Steve Gamble: Listening to virtual space in recorded popular music

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Abstract

Research on virtual recorded space manifests a division between production- and reception-based approaches. I address a number of issues which complicate discourse across perspectives and outline why a convergence may be beneficial to research in various disciplines. I consolidate previous models of listening, including Moore (2012) and Zagorski-Thomas (2014), and argue that the ecological approach to perception and research on embodied cognition may provide a useful theoretical framework for bridging this divide. This is exemplified by music analysis and interpretation of Karnivool's (2009) 'Goliath'. I discuss the virtual recorded space that the track affords me and consider how listeners may narrativise the track's personic environment according to ecological/embodied principles.

Introduction

In recent years, popular music scholars have increasingly turned their attention towards the virtual spaces of recorded music. The emergence of ASARP as an institution, along with its conference and journal, particularly stimulates further research on this topic. Researchers of varying disciplinary perspectives have diverse aims for such work, from providing guides for mix spatialisation to developing theoretical models of listener experience. Kraugerud (2017), in a recent review of approaches to virtual space, notes that a close relationship between space and meaning is often theorised in academic work. Indeed, it has been widely observed that the imagined spatial layout of any given track appears to shape that track's meanings for its listeners (Moore: 2005, 2012; Clarke: 2013; Zagorski-Thomas: 2014). Investigations into virtual musical space may benefit from addressing how listeners experience environments more generally (Windsor and de Bézenac: 2012; Brøvig-Hanssen and Danielsen: 2013). Furthermore, the underlying question of this research combines issues of creativity, technology, perception, and cognition: how does virtual space mean?

There are two dominant perspectives for investigating space and meaning in recorded music. It is often tempting to portray them as binary oppositions: the 2017 ASARP conference, where I presented a formative version of this article, titled the theme 'aesthetics versus technology'. Related characterisations of this dualism include reception versus production (Zagorski-Thomas: 2014, pp.2–4), and interpretation versus expression (Brackett: 2000, p.15). This dichotomous structure seems to emerge principally from disagreement between two overarching disciplines. In day-to-day practice, the seasoned recordist depends upon their understanding of spatial techniques in order to produce tracks which appease artists and labels. They may claim, therefore, that specific production or mix decisions affect a given musical meaning. By contrast, the music studies academic may stress the potential for any particular track to mean differently for different listeners. This responds to a concern for subjectivity, cultural context, and the body, following poststructuralist thought in the new musicological turn. The gulf between the two perspectives is crossed in ASARP meetings to productive ends, but remains an unavoidable consequence of addressing research foci which span so many disciplines. Each provides valuable contributions to the analysis of virtual recorded space, but uniting varied approaches under a single theoretical framework has proven a challenge (Vad: 2017). Conceiving of these positions 'versus' one another particularly illuminates the difficulty of combining these historically distinct perspectives, practices, and ways of musicking.

As it was developed over the last two decades, study of the art of record production deemphasised some dominant musicological concerns in order to prioritise research on creative recording practices in the studio (Cottrell: 2010). Although some work grouped under the ARP label contemplates record listening, the clue is, of course, in the name: record *production*. Zagorski-Thomas (2014, pp.1–46) examines the disconnect between established research traditions and the new ground that ARP attempts to cover, particularly the creation of recorded music. Many publications which address recorded space principally inform practice, varying from technical manuals to more musicologically situated investigations. To give a representative range of examples: Hodgson (2010), Rumsey and McCormick (2014), Huber and Runstein (2018) are technical guides, closely associated with audio engineering and the Audio Engineering Society; Lacasse (2000), Young (2015), and Mynett (2017) are somewhat more theoretically grounded; Chanan (1995), Théberge (1997), Zak (2001), Doyle (2005), Greene and Porcello (2005), Moorefield (2005), Katz (2010), Schmidt Horning (2013), and Papenburg and Schulze (2015) are historically, culturally, or ethnographically oriented works. Most importantly, ARP called for the recognition of record production as a form of artistic creation, further challenging established notions of high and low art in music studies. Research consequently focuses upon the conditions, technology, and interpersonal negotiations of studio creativity.

Meaning in virtual recorded space

In this record production work, recordists relate to the meanings of recorded virtual space in a very different manner to the privileged position that some musicologists (and general listening publics) provide them. The former relationship is exemplified clearly by Moylan (2015, p.60), who claims that "the listener's ability to correctly interpret the sounds of the musical message impacts their understanding of the intended artistic meaning of the music", his work also addressing "the factors that limit the listener's ability to effectively interpret the artistic elements and understand the intended musical message (or meaning of the music)". This intentionalist or authorial view of musical meaning presupposes a very specific ideological configuration: musical creators intentionally place messages into an artwork, where they inhere, and listener interpretation is correct insofar as it focuses upon those meanings. Fales (2005, p.173) would reject such an account, noting that a composer "cannot enter the perceived world of his [*sic*] listener". Of course, the author has long been dead in critical approaches to interpretation (Wimsatt and Beardsley: 1954; Barthes: 1977). It is understandable to privilege the authorial position in record production, where recordists' work is evaluated on the basis of successfully interpreting the desires and intentions of performing artists (at least in traditional recording practices, whereby producers/engineers and artists are separate labour roles). Discussions regarding song meaning may therefore provide guiding principles in arranging, engineering, and mixing processes: the spatial layout of the track may be designed with certain interpretations in mind. The resulting approach to music listening is ultimately a pragmatic consideration rather than a theoretically informed account of how listeners understand recorded tracks. A relative of this perspective can be found in Bennett (2015), where the classification of the Sex Pistols' *Never Mind the Bollocks…* as rock, not punk, depends upon the successful realisation of its producers' intentions. Intent does not necessarily materialise in meaning for the listener, however. It may potentially be factored into a listener's wider understanding of a work, but this involves making a second-order interpretation (Moore: 2012, pp.163–165) when it may be "more prudent and productive to turn primarily to its final arbiters" (Tagg: 2012, p.198), listeners. The view of meaning suggested by production guidebooks may overlook music psychology, aesthetics, hermeneutics, phenomenology, and cognitive science, each of which offers models for understanding music's potential to affect us as listeners. It also assumes that each listening experience takes place in the same neutral environment with relatively accurate reproduction technology and full listener attention (as in the studio where the producer typically works on tracks). But the meanings of virtual space are not static or monovalent (Negus 2012). To assume that they are is to deny the imagination of the listener, the very same imagination that the recordist relies upon to make their own subjectively grounded decisions.

The account from record production may therefore seem to oppose any musicology of listening.

How might this perspective be reconciled with approaches to recorded music listening? We might also ask what there is to gain from such a confluence. ARP research focuses upon recordist practice in order to legitimise the new field and destabilise historical divisions between composer, performer, and the work (Zak: 2007). Music studies may simultaneously develop theoretically and empirically grounded perspectives on music listening. However, this narrative of separate progress overlooks the potential, mutual benefits of further combining the two. After all, a theory of popular music listening must account for historical changes in recording practice, a whole host of culturally grounded transformations which have been well addressed by ARP research (Cottrell: 2010; Zagorski-Thomas: 2014). There are at least two further contributions from production-oriented studies with particular significance for accounts of listening: prioritising the recording as the primary text for investigation, and tracing the increasing technological potential of composition. In return, ARP work may gain from studies of listening a greater awareness of the diverse contexts for reception, and a reconsideration of wider musical understanding. Foremost of these is the reminder that recordists, too, are listeners. The decision-making of a recordist crucially depends upon their listening and understanding of the track as it materialises. In other words, there is no process of record production independent of listening. The maxim 'mix/edit with your ears, not your eyes' (Burgess: 2013, p.155–6) reminds engineers to rely upon their listening skills rather than focus upon the visual feedback of digital audio workstations. It is the purely aural outcome of recordists' decision-making which matters to listeners, who experience the track with no (or an entirely different) visual source. Attending to the theoretical models of reception-based approaches may therefore help recordists to understand the cyclical, mutually dependent processes of listening and decision-making in their creative practice. For instance, Moore's (2012) view of musical style usefully accounts for the assumptions that individuals bring to their listening experiences. Expectations regarding spatial placement and source motion in a mix depend deeply upon contextual and personal factors as individuals negotiate style conventions. So too does an awareness of our individual capacities: Zagorski-Thomas (2014, p.28) notes how his trumpet lessons as a child inform his personal, embodied experiences of hearing trumpets, a theory relying upon neurological processes of mirroring. Encouraging recordists to critically examine their own listening and embodied understandings of music-making may inform their work in the studio. Ultimately, they may become more aware of their biases, priorities, and preferences. There is, of course, no objective stance from which to make decisions, no "perspectiveless perspective" (Moore: 2012, p.330). Considering how listeners creatively develop meaning in their experiences of recordings encourages us to reflect on our compositional practices as producers.

An ecological-embodied framework

There have been a number of previous endeavours to bridge this divide. Several models of virtual space and listening draw from an ecological approach to perception and/or research on embodied cognition. The application of these perspectives to recorded music is gaining traction within popular musicology in particular. Such work usefully addresses a range of issues, challenging traditional theories of musical meaning (Clarke: 2005; Cox: 2016), providing a methodology for analysing popular song (Moore: 2012), or studying the work of a single artist in detail (Dibben: 2009; Osborn: 2017). These perspectives may be used to combine the distinct foci on record production and listening, and to stop seeing them as fundamentally opposed in the first place. While a full introduction to ecological perception (as it is often abbreviated, i.e. applying ecological psychology to musical perception) and embodied cognition is not possible here, I consider how each approach provides tools for analysing and interpreting virtual musical space. Combining the two research paradigms may require further justification. I therefore review and consolidate a number of previous models, recognising the potential of a combined framework to approach listening, record production, and wider studies of musical meaning. In this discussion, I draw particular attention to the abilities of these models to overcome subject/object divides. This may avoid upholding dichotomous views towards aesthetics/technology and reception/production. I subsequently demonstrate the use of this framework for music interpretation, employing it as a basis for an analysis of Karnivool's (2009) 'Goliath'.

Recently, the term 'affordance' has found particular use in addressing listening experience within music studies. Originally conceived in the ecological psychology of Gibson (e.g. 1986), the theory of affordances acknowledges that the potential for action and meaningful experience emerges in the mutualism of an organism and their environment (Windsor and de Bézenac: 2012, p.104). Applying this to music listening, a recorded track is an environmental stimulus, and our individual listener the organism. What the track affords will depend upon the capacities of the listener and their perception of the music in each listening circumstance. Whereas ecological perception may characterise environmental information as "structure that is already out there in the environment" (Clarke: 2005, p.15), my specific approach emphasises the listener's interpretive capabilities. It is affordances, not stimuli, that are perceived (Michaels and Carello 1981: 42). This view aligns more closely with the experiential perspective of embodied cognition, developed particularly by Lakoff and Johnson (1980; 1999). The view from embodied cognition argues that human reasoning processes are embodied and largely metaphorical. Concepts or image schemata, which are specific precognitive gestalts, are understood to underlie human thought, depending deeply upon the peculiarities of the individual body. Thus the perceiver's relation to their

ecological environment – and by extension the emergence of meaning – depends not only upon the structure afforded by the environment but the adaptive, embodied capacities of the individual. As recorded music can be an environmental stimulus, these accounts can be fruitfully applied to music listening. Whereas traditional perspectives may view musical meaning as abstract, disembodied, and representational, the embodied and ecological approaches characterise individuals' understandings of music as conceptual, embodied, and metaphorical.

On this basis, Moore (2012) analyses recorded virtual space using the soundbox, which is an imaginative model of the listener's spatial experience. Following ecological and embodied principles, we may use it to analyse how tracks afford locating certain sound sources in a virtual environment. It shares a concern for meaningful understandings of recorded music with Lacasse's (2000) conception of staging. While Lacasse's (2000) approach suggests the objective arrangement of sound sources, however, it may be argued that any physically verifiable spatial placement is not what generates meaning for listeners. What matters for the perceiver is the virtual space that they understand (even if visualisation software might suggest they are hearing it, in some sense, incorrectly). Recorded audio is objectively verifiable data, but listening experiences are not, and we are in deeply interpretive territory as soon as a listener has conceived of a given source as music. I propose further combining the ecological and embodied approaches into a coherent framework of listening in order to address this activity. Meaning is taken to arise in the interaction between the object and its perceiver, instead of emerging from immanent properties of the environmental object. In other words, the soundbox models the spaces that listeners understand, rather than a spatial environment "existing as physical space" (Brøvig-Hanssen and Danielsen: 2013, p.72). Such understandings can be extremely imaginative and creative, as listeners narrativise the virtual spaces that they hear (Harden: 2016). It is valuable to recognise this creative activity when discussing the meanings of virtual musical space.

Indeed, the interpretive complement to the soundbox that Moore (2005; 2012) provides is the personic environment, which addresses the relationship perceived between the lead voice and everything else heard in a track. The listener may imagine the lead voice to indicate a persona, and the remaining elements of the track form their environment. This approach is broadly compatible with other theories of the persona developed in popular music studies. Auslander (2009) and Frith (1996) provide complementary models of musical personas for studying star personalities and fandom beyond an emphasis upon music listening. These are consistent with embodied and ecological perspectives which address everyday interaction with other individuals. In the analytical example I present, the persona is defined only as the character which the listener may imagine in the listening experience. This focused conception of the personic environment is framed by ecological and embod-

ied principles: as listeners, we may ask where the persona is in relation to their environment, and where the track affords positioning ourselves. When listening to recorded music – just as we do in our real environment – we attempt to understand our surroundings by means of asking what is afforded by the sources around us. Just as we turn our heads to face the speaker when we hear a voice day-to-day, so that the sound reaches each ear at approximately the same time, we may comparably focus upon the voice in a recorded space. The spatial placement of the voice in the centre of the stereo field has become normative, at least in rock (Moore and Dockwray: 2008), and there may be an embodied basis for this convention: as binaural animals, humans prefer balance, and hearing a voice stuck to one side of the stereo field (whether listening on speakers or headphones) may prove disorienting. The recordist may have conscious intent to create disorientation or discomfort using such a spatial layout, but they are unable to prescribe the listener's experience of the track. Clarke (2013, pp.108–9) elaborates that what any given "sounds afford for any individual listener cannot be definitively stated, since it arises out of complex interdependencies between detailed attributes of the sounds themselves and the particular sensitivities and circumstances of each listener". Zagorski-Thomas' (2014, p.244) approach to sonic cartoons comparably attends to interpretations of recorded space, stating conclusively that "record production doesn't create meaning for listeners; neither does music. Listeners engage in the process of interpretation. The meaning is in the people, not in the sound". Although this perspective might privilege subjectivity over the conventional Gibsonian approach, the debate regarding whether affordances should be seen as properties or as relations is still unresolved in ecological psychology (Sanders: 1997; Michaels: 2003).

Nonetheless, it is the interaction of people with their environments that both the ecological and embodies approaches take seriously (Lakoff, 1987: pp.215–6). I offer a new characterisation of their relationship to this end, which principally allows for interpretive discussion of recorded virtual space without privileging any single response. We may nonetheless suggest how some readings are more immediately or widely afforded, while some affordances may emerge for only a small number of people. The track (a particular recorded instance of song) is a suitably stable, widely accessible text for analysis. It provides a reliable substitute for the real interpretative focus, which is the listening experience. This experience might be repeatable to some extent, although listening closely to the track at home on headphones will differ dramatically from hardly hearing the track from a shopping centre tannoy speaker (Kennett: 2003; Negus: 2012). Moreover, we may be able to consider an average or ideal experience of a track, although this may change based upon our listening context and understanding of the style, artist, and ourselves. We can really only speak of our own experience, after all, even if we may expect some intersubjective agreement of others. This account does not require adopting an extreme subjectivist theory of meaning, because the

most convincing interpretations can be based upon specific understandings of virtual recorded spaces. The key argument I prioritise is that the individual matters: what is heard, and what the track affords them, might not necessarily correlate with the recordist's focused hearing in a treated environment. As such, any advice to mix, edit, or spatialise a certain way in order to produce a particular effect may be misleading.

I refer to the theoretical basis for understanding recorded musical experience which I outline here as an ecological-embodied framework. The perspectives subsumed under this label have been variously employed in the literature I have discussed, but this term and the specific characterisation are new. I suggest that it is most beneficial to approach this composite pragmatically: depending upon what we are investigating, we may draw more from either paradigm, but the underlying principle remains the same. At its most fundamental, the ecological-embodied framework posits that all of our experiences and understandings of the world – and of recorded music – depend upon our being the types of bodies we are, as we interact with our environments. Importantly, this model also responds to new findings in psychology and cognitive science, and can be adapted as new paradigms emerge. It is worth acknowledging that the study of the embodied mind is still in its infancy, relatively speaking, but it is beneficial to model musical experience based upon up-to-date empirical evidence (Zagorski-Thomas: 2014, p.30). Embodied cognition particularly bemoans the erasure of the body in established perspectives, and ecological perception attempts to define the environment ecologically rather than physically, which sidesteps the objective/subjective binary. This combined view adopts an experientialist account of meaning (Lakoff and Johnson 1980), which depends deeply upon embodied and cultural relativity in relation to environmental stimuli. Consequently, the distinction between nature and culture that traditional perspectives uphold is subverted from the outset. Cultural understanding forms part of our experience, based upon the perceptual and cognitive learning that we, as individuals, undertake (Windsor and de Bézenac: 2012, p.105). In other words, culture is part of our cognition.

The ecological-embodied framework may also help us to consider that the opposing accounts with which I introduced this paper – one research strand versus the other – may not ultimately be at odds with one another. They provide different insights from a range of perspectives that may be channelled back through the framework. For instance, the recordist's belief in their ability to create a meaningful effect may be reinterpreted as a heuristic which their work affords, one which helps them to make satisfactory decisions. Lacasse's (2000) staging, Moore's (2012) soundbox, Brøvig-Hanssen and Danielsen's (2013) music sound stage, Zagorski-Thomas' (2014) sonic cartoons, Moylan's (2015) sound stage, and related approaches all provide conceptual and metaphorical tools for understanding virtual space. As Brøvig-Hanssen and Danielsen (2013, p.75) note, "Gibson's notion that the same

environment might afford different things to different people rings especially true when using the sound stage as a metaphor to describing sound". Recall that the view from embodied cognition suggests that metaphor is not merely a linguistic, poetic function, but a principle underlying thought processes. We may use the framework in this way to usefully address the ways that a range of listeners understand virtual recorded space.

Following this development of the theoretical framework, I now exemplify its use in music listening and interpretation. This is surely not its only use, as other scholars have pointed out (Zagorski-Thomas: 2014, pp.37–46): many types of musical engagement may be addressed using this framing for experience, including approaches to studio creativity, recordist practice, and audience research. In this paper, I provide the track analysis as a salient application of the framework, which provides a certain degree of stabilisation to the 'versus' debates in record production research. This analysis additionally contributes to scholarship on popular music analysis, hermeneutics, and metal music studies. I discuss the potential for meaningful experiences of virtual space to arise in listening to Karnivool's (2009) 'Goliath'. This track, taken from the Australian band's 2009 album *Sound Awake*, is an appropriate example for this contribution, due to its critically acclaimed production (Barkan: 2010) and its interesting relationship to production norms. In some ways, it abides by modern rock/metal standards (Mynett: 2017), but in others it varies idiosyncratically, affording me a rich narrative interpretation. While I cannot embed the track here, it is widely available on the usual listening platforms. It may help to listen to it now before engaging with my understanding of the track.

Karnivool – 'Goliath'

The spatial environment of the track is introduced piece by piece. First, there is a metrically ambiguous and highly distorted electric guitar monotone, situated just right of centre. Another guitar that I hear towards the left ear plays call-and-response with this, notably unbalanced by anything to the right. We may expect something present on the right to provide balance – complying with mix conventions (Moore and Dockwray: 2008) – depending upon what we are used to hearing. In 'Goliath', however, the right side of the stereo image is rather vacant, and the listener might feel slightly off balance if they imagine themselves within this environment: the sound powerfully engages only one side of the body. When the drum kit and bass enter at subsequent repeats of the riff pattern, they are confined rather narrowly to the centre. Although the drums are forceful and the bass highly abrasive, their central stereo location may make the distorted guitar on the left feel even more remote, and the space on the right even emptier. Shortly after the kit and bass enter, the voice appears in the centre. The persona that I imagine is

slightly more distant than the other elements: I feel his declarations hit me from afar, then dissipate upward and outward. His presence is rather unobtrusive, seemingly floating above the menacing high-frequency content of the distorted bass. It is as if he is trying to call over this mass of sound, which works against him, obscures him. After a few vocal lines, the stereo space offers some balance, as a new guitar joins towards the right. This guitar part is not in synchrony as we may expect in rock or metal, however, instead repeating a flurry of higher notes. It may provide an unsettling contrast to the gritty tonic pedal of the left-panned guitar. At 1'02", the persona's voice spreads to the mid-left and mid-right rather than occupying the centre, perhaps providing a little stereo stability, or otherwise dividing disconcertingly. The right-side guitar flurry settles into harmonic filler with a cleaner tone. The persona presently returns to the narrow centre, and the right side soon empties altogether, the guitar departing by ringing out a slightly dissonant B over C#. Later, the persona is underlined by a new voice doubling the octave below. Although it feels somewhat closer to me, and perhaps more urgent, it does not seem able to fully reach through the thick guitar walls either.

The environment generally alternates between these spatial layouts up to 1'50", where the main rhythm guitar is doubled to both ears for the first time. At this point, the unsettled lead guitar semiquavers sit just right of centre, closer than before, and perhaps alarmingly so. The dense, homophonic motion of the doubled, wide-panned guitars and airy crash cymbals in this section more clearly resemble a typical metal mix (Mynett: 2017). The rests between the unison guitars' polyrhythmic downstrokes cause the stereo space to suddenly open up, which we may understand to enact the persona's lyrical demand to awaken. The listener might imagine this to be a sudden blinking open of the eyes, a gasp for air between the opaque, oppressive guitar slides. The persona now seems rather trapped – confined to the centre between these thick timbral walls – and unheard, because he keeps repeating himself. More specifically, I conceive of the persona trying to shake himself awake when trapped in a nightmare, as if experiencing sleep paralysis.

The worst of the dream passes for a short while, and a new riff is introduced by the left-side guitar from 3'19". This virtual environment is again rather imbalanced, save for a subtle palm-muted tonic pedal on the right. Little textural equivalence is provided here, and I am unsettled by the thick timbral wall of the left and the thin strand of the right, especially when the latter rises a perfect fifth. The guitars and kit become more animated throughout this section, still based on one harmonic centre and one side of the soundbox, even into the riff proper, where the hard-left guitar begins leaping frantically. On the far right, the semiquaver flurry returns, now more frenetic and mostly chromatic. This guitar may seem rather separate from the drums and other guitars, spatially and harmonically, barely aligned in time. In my imagination, this virtual environment enacts both a troubled sleeper

and their nightmare: the right-side guitar acts out the torment of being trapped in the dream, and the punchy kit and heavy guitar on the left create the sleeping human violently shaking (perhaps trying to break free) in the night. Such potentially horrifying scenes of nightmare and/or sleep paralysis have been frequently depicted in the visual arts, associated with cultural beliefs regarding the supernatural (Jalal and Hinton: 2013). As the sleeper in 'Goliath' tries harder to wake up, the persona calling out again at 4'20", the right-side guitar seems to answer 'no'. This guitar synchronises with the sinister riff of the left side guitar, and both drop down a half-step to C as the nightmare prevails. This is a potent vertical shift, as if the entire environment has been suddenly tugged downward, particularly as the track has wallowed in a C# tonic centre for its entire duration up to this point. We may also conceptualise such a change stylistically, associating the track first with a rock style, before the wide-panned guitars finally offer the equivalence and lower pitch typical of metal.

Conclusion

This interpretation of 'Goliath' is based upon the virtual space that I hear on a typical experience of the track. It may more closely resemble the kind of narratives which fans often report in their listening. My interpretation draws from analysis of the virtual music space, but generally avoids the specific language of music production. After all, many listeners do not relate their experience to the precise placement of sound sources or the use of particular compression styles. The ecological-embodied framework acknowledges that individuals may instead relate to the track's virtual musical space more metaphorically, as appropriate for their interpretation. They may hear shapes (e.g. the guitar 'walls') relationships (the distant persona), and the feelings (unsettled, threatened, horrified) that these are believed to produce. On the experiential view, listeners themselves are the producers of such embodied understandings (Zagorski-Thomas: 2014, p.244), but the potential of music to evoke affective responses remains a prevailing conception of music's power. The listener responds first and foremost to what they understand a track to mean by listening, whether or not this is supplemented by knowledge of production processes or recordist commentary. In the analysis I provide, the emphasis is placed on my listening and interpretation free of any authorial sentiment. Specificities of the recording remain central to my understanding, however. I did not approach the track simply thinking about nightmares at first encounter, but formed this interpretation by experiencing characteristics of the virtual space: the voice constricted to the centre, seemingly distancing the persona, who panics about waking; the wide, animated guitar walls and an abrasive, threatening bass; an unbalanced stereo spectrum, with empty spaces, then sudden bursts of stereo synchrony. These at-

tributes may be alarming in our everyday environment, and they are when listening to 'Goliath', too. This is perhaps the most significant contribution of the ecological-embodied framework: investigating our experiences of the world, of our environments, and of our music, as we understand them.

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