Rhythm in Acousmatic Music

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'Rhythm' is often equated with 'metered pulse'; as the latter is often eschewed by contemporary music, including acousmatic music, this is often assumed to mean an absence of rhythm. This article proposes that, in fact, acousmatic music does indeed contain rhythmic qualities, and further, that rhythm is one of the dominating forces of acousmatic music, even when pulse or metre at first glance appear to be lacking. This stems from the roots of acousmatic philosophy in phenomenology and a steady focus on our experience of the world around us. Importantly, this points simultaneously towards rhythmic qualities of our environment and towards rhythmic qualities of our embodied experience of that world, due to rhythmic aspects of our bodies, our perception and our cognitive faculties.

1. INTRODUCTION

Acousmatic music is not generally considered to be a particularly 'rhythmic' form of music. In fact, quite the opposite: much acousmatic music generally avoids established rhythm, pulse or beat, in much the same way that it often eschews open melodic or, especially, harmonic structures. To what extent, varies significantly between composers and works; however, it is fair to say that, as a general rule, acousmatic music employs a sufficient degree of abstraction with regards to more 'traditional' musical parameters, rhythm included, to make it an unlikely subject for a discussion of rhythm.

I will propose here, however, that despite the initial appearance of a lack of rhythm, acousmatic music does indeed contain rhythmic qualities, and that, in fact, rhythm is one of the dominating forces of acousmatic music.

Immediately, this question hinges on how we define our terms: how we define 'rhythm', and how we define 'acousmatic music'. We will be considering some of the relevant definitions of 'rhythm' in due course, but we should begin by clarifying that we are primarily interested here in a particular area of acousmatic music.

Over the decades we have seen musique concrète and acousmatic music change and transform in a variety of ways; sometimes we can talk about an evolution of the genre, but sometimes it is simply a question of changing tastes and shifting trends. Over the last twenty years approximately, acousmatic music has experienced what we might call the 'rhythmic turn', much as we might talk about a 'timbral' or 'spectral turn' prior to that. In this 'rhythmic turn', we have seen metre and pulse become a great deal more prevalent than it might have been in the decades prior. Of course metred pulse has never particularly been a taboo in acousmatic music, but, like melodic materials or harmonic materials, rhythm was perhaps, at least initially, a territory that musique concrète and acousmatic music could reference or access, but that perhaps was not central to the art form.

The general attitude to rhythm across musique concrète and acousmatic music is one that is shared across much of electroacoustic practice, and indeed much of contemporary music more generally: a general sense of abstraction with regard to the more regimented, grid-like structures of traditional tonal music. 'Rhythm' is often equated with 'metered pulse'; as the latter is often eschewed by contemporary music, including acousmatic music, this is often assumed to mean an absence of rhythm. This is, however, critically and categorically false: there are many other very significant aspects of rhythm, beyond the simple quality of metre, and these aspects are often central to much contemporary music, and certainly to acousmatic music.

In discussing rhythm in acousmatic music here, we will not be addressing the more clearly metred or pulse-driven music of the 'rhythmic turn', but are instead primarily interested in a more 'traditional' subset of acousmatic music – carved out in musique concrète, anchored by the somewhat abstract shaping of the 'objet sonore' (Chion 1982: 29), and maybe less likely to make use of established rhythm, pulse, or beat. This is certainly not intended as any attempt to limit, or to define, acousmatic music; rather, this territory is perhaps somewhat unique to acousmatic music, and as a result might benefit from closer theoretical examination, compared with those areas that it shares with instrumental genres that have often been very adequately explored in the existing musicological literature.

The most important key to acousmatic rhythm, however, does not lie here, in the fluid temporal attitudes to rhythm employed in some areas of contemporary instrumental musical; it lies, rather, as with much of acousmatic philosophy, in the rhythmic qualities of the world around us – or, perhaps more accurately, in our perception of the world around us.

To some extent, the thoughts here on acousmatic rhythm represent changes in my own perspective over the course of my education and my experience as a

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composer. This began with a belief that acousmatic music generally avoids rhythm; that rhythm had been deliberately sidelined early on, much like openly melodic or harmonic structures, as part of the genesis of the art form. However, as time went on, I began to have some doubts about this seeming absence of rhythm. In part this has to do with redefining rhythm – moving away from my own initially over-simplified idea of what rhythm is – but it is also a question of realising that we are responding to rhythm in ways and in places that are not always immediately apparent.

Acousmatic composers have likely all had the experience of moving sonic materials around on a timeline in order to arrange them into sound objects or into longer phrases, only to find that, despite our firm compositional conviction that these materials are well suited to join together to form a compound unit, they are instead stubbornly refusing to fuse, to lose their discrete identities and become a single cohesive musical unit. We might also recognise the related experience of placing phrases in a longer formal sequence, seeking the appropriate placements and spaces between them that will make it all seem natural, only to find that these magical placements and relationships are proving elusive. In many of these cases, when the sound materials finally do lock together, or when the perfect durations of pauses between phrases are found, it is often extremely small differences in placement or duration that make the difference between a haphazard collection of sonic scraps, and an elegantly and invisibly fused gesture or phrase, or a graceful ballet from phrase to phrase to form a larger section of a piece.

As we will see, the source of this almost mystical fusion, so painfully elusive at times, is compound, and therefore difficult to pin down with any degree of objectivity. In broad terms, it seems to be the result of a combination of two elements: our embodied sense of real-world gesture and our culturally learned sense of rhythm. If either of these is contradicted by the placements and timings of the sound object, gesture, phrase or formal section we are attempting to craft, then these elements refuse to 'come together'; when, at last, the elements align with our senses of rhythm and of embodied gesture, then they suddenly appear 'natural' and 'right', and all previous tensions between said materials seem to vanish. David Huron ascribes this to the relative degree of predictability in the timing of the event, a quality that may well be a question of musical rhythm, but may also be a question of embodiment, or, indeed, of anything that grants us a particular expectation based on familiarity (Huron 2008: 177–99).

2. TEMPORAL LEVELS

Very importantly, however, it could be argued that 'embodied gesture' and 'musical rhythm' are not, in fact, two distinct qualities, but rather are two sides of exactly the same coin. For example, we might turn to the range of time scales in music proposed by Curtis Roads, beginning with the broadest scale (at its most extreme), and zooming increasingly closer, to arrive at the smallest subdivisions: 1) Infinite; 2) Supra; 3) Macro; 4) Meso; 5) Sound Object; 6) Micro; 7) Sample; 8) Subsample; 9) Infinitesimal (Roads 2001: 3–4). It could be argued that 'gesture' and what is normally referred to as 'rhythm' are simply different steps in Roads's categorization – for example, we might equate 'musical rhythm' with Roads's 'Micro' level, and 'gesture' with Roads's 'Meso' level. A consideration of acousmatic rhythm would therefore be likely to focus on these two levels, possibly extending to include level six 'Micro' and level three 'Macro'. Schaeffer confirms this in his discussion of 'duration', distinguishing between 'short', 'medium' and 'extended' durations, which we might usefully map to Roads's 'Micro' (short), 'Sound Object' & 'Meso' (medium) and 'Macro' (long) (Andean 2016).

Importantly, Schaeffer specifies that 'duration' is a question of 'psychologically experienced' time, in contrast with 'chronometric' time (Chion 1983: 134), a distinction for which the Greek language uses two different words: *chronos*, 'chronological time, the concept of time as a clock mode', and *kairos*, 'a temporal dimension of meaning, informing the correct understanding and interpretation of events, perceptions, actions, and cognitions' (Thaut 2005: 16). This, I would argue, is the key to understanding rhythm in acousmatic music: acousmatic rhythm is much more heavily involved with *kairos*, where metred or pulse-based music is heavily oriented towards *chronos*.

3. TEMPORAL EXPECTATIONS

The connection between rhythm and *kairos* is closely linked to the question of anticipation. One of the great successes of acousmatic music is in its capacity to establish anticipation and expectation, and thereby to deny it when so desired, without recourse to the more rigid patterning of traditional musical forms. This applies very much to rhythm: one of the strengths of rhythm is that it establishes a framework for temporal expectations, which can be supported or denied, offering the composer one of the central tools for shaping the listener's experience. So, if we remove metre – that is, if we remove a fixed rhythmical framework – do we thereby lose the capacity for temporal expectation? Initially I would have argued yes, but now I would propose that the shift from *chronos* to *kairos* does not in fact automatically result in the loss of the capacity for anticipation and expectation. In other words, we are perfectly able to build anticipation and expectation without recourse to a fixed temporal grid.

There is some useful research into music cognition that applies very well indeed to acousmatic music.

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For example, research into 'nonperiodic temporal expectations' as discussed by David Huron: 'Although periodicity helps listeners to form temporal expectations, periodicity is not necessary for the formation of such expectations. It is important only that the listener be experienced with the temporal structure, and that some element of the temporal pattern be predictable. An illustration of this point can be found in the expectation for "bouncing" rhythms' (Huron 2008: 187). This, it should be noted, serves as an excellent description of the general acousmatic attitude to rhythm. '[T]he basis for temporal perception is *not* periodicity – but *predictability*. The purpose of a good temporal representation is to predict the appearance of future stimuli, not to predict the start of a periodic cycle' (ibid.: 199).

As an example of a key application of this in acousmatic music, we might consider what we might call the 'acousmatic cadence':

> A common way to increase the feeling of anticipation (and the accompanying tension) is through delay. By delaying the advent of the expected event, the state of anticipation can be sustained and so made more salient for a listener ... Perhaps the epitome of contrastive valence in music is the climax. In addition to using 'delay-of-the-expected' to increase tension, climaxes often make use of a vast array of devices to evoke a negatively valenced limbic state prior to the release. (Huron 2008: 328)

> The characteristic slowing of natural bodies (such as rolling objects) provides a familiar temporal schema: emulating the natural trajectory of a slowing object allows for increasing delay while simultaneously making the delay process itself predictable. (ibid.: 368)

This underlines a fairly classic example of how acousmatic composers craft their gestures to control the listener's response, and demonstrates quite well one of the ways in which acousmatic music has found new territory for tension/release mechanisms without relying on tonally learned musical languages. It is also a perfect example of how rhythm is used as a key structuring element in acousmatic composition.

4. ECOLOGICAL MODELS

Of course, this does not happen in a vacuum; the capacity for anticipation/expectation, and thereby for tension and release, still requires some kind of common framework or understanding that is shared by both the composer and the listener. Research and theory in a number of fields – such as ecological psychology (Windsor 1995; Clarke 2005) and music cognition (Huron 2008) – suggest that musical notions such as 'rhythm' are, in fact, simply cultural expressions of our embodied experience of ourselves and of the world, rooted in primal and innately 'rhythmical' bodily acts such as walking, breathing, or our heartbeat. R. Murray Schafer (1977) extends this intuitive sense of rhythm out into the soundscape, linking our concept of musical rhythm to both our biological rhythms of heartbeat and footstep and the diurnal rhythms of the ecosystem. Thus we have simply replaced the shared language of tonal music with a shared sense of embodiment and ecologically grounded experience of the world, which now forms the basis of this capacity for acousmatic gesture and acousmatic expectation.

Consider, for example, the compositional experience described above, of moving materials around on a timeline – recorded materials, fairly abstract, that the composer is working to shape and mould into a sound object or into a phrase, or to place multiple phrases into some kind of relation with one another. Because these materials and gestures do not have a pulse or metre, the composer feels free to shape, to stretch, to expand and to contract, freely and as they see fit. One is struck, however, by the almost overpowering magnetic force the materials within a sound object or a phrase tend to have towards particular points and particular temporal relations, often with a remarkable degree of precision, in the millisecond range. This is, I think, a familiar situation for many acousmatic composers: we are moving our materials around, but they refuse to gel, until suddenly they snap to the perfect spot, to the perfect temporal relationship with the surrounding materials, and immediately they are perfect: no other relationship is possible, that material seems to have been destined be at that exact spot, and the entire phrase or object becomes natural and inevitable. Personally I find this really quite a profound feeling of epiphany, each and every time.

This sense of epiphany might be explainable by a combination of two distinct cognitive effects: one is the positive valencing that comes from an accurate 'prediction response' – that is, when you hear an event at the point that you expected to hear it, it 'feels good' (Huron 2008: 184) – coupled with the observation that 'accurate expectations about when a stimulus might occur help the listener in resolving the "what" of perception' (Jones, Moynihan, Mackenzie and Puente 2002; Huron 2008: 177) – meaning, in our case, simply that the sound object does not properly 'take shape', and therefore remains unrecognised and ineffective, until it is timed correctly. Obvious enough maybe, but combined with the positive valencing, we have an object or phrase that we suddenly somehow 'recognise', and that suddenly somehow 'feels good'.

So, we can agree with Windsor that it is indeed our sense of embodiment and ecological experience of the world that shapes our understanding of these temporal relations: the bouncing ball, the drop followed by an impact – all of these form temporal gestalts that we unconsciously intuit, and that guide the composer's hand and shape our listening experience. However, these ecological models of gesture, rhythm and timing

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in fact generally include a far greater degree of flexibility than what we experience on our compositional timeline. In other words, the incredible precision that our sound materials often demand as we try to follow our intuition in placing those materials in relation with one another, seems to be far beyond the demands of the much more flexible forms imposed on us by embodied or ecologically grounded models. This seems to point once again back to 'chronos', and the more demanding tyranny of the clock, of metre, and of pulse.

However, Windsor points out that such dichotomies are perhaps not the contradictions that they at first appear to be. Windsor (1995) calls into question the perhaps arbitrary distinction between 'nature' and 'culture' that we sometimes find in ecological theories, pointing out that we are tuned by our embodied experience of our environment, and we bring this intuitive knowledge to our art. But culture is just as much a part of our environment as anything else. 'Cultural' sound is not somehow sidelined from our environmental perception and set aside; whether it is music coming from a car radio as it drives by, or an orchestral performance in a concert hall, these are every bit as much a part of our environment as anything else. As a result, embodied learning and ecological understanding would naturally be just as much guided by the music in our environment as by any other environmental factors. So, to return to the topic at hand, the more flexible expectations derived from our intuitive sense of embodied gesture, object behaviour and so on, and the more rigid expectations rooted in fixed pulse and metre, are equally comfortably contained within ecological models, since music is as much a part of our environmental learning as anything else. *Chronos* and *kairos* are therefore not contradictory, but exist side by side, and very likely inform each other, to collaboratively construct our sense of rhythmic anticipation.

5. THE ACOUSMATIC CONDUCTOR

A potentially interesting example of this comes via a personal anecdote, from a composition session some years ago with acousmatic composer Gilles Gobeil. Gobeil was critiquing a recent work of mine – a fairly typical concrète-ish work – and commented that a particular gesture a few minutes into the piece was in the wrong place, because I had placed it on the downbeat, whereas it would be more powerful if I placed it on the upbeat. This was quite surprising to me at the time, as at no point did the work contain or reference any metre or pulse: it was made up of gestures and phrases that were free-floating and not in any fixed relationship with one another. I was therefore quite surprised at the sudden appearance of notions of 'up-beat' and 'down-beat' in what I believed to be an abstract work. In response, Gobeil started the piece at the beginning, and began to conduct – an act that he apparently does periodically while composing himself, but that personally I found entirely surprising and would have found completely unimaginable prior to seeing it. And, of course, he proved to be quite right: the gesture in question did indeed fall cleanly onto a downbeat. In other words, Gobeil had intuitively and accurately identified a pulse in my own work that was entirely unknown to me. This was striking, not only as a demonstration of the clarity and insight of Gobeil's listening, but also because it clearly indicated that I had unconsciously composed an entire work to a clear pulse, without any awareness that I was doing so – in fact, while completely convinced that I was doing no such thing.

Understandably, I asked myself: how is this possible? Have I so completely internalised such a refined sense of musical rhythm that it has completely shaped my acousmatic composition, without me even being aware of it? And, what do we then make of the embodied and ecological models that I had assumed were driving my decisions regarding gesture or phrase length and placement, etc., which appear contradicted by the sudden awareness of previously hidden pulse and rhythm? The answer, perhaps, lies in the above insight taken from Windsor: in the reconciliation of *chronos* and *kairos* as avatars for culture and nature respectively, as equally suitable for ecological consideration.

While the clear conclusion from the above anecdote appears to be that acousmatic music is, indeed, a profoundly rhythmic art form, Gobeil in fact proposes a slightly different perspective. When I interrogated him a bit about his conducting, he responded that, in his view, it is not that acousmatic music is inherently rhythmic, but rather that it is the world itself that is inherently and fundamentally rhythmical, with sounding events aligned or in rhythmical correspondence to an alarming degree: seemingly random events in the world, he argues, are in fact in rhythmic relationships with one another. Gobeil believes the soundscape, be it urban or natural, to be inherently rhythmic, in which everything finds its own rhythmic position – an idea that is essentially a kind of rhythmic 'niche theory' (Krause 1987). Acousmatic music is therefore rhythmic in nature because the world is rhythmic in nature, with the rhythmic qualities of the world leaking into acousmatic works; for example, through recorded materials taken from the world around us. According to Gobeil, acousmatic music is not rhythmic because we have composed it that way; acousmatic music is rhythmic because the world from which it draws its material is itself naturally and inherently rhythmic. In this, Gobeil is perhaps extending R. Murray Schafer's ideas, described previously, to an interesting extreme, while simultaneously echoing Pierre Schaeffer's foundational phenomenology, but with a somewhat Platonic twist, with Gobeil positing acousmatic composition as an aesthetic shadow or reflection of the world itself.

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6. RHYTHM COGNITION

Now while this is a rather marvellous proposition, we may need to modify it a bit. To begin with, we might ask ourselves if the rhythm we are hearing is a question of composed rhythm, or of received rhythm? In other words, just because we hear it, does not mean it is there.

All our knowledge of the world flows through to us via our senses, via our perception and via our cognitive filtering. To some extent, the rhythmic qualities of the world as described by Gobeil and R. Murray Schafer may be less an ontological fact, but rather a question of our perception and our cognition being rhythmically 'primed': that we are tuned to scan the world for rhythmical qualities, possibly due to characteristics of human speech and other forms of communication, or simply as a consequence of pattern-seeking (Berlyne 1971; Thaut 2005). We are primed to find patterns when they are there, and our processing tends to perceive, and even to impose, patterns when they are not. In this sense, our mental obsession with rhythm is simply a subset of this broader obsession with pattern (Thaut 2005, 2009; Huron 2008). In part this is likely a consequence of language: our brains are 'hardwired' for language and for communication, and the rhythmic properties of language are among the key elements that serve to distinguish language from the rest of our soundworld, allowing us to locate and identify language when it is present in a soundfield. So it is quite natural that some part of our brain is constantly on the lookout for rhythm.

7. UNDERLYING PULSE

Acousmatic music, in fact, provides an almost ideal case study of this phenomenon. For example, what Gobeil demonstrated by conducting the piece was an 'underlying pulse', which took me by surprise because I had not put one there; if we look at the research into the cognitive reception of musical rhythm, we find some interesting answers.

First of all, it takes extremely little to establish an underlying pulse; in fact, only a very few iterations – the minimum number required to intuit a pattern, likely just a few beats. Once established, the brain in essence 'repeats' this pattern automatically 'until further notice, that is until a specific command to stop, or to modify, is given' (Clynes and Walker 1982: 177).

> In a complete series of sounds the first perceived pattern tends to impose its structure on the later patterns. It becomes a privileged form of grouping. (Fraisse 1982: 162)

> The time-form pattern of a beat is printed out repeatedly without further specific attention unless a special modifying command is given. (Clynes and Walker 1982: 178)

> Repetition occurs without continuing attention once the form of the beat is begun, so that attention may be focused on other aspects of the music, yet it forms a partially aware and partly subconscious basis to the music. (ibid.: 212)

> In order to avoid this effect, it is necessary to use artifices so that no pattern imposes itself due to its initial position. (Fraisse 1982: 162)

In light of these observations, we can propose that, in acousmatic music, it is not that the composer establishes a fixed pulse, metre, or beat for the work, but rather that the listener, in the first moments of the work, latches onto any available rhythmic clues they might unearth from the very first sound materials, and then unconsciously retains that pulse or beat for the duration of the work (or possibly until something sufficiently dramatic happens to force them to shift to a new or altered sense of pulse or rhythm). In Gobeil's case (and possibly also the case for many acousmatic composers), it is simply a question of becoming conscious of this otherwise unconscious process, taking a metre that is somehow implied, however tenuously, by the very first sounds heard in the piece, and carrying it with them for the duration of the work.

8. THE RHYTHMIC BRAIN

On the other hand, it is possible that it is not only that we are looking for rhythm, but also that our perceptual means are themselves inherently rhythmical, and that as a result all information coming in is filtered through and charged with this inherent rhythmical quality. In other words, the fact that we find rhythm everywhere is perhaps not so much a characteristic of our environment, but rather a consequence of rhythmical characteristics of our means of perception (Mauro 2006). While it might prove difficult to properly verify Gobeil's proposal, the rhythmic bias of our perceptual and cognitive apparatus is, in fact, well established. In other words, the world may or may not be inherently rhythmic, but what we can say with some certainty is that, first of all, we are primed to scan for and to locate rhythm, but even further, our perceptual and neural mechanisms themselves tend to impose rhythm onto what we perceive (Thaut 2005; Mauro 2006).

The brain itself is rhythmic in nature. This not only goes part way in explaining our readiness to perceive rhythm, but also suggests that our perceptual processes may be imposing rhythm onto what we perceive:

> The brain is particularly tuned to auditory stimuli with rhythmic content ... These responses are explained by viewing the brain as a dynamic system that operates according to rhythm-based principles ... The rhythmic nature of cognition and action is probably most evident in music performance ... It is this fundamental

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> relationship between music and neural function that underlies the brain's exquisite sensitivity to music. (Mauro 2006: 164)
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> The perception of rhythm and formation of rhythm may be biologically based more on the entrainment of oscillatory circuits in the brain than on actual acts of measurement in terms of timekeepers that are often conceptualized and modelled as clocks, pulse counters, or stopwatches in the brain. (Thaut 2005: 6)
>
> "Musical rhythm rapidly creates stable and precise internal templates for temporal organization of motor responses. The motor system is very sensitive to arousal by the auditory system. Neural impulses of auditory rhythm project directly into motor structures. Motor responses become entrained with the timing of rhythmic patterns. The entrainment process can be modelled well via resonant network functions and coupled oscillator models. The motor system has access to temporal information in the auditory system below levels of conscious perception. Rhythmic synchronization appears to emerge in a fuzzy biological system characterized by stochastic time fluctuations that are embedded in self-correcting, nonlinear coupling functions. (Thaut 2005: 57)

In other words, we find an enormous entrainment loop: auditory rhythm leads to neural rhythm leads to motor response rhythm. Rhythm in the world, in what we hear, drives biological rhythm in us, and 'tunes' us to interpret rhythm in what we perceive, resulting in a rhythmic ecological feedback system.

This is somewhere that acousmatic music offers some intriguing potential as a research tool. Acousmatic composition enacts and makes concrete this relationship described above, by inserting the deliberate intentional act of creation into the loop. This comes back to the question raised above, whether we are talking about composed rhythm or received rhythm; in light of what we have just seen, this is likely a false dichotomy, in that it is just as much a human brain that is composing the work, as it is a human brain that is listening to it. Both are largely being driven by the same phenomena.

So, we can insert the composer into our feedback loop: environmental rhythm 'tunes' me and 'primes' me to experience rhythm; as a composer, I now take this sound material that I experienced as rhythm, and place it together with other materials, which I likely also experienced as rhythm; then I present it to you, the listener, in which case it becomes part of your environment, so its embedded rhythmicality tunes you and primes you for rhythm. And on and on, in an enormous feedback loop that is part biological, part social.

Rhythm in acousmatic music is therefore a part of a much larger cycle, in which it is both a cause and a consequence of our sense of rhythm in the world.

9. CONCLUSION

To summarise: we have highlighted a number of areas in which current research helps to explain or clarify aspects of acousmatic rhythm. These include:

- It is predictability, rather than periodicity, that determines our experience of rhythm; this supports a rhythmic interpretation of acousmatic music's approach to the sound object, and affords one of acousmatic music's central sources for tension-and-release via expectations either supported or denied.
- The opening moments of a work, should they contain any trace of rhythm, tend to establish an underlying pulse, which is often unconsciously maintained by the listener throughout the remainder of the work.
- Our experience of 'rhythm in the world' is based on a feedback loop between two inter-related processes: a cognitive predisposition to search for patterns, and the rhythmic characteristics of our own neurobiological processes. This experience is imported into the acousmatic work according to the composer's response to these processes, and is then established and reinforced by the listener in accordance with their own processes.

The thorough grounding of acousmatic music in perception and experience has allowed the genre to evolve in close partnership with these and other cognitive, ecological and biological processes. I believe it is this partnership that grants acousmatic music much of its power and depth, and that makes acousmatic listening such a profound and moving experience. Rhythm has here provided us with a strong example of this partnership at work, in a manner that helps us to understand the acousmatic listening experience, but that also offers composers some possible insights if they wish to control, guide or shape the listener's experience of acousmatic rhythm.

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