoven. The identification of memes in this instance facilitates a discussion as much about musical culture and its evolution as it provides a mechanism for understanding individual works. The identification of memes within works, or a genre of music has been widely debated. Dawkins questions whether the meme works at the level of a whole 'work, a movement, a tune, a bar, [or] a chord?' [8] Daniel Dennett states that 'these new replicators are, roughly, ideas.... complex ideas that form themselves into distinct memorable units.' [9] In an attempt to provide a more concrete definition of the meme and a more analytically useful unit of reference, Jan adapts Dawkins description of the gene to describe the musical meme as,

...any portion of [musical patterning] that potentially lasts for long enough generations to serve as a unit of natural selection...a...unit that is small enough to last for a large number of generations and to be distributed around in the form of many copies...a unit which, to a high degree, approaches the ideal of indivisible particularness. [10]

Musical patterning can operate at different structural levels. Examples are: 1) Structural memes – where composers employ a similar global structure repeatedly in a number of works. 2) Topic Memes – which involves the association of a musical meme with a verbal-conceptual meme (e.g. the chromatically descending tetrachordal bass in classical music is associated with death or grief. In electroacoustic music an example is the sound of crickets and exotic birds associated with the topic-meme of hot nocturnal-tropical environments. 3) Musico-operational memes – where a similar compositional or generative process is replicated between works despite the use of different musical material. 4) Low-level memes – where a short cadential or melodic figuration is replicated from work to work (e.g. in electroacoustic music one such example is the sound of a door opening and closing a musical phrase. Although this sound configuration can also act as a musico-operational meme where the sounds

are spectrally similar then low-level memes can be identified.

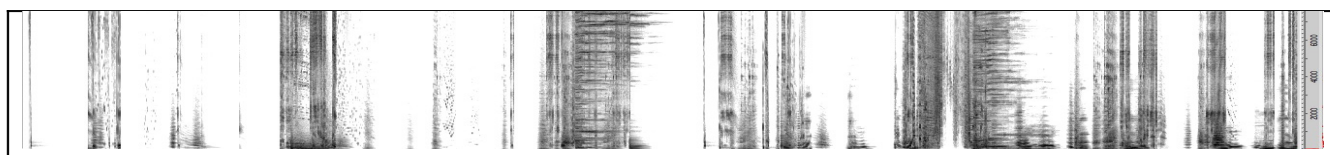
The assigning of memetic status is reliant on the identification of self-contained units or particles, regardless of the hierarchical level at which the musical unit in question is operating. Such identification is reliant upon splitting the audio stream into units. Segmentation is a large topic and beyond the scope of this paper. It has been covered elsewhere by Delalande (1998), Diamantides (2007), Jan (2007), Lerdahl and Jackendoff (19**). From a memetic perspective the subdivision into discrete units of information takes place by reference to

other copies or co-indexes of that information or meme, through the identification of that portion of the pitch, rhythmic or timbral continuum that is replicated... For such a particle to be regarded as a meme, a unit of imitation, one must, by definition, isolate the copy/copies – which one might term the co-equal/s – of the particle, from which the particle is imitated, or which is/are derived by imitation of the particle... It will be understood that particularity, the segmentation of the symbolic stream, can only be defined by reference to coequality, the presence of analogous segments of the same or another symbolic stream... [19]

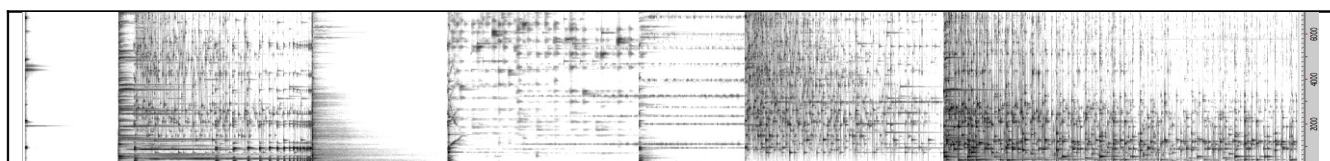
However, in electroacoustic music, the use of referential or anecdotal sound differentiates electroacoustic from purely acoustic music and implies additional criteria to enable the segmentation and perceptual grouping of memes. In instrumental music topics such as the *Sturm und Drang* of the Classical period involve the association of a musical meme with a verbal-conceptual meme. In electroacoustic music, topics often involve the association of referential real-world or anecdotal sound materials associated with a verbal-conceptual meme. An example of a topic-meme in electroacoustic music is the identification of homologous environments associated with the ‘urban’ or ‘exotic’. One of the characteristics of such topic-memes both in instrumental and electroacoustic music is that although it is possible to identify the topic as a replicated pattern of musical meme and verbal-conceptual meme in a stable co-adapted relationship, it is not possible to identify low-level musical memes that are common to all members of a particular topic-class. A ‘nocturnal-tropical’ topic-meme can be identified in: *Sud* by Jean-Claude Risset, *Hot Air* by Jonty Harrison, *Signé Dionysos* by Francis Dhomont, *Tangram* by Robert Normandeau, *Near and Far* by David Lumsdaine, *La Création du Monde* by Bernard Parmegiani, *Associations Libres* by Gilles Gobeil, *Les Couleurs de la Nuit* by François Bayle, and *La Disparition* by Christian Calon. The topic-meme appears in each work at different structural points. The topic-meme is pervasive throughout the works by Bayle and Lumsdaine, whereas in the others it is one topic-meme amongst many other sound elements.

In electroacoustic music a musico-operational meme can be identified as a replicated compositional process occurring at a deeper structural level than the surface low-level memes. A musico-operational meme occurs when compositional devices and ways of handling material are replicated between works even though the material itself may be quite different. Like topic-memes, it is not possible to identify low-level musical memes that are common to all musico-operational memes. Two examples will be given: the first demonstrates two musico-operational memes in abstract works; the second considers musico-operational memes occurring in works that use anecdotal material.

In Denis Smalley’s *Windchimes* (1987) and Andrew Lewis’s *Time and Fire* (1991) a number of musico-operational memes can be identified. The two illustrated here are taken from the opening and the close of the exposition of each work. The sonograms below (*fig. 1*) are taken from the first two minutes of each work. What they illustrate is a musico-operational meme in which a single opening attack/resonance gesture, followed by a period of silence is gradually developed during the exposition through the extension of the resonance and iterative textures into extended musical phrases. This musico-operational meme, and others throughout the work, such as the harmonic change at the climax of the work, give rise to a shared structural meme in these two works.



Andrew Lewis: *Time and Fire* 0'00 – 2'00



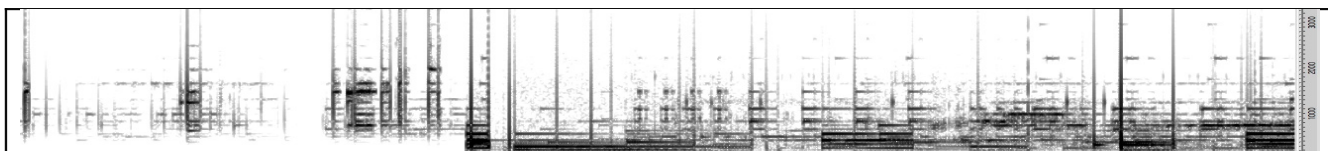
Denis Smalley: *Windchimes* 0'00 – 2'00

(Fig. 1)

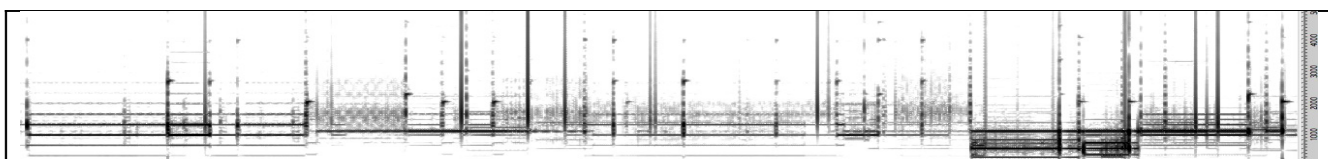
A second example occurs at the end of the exposition of these two works. In both Smalley’s and Lewis’ works the end of the exposition is marked by a strong low frequency attack that cuts off a musical texture that has been

building in both spectral density and gestural activity since the beginning of the work. This low frequency attack (occurring in both works at 3'29-3'32) is followed by a low resonance fading to silence and then an extended period of mid-high frequency sustained sounds, occasionally interrupted by attack gestures from the exposition.

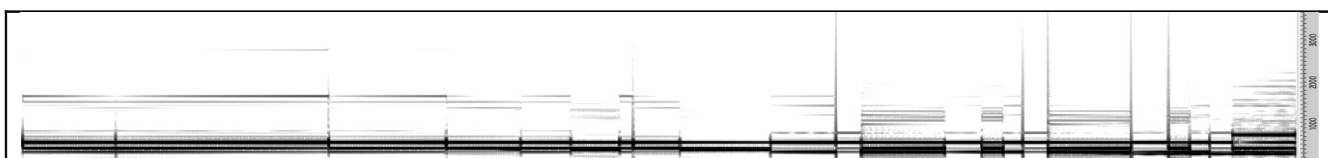
Once a composer becomes consciously aware of the various memes within a given dialect or idiom it is possible to use and manipulate these intentionally within a composition. One such example is in my own *Five Panels no.3* (2008) in which I consciously use a number of musical memes normally associated with differing dialects. One particular meme comprises the use of 'glitch' sound materials combined with a (filtered) mid-frequency quasi-tonal melodic line or drone. Co-equals of this meme occur in *audio avant avant (après edit)* by des Cailloux et du Carbone, *northern* by Taylor Deupree, *Formations* by Mileece, *arid* by Sogar, *closed circuits* by motion, and *Family Tree* by Off the Sky. The sonograms below (fig.2) each present twelve seconds of music:



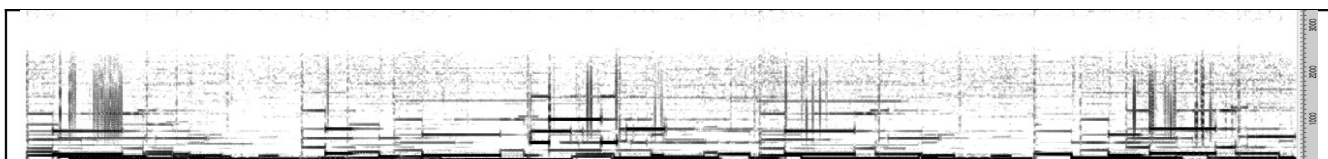
des Cailloux et du Carbone – *avant avant (après edit)* - 0'00-0'12



Deupree: *northern* - 0'00-0'12



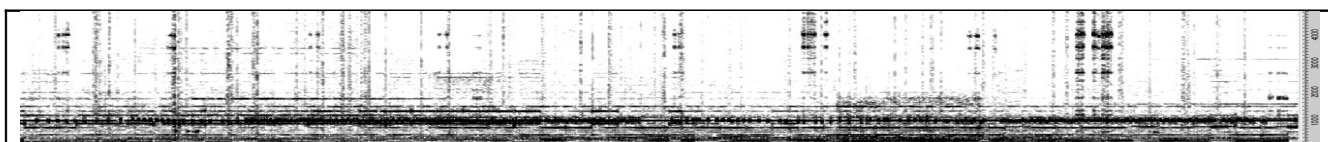
Off the Sky: *Family tree* - 0'00-0'12



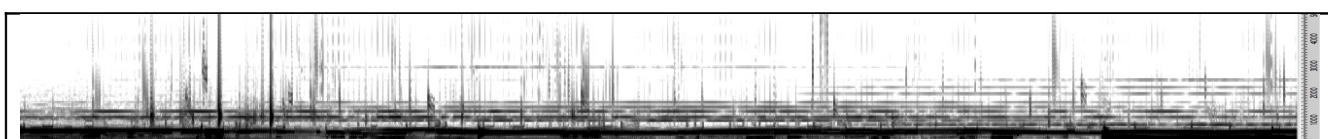
Motion: *Closed Circuits* - 0'00-0'12



Mileece: *Formations (track 1)* - 0'00-0'12



Sogar: *Arid* – (2'54-3'06)



Adkins: *Five Panels (no.3)* – (4'55-5'08)

(Fig.2)

The sonograms, though useful, are not the sole means of demonstrating coindexation and segmentation due to the difficulty in illustrating differences in timbre. In the first five examples the interruption of sustained tones by high spiking glitches is clearly evident. This similarity of sonic patterning regarding interruption of gesture, register and the similarity of structural positioning (they all occur at the beginning of the tracks) allows for the assigning

of memetic status. The latter two examples illustrate this same patterning but in a sonic texture in which this is one of a number of sonic layers.

Tracing the development of the glitch memes in these works not only enable us to analyse each of these tracks individually but also to demonstrate the evolution of dialects as the meme is propagated throughout the musical infosphere. Through tracing various 'glitch' memes in music since their inception with Yasunao Tone and Oval's work in the late 1980s and early 1990s we are able to trace these memes from their origins in a post-techno dialect into Fennesz's nu-gaze, the glitch-house of des Cailloux et du Carbone, the ambient experimentalism of Taylor Deupree, through to Bjork's *Vespertine*. Jan maintains that this is a part of the evolution of music - that composers,

replicate small units of the musical continuum either remembered from musico-aural experience or viewed as musico-graphical symbols on paper, navigating the straits between the siren voices of memorability and the rocks of plagiarism.' [25]

5. Conclusion

In this paper, I have briefly outlined the application of memetic theory and analysis to electroacoustic music and provided examples of how this method of analysis can illustrate not only how individual works can be discussed but how memetics can also elucidate larger issues related to musical culture and its evolution. To paraphrase Paolozzi, if all of our musical culture is one big collage then the meme is fundamental in our understanding of how it all fits together.

References

- [1] Paolozzi, E. (2000), *Writings and Interviews*, ed. Robin Spencer (Oxford: Oxford University Press)
- [2] Dawkins, R. (1989), *The Selfish Gene*, 2nd edn. (Oxford: Oxford University Press) p.192
- [3] Broks, P., (2008), Catalogue Essay for *Scribing the Soul* exhibition by Susan Aldworth, Standford Goudie Gallery, Newcastle
- [4] Blackmore, S. (1999), *The Meme Machine* (Oxford: Oxford University Press) p.231
- [5] Dennett, D. (1993), *Consciousness Explained* (London: Penguin Books) p.207
- [6] Jan, S. (2001), 'The Illusory Mozart: Selfish Memes in the Priests' Marches From *Idomeneo* and *Die Zauberflöte* in *International Journal of Musicology* 10
<http://www.goldbergstiftung.org/file/theillusorymozartcomplete.pdf> p.16
- [7] Jan, S. (2000), 'Replicating Sonorities: towards a Memetics of Music' in *Journal of Memetics – Evolutionary Models of Information Trans-mission*, 4.
http://jom-emit.cfpm.org/2000/vol4/jan_s.html p.1
- [8] *ibid.* 2, p.195
- [9] Dennett, D. (1995), *Darwin's Dangerous Idea: Evolution and the Meanings of Life* (London: Penguin Books), p.344
- [10] *ibid.* 6 citing Dawkins [2] pp.28, 32-33
- [11] Dawkins, R. (1983), *The Extended Phenotype: The Long Reach of the Gene* (Oxford: Oxford University Press) (repr. From London: W.H.Freeman and Company Limited, 1982), p45-46
- [12] Tenney, J. & Polansky, L. (1980), 'Temporal Gestalt Perception in Music' in *Journal of Music Theory* 24 p. 206-7.
- [13] *ibid.* 12, p.208
- [14] Rowe, R. (2004), *Machine Music*, (Massachussets: MIT Press) p.163
- [16] Jehan, T. (2005) 'Event-synchronous music analysis/synthesis' in *Proceedings of Digital Audio Effects Workshop (DAFx)*, Naples, Italy
- [15] *ibid.* 14, p.165
- [17] Delalande, F. (1998) 'Music Analysis and reception behaviours: *Sommeil de Pierre Henry*' in *Journal of New Music Research*, vol. 27, no. 1-2, p.20
- [18] Nattiez, Jean-Jacques (2004), trans Dunsby, J., *The Battle of Chronos and Orpheus: Essays in Applied Musical Semiology*. (Oxford: Oxford University Press), p.254 citing Chion, M. & Riebel, G. (1976), *Les Musiques electro-acoustiques* (Aix-en-Provence: INA-GRM-Édisud) p.58
- [19] *ibid.* 7, p.18
- [20] Roy, S. (2003), *L'analyse des musiques électroacoustiques: Modèles et propositions* (Paris: L'Hartmann, Univers Musical)
- [21] Diamantides, P. (2007), 'Integrating analytical with compositional processes' (unpublished Masters Thesis, Institute of Sonology, Royal Conservatory, The Hague)
http://www.koncon.nl/public_site/220/Sononieuw/NL/thesis-pdf/Integrating%20analytical%20with%20compositional%20processes.pdf
- [22] Agawu, V. (1991), *Playing with Signs: A Semiotic Interpretation of Classic Music* (Princeton: Princeton University Press), p.130
- [23] *ibid.* 11, p.283
- [24] Moradi, I., (2004) *GTLCH Aesthetics*,
http://www.oculasm.org/glitch/download/Glitch_dissertation_print_with_pics.pdf p.10
- [25] *ibid.* 7, p.14