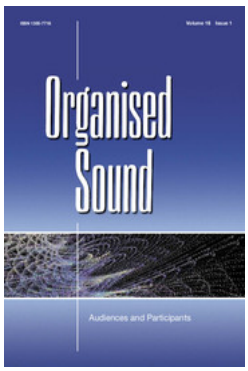

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On Performing Electroacoustic Musics: a non-idiomatic case study for Adorno's theory of musical reproduction

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Adorno's theory of musical reproduction is unfinished, inconsistent and attuned only to score-based acoustic music – but it has relevance for electroacoustic performance as well. His theory prompts contemplation about what 'good' interpretation, and interpretation itself, means for fixed electroacoustic music. A digital sound file is frequently, if not typically, viewed as more rigid and precise than a score. This article uses Adorno's theory to compare ontologies of score and digital file realizations respectively, thus questioning the above assumption. Do electroacoustic works truly exist apart from their performed features, or is a given work only its performances? Different answers imply different work concepts and interpretive strategies. Toward the essay's goals, we examine three features often viewed as nonontological to an electroacoustic work, namely performed spatialisation, equalisation, and amplitude balance. We consider the impacts of these features when they are manipulated in real time, or performance to performance. As Adorno asks how choices of timing or dynamics dictate a notated work's aesthetic 'clarity', this paper asks how performed choices contribute to an electroacoustic work's clarity, and to the unique interpretive potential of electroacoustic music. Tape music and acousmatic music, with its diffusion tradition, are central to this paper's thesis; but multi-channel works are circumscribed by it as well.

1. INTRODUCTION

1.1. The main questions and methodologies

Electroacoustic music has wrestled for decades with the critique that it lacks liveness. Clear dissatisfactions have coalesced around the fixity of the medium, and the music's typical presentation – in the dark with a bare stage. This perceived limited liveness quotient has contributed to the intense interest in mixed musical forms and in live electronics that has evolved since the mid-twentieth century, and most strikingly since the 1970s. '[W]hat it all comes down to is the notion of soul – an invisible quality that encompasses something of the magical, the immaterial and the emotional in live performance' (Milutis 2008: 71). In an electroacoustic concert 'we can perhaps say that the spirituality of the performer, if there was one, [is] hidden away in the compositional process' (Milutis 2008: 71). Through the term 'spirituality', Milutis conjures up something suprarational. This broad concept of 'performance magic' reminds us that a powerful performance experience doesn't depend upon performer-to-audience communication. Sensations arise from a complex situation; and, in fact, notated acoustic music performance involves mostly indirect audience communication. Thus a lack of direct performer–audience communication only weakly explains why a listener might not perceive liveness in a fixed media presentation. Other characteristics that better explain such a reaction might include nostalgia for a visually verifiable relationship between the agent and the sound, a display of the virtuosity or skill that may fail at any moment. A question that flows tangentially from this thematic opening is how we aurally discern electroacoustic interpretation in the first place.

While some practices, such as diffusion, have always been viewed as interpretive, they have not generally been viewed as 'reproductive' according to at least some aspects of Adorno's theory, an overview of which is detailed further in the next section. In *Towards a Theory of Musical Reproduction*, the debate about ontology in the acoustic realm asks whether an ideal work actually resides in its score, or whether the score is a set of instructions or reified features that enable an unending search for the best performance. (In either case, the score captures and objectifies aspects of the 'originary' mimesis.) If applied to fixed electroacoustic music, the first scenario leads us to search for authenticity within the work: what interpretation is best implied by the invariant elements? The second scenario leads us to value liveness en route to the best reproduction of the work; but its authenticity is ultimately unknowable. We generally adhere to the first case, and assume that an invariant electroacoustic piece 'exists' apart from all of its performed features. Often, Adorno's theorising suggests a different way of thinking, advocating ceaseless interpretative efforts in search of always better reproductions, and 'the piece'. This essay acknowledges this basic contradiction in

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Adorno's text; but it does not preclude the usefulness of his thought.

Adorno's theory is thus relied on here to probe systematically what we care about in fixed electroacoustic media performance and how we select interpretive strategies. Is our way of thinking about and performing electroacoustic music responsible for the perceived lack of liveness? In addressing this, we will consider spatialisation – both live diffusion, and space-specific multi-channel designs – as a primary interpretive component, and equalisation and amplitude variation secondarily. We will compare how the reproduction of a digital sound file mirrors and diverges from the reproduction of a musical score. How might interpretation be integral to an electroacoustic work's apparent 'clarity' in much the same way that interpretation elucidates, for Adorno, an acoustic composition's clarity? As he states, 'The idea of clarity … is a hierarchy of the clear and unclear … of the mimic gestus' (Adorno 2006: 203). Adorno's text prompts us to re-evaluate elements that we normally view as non-essential ontologically to the electroacoustic work, although we must manipulate these features at least minimally in performance. His mimetic-to-logical-to-idiomatic model is useful in articulating the structure that results when the score is bracketed out of the work concept equation. (There is an assumed reference throughout this paper to a performance space which typically has an array of loudspeakers. But a stereo realisation with just two speakers is not precluded. This article confines itself, however, to music heard in an acoustic environment; hence headphone listening rarely enters the following discussion.)

1.2.1. Historical background of Adorno's theory

Adorno sketched plans for his project on the theory of musical reproduction in the 1920s, early in his career. It was a task he worked on all his life, but never completed. Adorno's notes for this book were published posthumously in 2001 as *Zu einer Theorie der musikalischen Reproduktion*; the first English translation, *Towards a Theory of Musical Reproduction*, was released in 2006. Adorno's working manuscript titles were *Die wahre Aufführung* and *Reproduktionstheorie* – True Performance and Theory of Reproduction.

His choice of the word 'reproduction' as opposed to 'interpretation' reflects a primary supposition – that a score points to an existing musical conception whose precision exceeds what is visible on the page. We are searching, through the score, for a conception that lies beyond it. Adorno still values a detailed, historically informed understanding by the performer of all notated parameters, since for him the score is what allows the sonic 'inspiration' (Adorno 2006: 178) to arise from a composer's mimesis. (Wieland Hoban, translator of the text, points to Adorno's idiosyncratic use of the word *Beseelung* as 'a literal correlate' that suggests life being breathed into a soul) (Adorno 2006: 265). For Adorno, we grasp at this ideal not through a rule-based process but through an open-ended search. It is productive to think of the sound-file-to-performance pathway similarly, for philosophical and pragmatic reasons. First, the sound file is in an unrealised form; second, our performance practices, technologies and cultural contexts change, and we are forced to grope a bit aimlessly for the piece's originary impulse.

1.2.2. Ideal interpretations of electronic music

Adorno sees, as a growing trend, many early twentieth-century composers insinuating themselves as ideal performers into their scores. ('The integral organisation of the musical score through the twelve-tone method has increasingly limited the scope of interpretation … In the face of such music, mute reading with the precise use of the imagination defines itself as the true interpretive ideal' (Adorno 1977 [1958]: 82).) Adorno most likely links the utility of mute reading also to the fact that contemporary music had fewer and fewer referential models (Hirt 2010: 128). (It is notable that Adorno locates this trend toward exact score rendering as starting not with Schoenberg, but rather Berlioz, for whom 'the negation of meaning [in the score] is elevated to the level of meaning' [in *Symphonie Fantastique*] (Adorno 1977 [1958]: 82; 1978 [1958]: 232). 'In [Berlioz'] work the instrumental organisation and compositional disorganisation complement one another' (Adorno 1977 [1958]: 82; 1978 [1958]: 232); the work no longer follows a referential model of cohesion, in other words.)

Can something like mute reading be sought in electroacoustic performance where the composer is at the mixer, and as in previous eras performing her or his own work? Max Paddison calls silent reading, for Adorno, a 'philosophically necessary position' (Paddison 2007: 233). In all Western art music, the 'idea of the unrealised, and perhaps unrealisable work, can be located in the score', since it is the source of 'endless re-readings' (Paddison 2007: 233). For Paddison, a performance of such music seeks to persuade us 'that *this* particular performance *is the best there is*' (2007: 233–4). This article does not dispute Paddison's reading of idealist elements in Adorno's theory, but we focus here on the value Adorno sees in the search itself, en route to the ideal. For Adorno, notated music eludes both its historically located authenticity and its mimetically located one. So a notated work and a composed digital electroacoustic work both remain non-coincident with their mimetic originals and (often) with their

historical times. In this way, both mute readings and live performances seek ideals. The mute reading strives toward a definable but inherently incomplete object, and the live performance strives toward a shared cultural object that arises only in sensuous perception. Where there is no score to respond to (the case with a digital sound file) the ideal is more closely a self-referential entity. But the main point here is that we can, and do, experience meaningful differences amongst various performances of a fixed electroacoustic music composition. In what ways do the strongest performances manifest Adorno's idea of musical 'clarity'? Most essentially, they help us to recognise structural elements; in other words, to reveal them to our cognition.

Adorno actually ponders or quips about electronic techniques as conceivable norms of the future. True, his sarcasm indicates disdain and scepticism; but at the same time his commentary contains an admission of how powerful a 'reproduction of production' could be – if it could be implemented without totally melding the technique of reproduction with the content of the work. 'With the absolute acoustic realisation of a composition through electronic means, indeed, perhaps even by means of recording on wire or tape, doubts are registered regarding the writing down of a manuscript score: as if one could make music as directly as one paints a picture and the significative intermediate level, notation, could be bypassed as though it were an ornamental formality' (Adorno 1977 [1958]: 83). In sum, he is arguing here for the power of distancing the means of reproduction from the 'content'. He is not stating that the score is the only viable intermediary; he is simply expressing doubt that the recording through electronic means could preserve such requisite distance. 'The less musical portrayal continues to be the portrayal of something, the more the essence of the means comes to agree with the essence of that which is portrayed' (Adorno 1977 [1958]: 83).

Here Adorno is talking about 'reproduction' in the sense of a direct musical realisation from a disc, not a 'mechanical reproduction' in the sense of a playing back that would recreate a recorded acoustic piece. His concept of gramophone composition is conceptually quite close to fixed electroacoustic music composition. As his colleague H.H. Stuckenschmidt describes: 'Considerably richer perspectives are presented by the possibility of authentically composing onto the gramophone disc … Moholy-Nagy … suggests providing a huge disc, approximately five meters in diameter, with correspondingly large lines, and then photomechanically reducing this original to the size required for the gramophone' (Stuckenschmidt 1994 [1925]: 154–5). In 1925 Adorno acknowledges:

> Accordingly, also in approaching works that disallow interpretative freedom … the gramophone [would function] solely in a service role, whose value would be dependent on the aptitude of the composer for the realisation of his intention. (*Demnach käme auch bei Werken, die keine interpretative Freiheit lassen, dem Grammophon lediglich eine dienende Funktion zu, deren Wert abhängig wäre von der Begabung des Komponisten zur Realisierung seiner Intention*.) (Adorno 1984 [1925]: 444; my translation)

Thus Adorno theorises here the best implementable model for the 'composer as interpreter' in mechanically produced music.

Curiously, however, he writes in 1955, '[T]o date, electronic music has failed to fulfill its own idea; … [the music] sounds as though Webern were being played on a Wurlitzer organ' (Adorno 2002 [1955]: 194–5). He also deprecates the novelty of *Gesang der Jünglinge* upon hearing it performed (probably at its 1956 premiere) (Adorno 1997: 92), though his comments may show appreciation for the impact of its spatialisation: 'The desired constructive unification could be realized only through the multiplicity of voices inclining toward and away from each other' (1997: 92). But *Gesang der Jünglinge* 'strikes [him] as nothing more than the transposition and expansion of pianistic ideas to new material' (1997: 92). One can speculate that Adorno's comments about the Wurlitzer-organ-like sound refer to Stockhausen's *Studie I* (premiered in 1954). It is notable that Adorno does not comment at all on the 'reproduction' of the melody which, his comments imply, could be abstracted from its 'performance'. Regardless of the precise piece to which he refers, Adorno's focus is on its timbral palette, not on the interpretation that is conveyed in its timing by a conflated composer/performer. Adorno's attention to timbre shows a sensitivity to the unique interpretive potentials of electroacoustic music. His comments from 1955 are perhaps presaged 20 years earlier, when he wrote of his antipathy to 'vibrato [in general] which causes a tone which is rigid and objective[,] to tremble as if on its own' (Adorno 1997: 471). That Adorno then ignores the timbral complexity and physical gestures of *Gesang* is a bit of a puzzle, as are his critical remarks about its pianistic 'ideas'.

1.3. Adorno's task in *Towards a Theory Musical Reproduction*

Adorno's text fragments reveal a perpetual swerve toward imponderables. As late as 1954, in preparing a Darmstadt lecture on the Reproduction topic, his notes are enormously abstract. 'What does it actually mean to play a melody?' he wonders (Adorno 2006: 229). But, in *Towards a Theory Musical Reproduction* Adorno does succeed in creating a compendium of questions and observations that heighten awareness about the interpretive process. His journal-like entries proceed inductively from his own idiosyncratic reactions to performances. He rationalises his intuitions

that some performances are good and some are not, although he seems to acknowledge that listeners may not agree on which is which. 'Whoever has studied a work with performers knows how important it is to say anything at all, simply to start somewhere, and how little it matters exactly where, indeed whether the point singled out is right or wrong, as, in Kolisch's words, "something is always wrong"' (2006: 213). Though Adorno searches for interpretive ideals, for him any 'best' choice regarding an interpretive detail is misleading in its implication of singularity or stasis, first because of the inductive nature of the search, and second because of the interdependency of all internal choices.

Still, as listeners, we react. Typically, we decide that something in an acoustic performance doesn't 'work' because we have a set of other performances (of the same work or related ones) with which to compare it, which sound more 'right' or more persuasive. But we also react to performances on the basis of a single hearing of an unfamiliar work, *as if* we had heard other performances. Our experiences in listening to electroacoustic music are no different in this regard. Artworks exist in social and aesthetic systems of regulation, and they circulate in communities with shared values. That our sense of a good performance equates largely with the activation of such values is a topic that theorists including Eric Clarke have explored (Clarke 1999).

2. PHILOSOPHICAL QUESTIONS RAISED BY APPLYING *TOWARDS A THEORY MUSICAL REPRODUCTION* TO ELECTROACOUSTIC MUSIC

We turn now to this article's assertion that a parallel exists between using a score and using a sound file respectively in realising a performance. As a score fixes instructions (though it does more than this), the sound file fixes sample information that is constitutive. It is then used to create numerous instances of the piece. Both score and file are one-to-many pointers to all performances. And, like notation, a digital file's information coexists with contingent properties which arise distinctively in each performance. With the exception of ambisonic coded sound files, these contingent properties include spatialisation prominently. For ambisonic files in which spatial coordinates are actually encoded, other contingent properties such as equalisation still exist. As Jerrold Levinson says, 'A musical work of the standard sort *contains* a pure notationally defined structure, but is not to be *identified* with that structure' (Levinson 1980: 373). Levinson's analysis asserts that a composition is more than its repeatable or duplicatable pure structure. It is an ultimate structure created by someone particular at some particular time. For Nelson Goodman also, the uniqueness of a notated score is its one-to-many relationship to all its realisations. Lydia Goehr discusses Goodman's concept of score-based art – termed by him 'allographic' – as that which, in Goodman's words, 'establish[es] a distinction between the constitutive and contingent properties of a work' (Goehr 1992: 21 [Goodman 1976: 121]). As Goehr says, 'Notation is central to those transitory works presented on a number of different occasions, [i.e.] to works that are ephemeral' (Goehr 1992: 21). A digital sound file can certainly be viewed as tying down, or tying together, a set of ephemeral performances.

Goehr herself, in contrast, addresses the work concept as less explicitly tied to a specific production moment (the score production) as to a networked dynamic: '[the work concept is] intimately tied to a conception of the complex relationships obtaining between the composer, the score, and the performance, as these are expressed on several levels: within musical and aesthetic literature; and in terms of institutional codes' (Goehr 1989: 56–7). Adorno's work concept seems closest to Goehr's. Adorno also draws on negative dialectics: 'Art can be understood only by its laws of movement, not according to any set of invariants. It is defined by its relation to what it is not' (Adorno 1997: 3). Applying such 'laws of movement' to electroacoustic music, we can postulate that even works which are constitutively spatialised, like *Kontakte*, can appropriately be rethought in each performance. What is the impact on the integrity of the piece by various speaker placement distances, for example? Such a question would need to be answered by listening to multiple realisations, and could be approached as a deliberate shaping of a contingent property. Stockhausen clearly did this, implying distance placement in his instruction regarding 'the correct manner' of performing *Kontakte*: 'with four pairs of loudspeakers in a square, with good placement' (Stockhausen 1996: 92).

2.1.1. Contingent and constitutive characteristics in more detail

How crucial are particular instantiations of spatialisation, equalisation and amplitude balance to our perceiving a given electroacoustic work persuasively? What constitutes a good interpretation of electroacoustic music? An answer needs to be predicated on one of several philosophical premises, and on the nature of the work itself, as is so well detailed in Simon Emmerson's comprehensive analysis of diffusion practice (Emmerson 2007: 143–70). The first option is that spatialisation and/or equalisation are virtually constitutive (i.e. an essential part of a given work); thus they are not open to much interpretation. An alternate premise is that spatialisation and/or

equalisation are contingent properties (i.e. arising by chance), and are not very essential to the work concept. In this case, multiple renditions of these parameters may be heard as viable, and none will make or break structural elements of the work. And a third possible assumption is that spatialisation and/or proper equalisation are absolutely necessary for the work to emerge; thus there are good and bad performances based on particular, and often impossible to predict, choices invoked. As Jean-Claude Risset points out, some of these may be driven by cognitive considerations (Brümmer et al. 2001). Each of these premises might be applied as a global philosophy, or as an opinion about an individual work only. Let us now consider some examples of performance practice on this articulated continuum.

Jonty Harrison, for example, values minimal interpretive intervention. He advocates intensification of what is already there: 'Organic material is already sculpting time and space – diffusion is merely the necessary continuation and enhancement of this process – articulating spatial qualities already possessed by the sound, not arbitrarily imposing spatial behaviour on it' (Harrison 1999). He encourages performance choices that respond to an existent corporeality. The pure structure is immanent; it needs to be projected. Harrison's comment seems both a philosophical directive and a personal preference. A close parsing of Harrison's statement, though, might question his use of the word 'organic'; does he refer here to sampled sound, to structural naturalism, to innate structure, or to something else? The term 'arbitrarily', too, invites deeper questioning of Harrison's generalisation; one need not conflate the possibility of externally derived spatialisation design with the notion that all conceivable patterns may be equally ill fitted.

Ambrose Field thinks in similar aesthetic directions regarding underlining a 'pre-diffused' spatial design. And for him it is equally important to articulate images rather than point-source gestures. For Field, 'mov[ing] the sound out of the speakers' (Austin and Field 2001: 23) is fundamental. For François Bayle, too: 'I have always been interested in detaching the sound from the loudspeaker, using the loudspeaker not as an instrument but as a projector of spatial images. In the 1960s, I saw that one could decouple the sound, to make it appear to emerge from a deep space behind the loudspeaker, or to make sounds fly between loudspeakers at different rates of speed' (Desantos 1977: 14). For Field, spatialisation is not constitutive unless it is precisely encoded. Though he is meticulous to the point of 'predicting where an audience might be located in a sound field', ultimately, he feels that composing with ambisonics, for him personally, is the only route to 'truly add[ing] another dimension to the music' (Austin and Field 2001: 22).

2.1.2. Contingent electroacoustic properties conceptualised using Adorno's theory

Adorno's reproduction theory, in contrast to the above approaches, would seem to rationalise a separation of the fixed symbol and its actualised image, accommodating inconsistencies between an immanent spatial design and an externally imposed one. It would read such tension more as interpretive ballast rather than as a disregard for the material's implications. A boldly mechanical sound might, let us say, be diffused in butterfly-like motions for any number of artistic reasons. And Adorno's theory argues for adding pragmatism to the equation. Many sounds have such detailed micro-morphologies that extending maximal spectromorphological detail spatially is not technically or perceptually realistic. Finally, *Towards a Theory Musical Reproduction* encourages an acceptance and creative response to performance unpredictables, when the symbol (the sound file) and the image (the realisation) may be non-coincident in ways that can't be controlled. Inadvertent spatial results, as Denis Smalley points out, are frequent: '[Q]uite often composed space is created through artifacts or spatial byproducts of the sounds, textures, and processing techniques … For example, delays, phase changes, pitch offsets, or accumulation processes that give the sound more space also give it more depth' (Austin and Smalley 2000: 14). In other words, as new sonic and conceptual elements may inadvertently arise, a performance may try either to incorporate them or to mitigate them. Does one use equalisation in fixed media performance to neutralise the impact of room frequency responses, or also to interpret?

Slightly different issues arise in multi-channel works. There the spatialisation is largely constitutive since the number of prescribed channels is usually part of the piece. But spatialisation details still need to be worked out for each performance. When a graphically notated spatialisation diagram exists, it usually encompasses the loudspeakers' angular and grid-like relationships. But the dimensions of the speaker placements are rarely part of the work concept.

2.2.1. Silent reading, score performance, and electroacoustic performance

The topic of silent reading, mentioned earlier, is a significant thread in Adorno's theory. He even considers the 'out of time' practice evolutionary, predicting in a 1966 note that the 'infantile' practice of sensuous reproduction would eventually evolve: '[T]he truly precise idea gained from reading can serve as the ideal for performance that cannot be attained as such. The musical work is thus cleansed of the fortuity of its realisation' (Adorno 2006: 162). Yet Adorno pays astute attention to musical pacing in

real time in acoustic performance. Repeatedly he draws out musical examples on this topic: 'The first movement of Beethoven's 5th [should be] very quick – any attempt to monumentalize it turns it into something leisurely. The effect of the first bars by no means through a reduced tempo, rather at full speed, but at the heel and with a heavy counter-accent on the first note – falling on the weak beat: assuming one does not prefer simply to read it' (Adorno 2006: 75). His valuing of both silent reading and temporal control in live music thus seems inconsistent. How does silently read music sustain a loss as interpretively significant as the dimension of time?

In a perverse way, Adorno's theory perhaps absolves the fixity of electroacoustic performance since it, too, yields its control over timing, in the opposite direction.

But more to the point, and since there is no way to answer for Adorno regarding the contradiction above, it is productive to note these two different temporal access methods to the score, out of time and in time. It is also useful to pair the performance of a score and of a digital file regarding access to the future. Actualising a digital file, we confront the work's intermediary form (the file) aurally. While performing, we are not able to imagine ahead with the help of a stave-based memory aid. And so, all we can do is to react in flight, as we hear the sound emerging. Actualising a score, we almost inevitably think ahead of choices to be made, and no doubt some of these will ultimately prove to be failed interpretive attempts. Thus the performance of a digital file, in a way, more closely avoids the mere 'fortuity of [a work's] realisation' (Adorno 2006: 162).

2.2.2. Adorno's playing from memory, and electroacoustic music

Another practice Adorno endorses, related to silent reading, is playing from memory. Playing from memory lauds the 'primacy of the text over its imitation' (i.e. the imagination, over the score) (Adorno 2006: 5). Its relevance to electroacoustic music performance is intriguing. Memorised notated score performance and electroacoustic performance both depend on spontaneous aural reactions in a feedback loop with no visual intervention. Electroacoustic music is relieved of the extreme approximateness of an intermediary notation. Adorno's thoughts on playing from memory, and thereby encouraging imaginative freedom, also seem to contradict his sense of the score-residing work concept. But, to the extent that the process of playing from memory is close to a mimetic experience, it is possible to understand Adorno's lack of commitment between these two conceptual nodal points. The relevance to our discussion on electroacoustic music is to appreciate that electroacoustic music, to whatever extent it is performed, is necessarily realised from memory.

3. ELECTROACOUSTIC AND ACOUSTIC REPRODUCTION COMPARED

3.1. Creative stages of the work in both genres

Adorno is captivated in *Towards a Theory Musical Reproduction* by the performer's pragmatic task of 'reading between the lines' of a score. The score is viewed as an historical link between the pre-significatory 'neumic' stage and an idiomatic stage. All three stages are shown in Figure 1: neumic – mensural – idiomatic. Virtually the same tripartite model describes the process by which, according to Adorno, a musical work comes into being. As shown in Figures 2 and 3, the ephemeral sonic idea arises within the mimetic experience; the fixing of information is enabled by the logical/reflective; and the idiomatic happens almost exclusively during performance. The score and the sound file, through their objectification, allow the performer to reflect. It is in this sense that Adorno sees 'structure' as a tunnel into the subterranean foundation of experience. It is somewhat startling to discover how score-like Stuckenschmidt views the gramophone's analogue grooves, in 1925: 'the script on the … disc … is microscopically small [but] … with the aid of magnification it is possible to study its character' (Stuckenschmidt 1994 [1925]: 154–5).

3.2. Comparative technical features of acoustic and electroacoustic reproduction

What can be seen by comparing the respective realisations of a score and a sound file further? As shown in Figure 4 there are at least four elements that

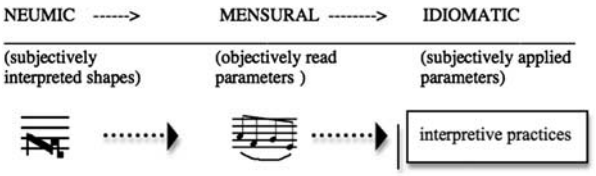

Figure 1. Historical stages of acoustic music according to Adorno.

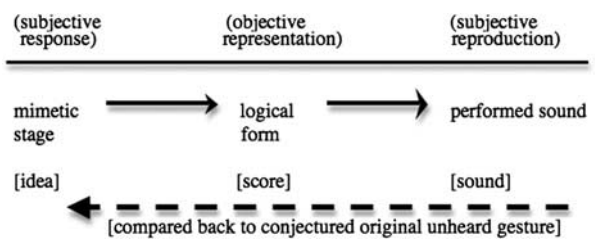

Figure 2. Creative stages of an acoustic composition according to Adorno.

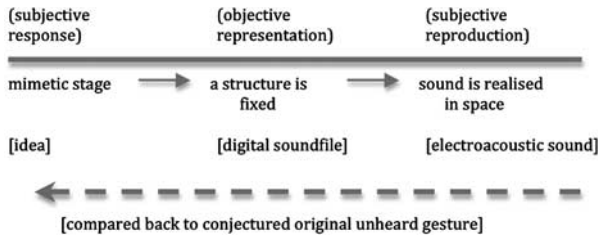

Figure 3. Creative stages of an electroacoustic composition.

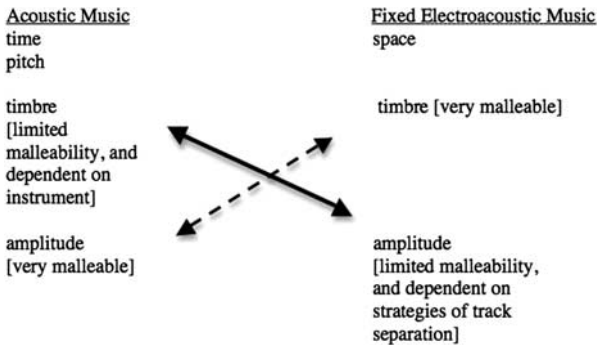

Figure 4. Malleable sonic domains in acoustic versus electroacoustic musics.

are highly or somewhat malleable in acoustic music: tempo/rhythm, pitch, timbre and amplitude (i.e. dynamic relations). (To qualify this statement a little: the degree of timbral malleability is highly dependent upon the given acoustic instrument and the implemented playing technique. Consider, for instance, even on the piano, the range of distinct 'touches' that allow us to recognise a particular performer; and consider the stark timbral change of the *una corda* pedal. But the physical deformations possible on this instrument are less extreme than, and of a different nature from, those possible, for example, on the cello or the flute.) Electroacoustic music's malleable elements, in contrast, are timbre, amplitude and spatialisation. They are powerful in that they can be modified in real time. They can also be replicated, and thus controlled, precisely during a performance. Since they are free of human performance and instrument design limitations, issues of practicality do not enter the picture.

A manipulation of these elements, collectively, contributes to nuanced variations in our perception of the music's temporal rigidity or elasticity. For example, our sense of the timing is often impacted by other parameters: equalisation may affect our perception of attack times; and speaker placement may affect our perception of speed and timing. Figure 4 summarises the additional elements that allow, if not require, interpretation in the two genres.

3.3. Conceptual clarity in electroacoustic music reproduction

This article's contention that a sound file is a functional intermediary between a piece's creation and its performance, in any way analogous to a score, is only persuasive if we assert (as we do here) that the sound file (like the score) is accessible in some palpable form before the performance. We can assert this, so long as we contend that a monitor speaker hearing or headphone hearing is distinct from a performance experience– in other words, that only in performance in a room space do distinct contingent properties emerge. The sound file is also accessible visually, of course, as a spectrograph, and some interpretive decisions may in fact be made on this basis.

(Denis Smalley's valuable spectromorphological approaches to analysis (or description) have had tremendous impact; but using a spectrograph directly as a performance guide is not a typical or known technique. François Delalande's description of the correlation between a particular scale of features and an interpretive mapping suggests a possibly interesting direction: 'When we listen to music, we constantly use metaphors, putting sounds in relationship to non-sonorous elements, which our other senses can normally perceive, but not necessarily in the same way … . The result will be diverging forms of metaphorization, linked to different methods of listening. However, if a listener is given precise directions that focus the semantic field [e.g. spatial locations] on a particular dimension, such as high/low or shrill/deep, sufficient convergence can be observed so as to construct scales [e.g. of locations] delineated by such correspondences' (Delalande 2003: 316).)

In sum, what appears pre-performance then is a skeleton of the waiting-to-be-reproduced music. Does a sharper articulation of parameters in the digital file indicate a greater insinuation of the composer into the performance, as Adorno observed in acoustic music? As a general tendency, we do hear the music this way. Acousmatic diffusion practice is one example. The way the stereo file is composed enables particular diffusion techniques to occur. Extreme registral striation, for example, would encourage moving the sounds manually to place certain registral or timbral related gestures in particular places. A more integrated registral technique would allow the digital file to diffuse itself more naturally across speakers/channels that were tuned to different frequency response emphases.

The tradition of listening to electroacoustic music in large spaces has spawned ongoing compositional attention to expressive features uniquely inspired by the anticipated venue type (Austin and Field 2001: 29). Yet we still have few spaces built exclusively for the reproduction of electroacoustic music. What a performer encounters in spatialising an electroacoustic

work is the possibility of a space/composition mismatch in a way that is potentially more dramatic than in the case of acoustic music. A violin sound is tied to the violin, whether in Carnegie Hall or on a subway platform. Acoustic musicians do, of course, also develop a connection or a struggle with a performance space, especially concerning issues of reverberation or room resonances. But electroacoustic music that is not meant to be tied conceptually to loudspeakers has the unique added challenge of trying to forge a *conceptual* connection with the space. (Why a practice has not developed of listening to *recorded* reproduced electroacoustic music – in other words, recorded as it is played back in given spaces – seems an interesting hypothetical, albeit something most explicable in the context of headphone listening only.)

3.4. Perceptual clarity in electroacoustic music reproduction: spatialisation

Insights by Pierre Schaeffer on the nature of musical clarity support an application of Adorno's theory to electroacoustic music on perceptual grounds.

> Before discussing space and sonorous architecture, it is appropriate to speak about the identification of the objects, and of their coexistence. Their localization means little; the only significance it carries is this: [it enables] an incomparably *clearer, richer, and more subtle* perception of their contents. Thus, stereo vision yields the third dimension, and allows, by staggering all of the visual objects in relation to one another, better judgment of their properties and relations. (*Avant même de parler d'espace et d'architecture sonore, il convient de parler de l'identification des objets et de leur coexistence. Leur localisation importe peu, c'est ce qu'elle permet qui importe: une perception incomparablement* plus claire, plus riche, et plus subtile de leurs contenus. *Ainsi, la vision binoculaire donne la troisième dimension, et permet, en étageant les objets visuels les uns par rapport aux autres, de mieux juger de leurs propriétés et de leurs relations*.) (Schaeffer 1966: 409; my translation)

In other words, placement of the sound objects in a three-dimensional world heightens the clarity with which we can perceive them as 'visual objects'. This precedes attention to the space's sound itself. One psychoacoustic example of this is that we hear sounds in the same registral band much more clearly if they are locationally separated.

Finally, a comment here about the selection of loudspeakers themselves, which play a part in the perceptual clarity of the electroacoustic reproduction. What we need to create in every electroacoustic performance is the instrumentation, or the meta-instrument. Loudspeakers are chosen in number and kind, placed in a particular configuration, and directed to react with the room surfaces in particular ways. 'The term orchestra in ''loudspeaker orchestra'' is appropriate not only because of the deployment of individual ''loudspeaker-instruments'' in space, but also because of the different registers and timbral qualities of each loudspeaker' (Tutschku 2011: 1). Heavily articulated spatial movement fosters heightened distinction, *Deutlichkeit* as Adorno calls it (Adorno 2001: 131), by manifesting structure in ways that encompass tactility and proximity. Hoban translates *Deutlichkeit* as 'clarity' (Adorno 2006: 100). For example, Stockhausen's numerous directives regarding loudspeaker arrangements for his pieces do not mention speaker type or size, but they do detail placement and directionality. His practice of using pairs of speakers at each locational node is a method aimed to create as many stereo images as possible in a surround formation; thus he creates sixteen right/left convergences from eight speakers (Stockhausen 1996: 93). He also practised placing loudspeakers on 'platforms, tilted upwards', specifying exact metre height from the ground (1996: 86).

4. WHAT DOES 'INTERPRETIVE' ACTUALLY MEAN?

4.1. 'Malleable' versus 'structural' elements

Adorno places the mimetic act of 'sensory spiritualisation' opposite to that of listening, which is a 'means of fixing [the sound], of identifying it' (Adorno 2006: 65). It is the function of the score (and the sound file) to fix some elements of the composer's mimesis, and to free certain elements. The performer then strives to approximate the mimetic experience. With a clearer sense of the respective roles of both 'malleable' and 'structural' elements, we can return more productively to Adorno's question, 'What does it actually mean to play a melody?' (Adorno 2006: 229). We can transform the question, too, into an analogous but more generalised inquiry regarding the electroacoustic medium. What does it mean to articulate a gesture? a spatialised texture? a timbral emphasis? Ultimately such questions can only be answered on a case-by-case basis. This article does not argue for a methodology of mapping, only for greater attention to the implications of how the malleable parameters, specifically chosen, may lend meaning to, or clarify the meaning of, fixed elements.

4.2. Amplitude interpretation in acoustic versus electroacoustic practices

There are two other categories (besides spatialisation) identified in this paper as malleable in fixed electroacoustic music. First, consider amplitude balance. It can be shaped emphatically in both acoustic and electroacoustic music. In acoustic music, however, its methodologies of implementation are vague. Notated

dynamics are subjective. Amplification potentials of instruments are idiosyncratic. Dynamics are responsive to a given performance space. Nonetheless, along with these quandaries comes enormous interpretive freedom to shape moment-by-moment textures and voicings, imposing hierarchical emphases.

In contrast, an electroacoustic piece's dynamic 'composite' is relatively intransigent. Dynamic emphases can be altered by adjusting the music's equalisation curves, but this affects sound intensity levels globally not on a momentary micro-event basis. Multi-channel works, however, especially those with registrally distinct track separation, may even have more potential for amplitude shaping than does acoustic music. An additional limitation is that amplitude variation of any isolated sound through a mixer and speakers rarely simulates the effect of amplitude variation of an acoustic sound through acoustic means. Natural amplification almost always changes the spectrum of acoustic sounds. Equalisation used in electroacoustic diffusion, however, is based on frequency variation not on amplitude variation. For all these reasons, typically, only when amplitude variation intersects with spatialisation does it play an emphatic role in the reproduction of electroacoustic music. Thus, an aesthetic question such as 'should this passage have a near field and far field, or a minimal depth of distance?' might be explored most effectively by adjustments to both spatialisation and amplitude together.

4.3. Equalisation in electroacoustic performance practice

Consider finally the potentially magnetic role that equalisation in electroacoustic reproduction might play, in light of Adorno's contention that timbre is the affect most aligned with music's pre-conceptual dimensions. ('Timbre' as used in this article refers to the spectral content and evolution of the sound, not the Schaefferian-based identification of a sound source.) Maybe even more so than the other parameters discussed, equalisation's fineness of control is dependent on the available mixing equipment. Still, there are philosophies of its use.

Equalisation is often used to neutralise room resonances or to mitigate unbalanced room activation. But, more intriguingly, a sound file can be tuned to interact with a room. If the performance space is a black box, performance-tuned equalisation can cause speakers at different heights of a performance space to be a secondary means of vertical spatialisation and of complex, unevenly distributed articulation. Finally, timbral change can affect our sense of spatial location since we associate natural roll-off of high frequencies with more distant sounds. And low frequencies can be used strategically to mask precise location identification, since they are notoriously difficult to locate.

Electroacoustic performance of 'timbre' is able to impose qualitative-like frequency-response curves across the entire orchestrated mix. Pieces most inclined to sounding transformed each time they are played are thus often those with textures that are timbrally monothematic or that evolve slowly timbrally. Selective emphasis of spectral weightings can articulate connections, much like voice leading. It can also direct timbral emphases outward, toward tactile effects on the listener, nearly irrespective of the musical structure. (This author experienced such sensations in an acousmatic diffusion concert where François Bayle performed his own music.)

Finally, timbre associated with individual performers might be a phenomenon in electroacoustic performance, as it is in acoustic performance, through unique aural filtering as well as taste; and there is interesting potential for equalisation to be a more personally distinctive element of fixed media performance. Stockhausen's approach to timbre supports a similar end as described here, even recording timbres of live electronic performance 'so that now and forever people can hear how these timbres sounded') (Stockhausen 1996: 98). How he might then perform these timbres would seem to follow from his philosophy of speaker experimentation in a specific space, toward 'managing the hall'.

4.4. Speed of events in electroacoustic reproduction: its fixity and its illusions

Let us look now, finally, at the most rigid feature of performed electroacoustic music – the timing of events. Fixity is clearly antithetical to spontaneity, but is it necessarily a negative? The fixity of timing in fixed media is certainly a limitation in that it deactivates tempo as an expressive element. Tempo's ability to underline other features is thus also deactivated. And so, in various performance spaces which may differ in size and reverberant qualities, the music cannot re-calibrate its pacing of events. At moments where more time might be ideal for the clarity of attacks, or more ideal for the perception of a phrase's trajectory, no temporal adjustment option exists. Spatialisation, however, can go a long way toward compensating. We can alter the perceived speeds of phenomena by careful distance movements in a diffusion or multi-channel design.

Consider, for example, how redistributed spectral intensity, or narrowing channel locations, or amplitude modification might affect perceived proximity for the listener, and thus take the place of an actual ritardando. As a reminder of the interconnectedness of expressive parameters, consider this remark by Adorno on the linkage of parameters in an acoustic work: 'It is also possible that the crescendo notated by Brahms in the 3 critical bars before the augmentation [in Symphony No. 2, movement I, bars 17–19] should

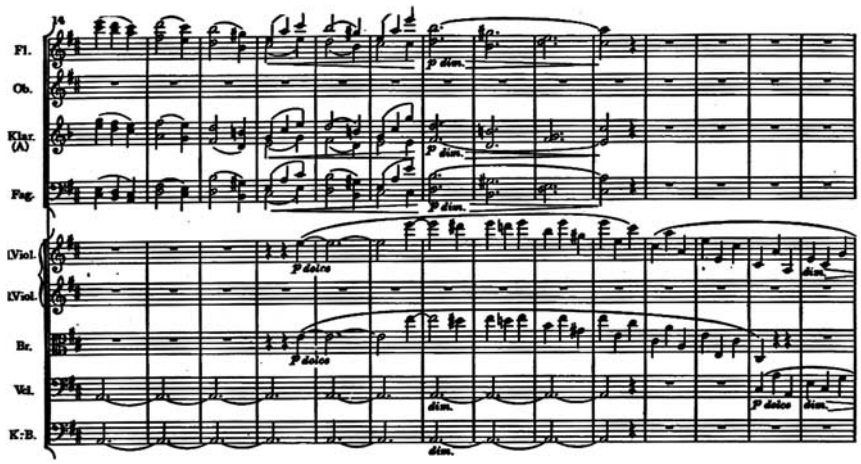

Figure 5. Brahms, Symphony No. 2, op. 73, movement I, bars 14–23.

prepare the ritardando effect *without* any tempo modification (dynamics can replace tempo!)' (Adorno 2006: 128). Adorno refers here to the difference between composed ritardandos (which are 'mensural' and idiomatic, and which seem to be augmentations) versus 'neumic' (or mimetic) ritardandos, meaning not written out. His point is that the lead up to the augmentation, in mensural fixed form, is not nuanced enough to make the augmentation persuasive. He then admits that Brahms' solution, the crescendo, creates the illusion of an appropriate temporal advance to the augmentation (Figure 5).

Let us conjure up an analogous situation in an electroacoustic music performance. Imagine a passage in which an object moves repeatedly left to right and back, slowing down markedly over time. The digital sound file encodes an image whose endpoint locations don't move. In this way, the gestural idea is fixed 'mensurally'. But, as the motion slows down in the file, the interpreter uses a panning motion that increases in its angular spread. In other words, as the motion slows, a neumic gesture, overlaid on the right–left encoded (mensural) motions, creates a lengthening of the distance the sound travels. The ritardando will thus seem far less apparent, subsumed by the greater distance. In sum here, echoing Adorno's remark that acoustic music 'is *always* "rubato"' (2006: 7), this article suggests a parallel aphorism, that electroacoustic music is *always* physically *motile*. Acoustic music is also always spatially active, but its fluctuating sound radiation patterns are very subtle, and also (partly for this reason) they have not worked their way into acoustic music metaphors.

5. CONCLUSIONS AND IMPLICATIONS

One of the goals of this article has been to reconsider the assertion that '[t]he electroacoustic work is fixed in so many of its attributes that it is not possible to provide a significant new interpretation. One could

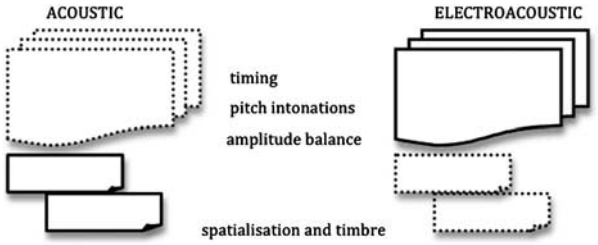

Figure 6. Performance intervention sites for acoustic (left) and electroacoustic (right) musics.

therefore come to consider electroacoustic music as the ultimate "museumification" of musical art' (Garnett 2001: 29). Adorno's theorising is useful as a springboard, a framework and an intellectual provocation for such a revisiting. Listeners have, for decades, tended to listen to fixed electroacoustic music performance with an attunement toward the same parameters that are activated in reproducing notated acoustic music. But, as Figure 6 shows, the most receptive sites for performance intervention in acoustic music (timing, pitch intonations and amplitude balance) are those that are immutable or relatively hard to control in electroacoustic music. And, conversely, the sites that are maximally receptive to performance intervention in electroacoustic music (spatialisation and timbre) are completely or marginally mutable in acoustic music performance. Electroacoustic performance (in comparison with acoustic) thus invites us to focus on both its malleable and its immutable elements as uniquely constructed. We do not wring our hands about the fixities of acoustic music, and perhaps we need not do so for electroacoustic music.

5.1. Implications and future applications

Adorno's theory also urges us to value the significance of the non-identity of production and reproduction in

the fixed electroacoustic music domain. By realising that scores do not exclusively enable what Adorno calls 'reproduction', we can think more reflectively about how encoded sound files are realised. Interpretation happens at the junctures in a musical work where precise information is difficult to encode, or has intentionally not been encoded. The sites at which this happens in electroacoustic music are unique. Music's ability to capture spontaneity makes it a powerful manifestation of mimesis. Adorno's remark that 'The subjective component of objectivity is interpretation' (Adorno 2006: 65) is applicable here. New layers of meaning arise from newly performed parameters. Ultimately, we discern interpretation in the interaction of the fixed and the malleable elements. These are all reasons to revisit assumptions of fixed media music 'museumification'. Thinking more analytically about electroacoustic reproduction promotes artistic development of its performed features, deeper analysis of the practices, and clearer thinking about our interpretive goals in reproducing electroacoustic music.

REFERENCES

Adorno, T. 2006 [2001]. *Towards a Theory of Musical Reproduction*, ed. Henri Lonitz, trans Wieland Hoban-Cambridge: Polity Press.

Adorno, T. 2002 [1955]. The Aging of New Music, trans. Robert Hullot-Kentor and Frederic Will. In *Essays on Music*, ed. Richard Leppert, trans. Susan Gillespie. Berkeley: Univeristy of California Press.

Adorno, T. 2001. *Zu einer Theorie der musikalischen Reproduktion*. Frankfurt am Main: Suhrkamp.

Adorno, T. 1997. *Aesthetic Theory*, trans. Robert Hullot-KentorMinneapolis: University of Minnesota Press.

Adorno, T. 1984 [1925]. Zum Problem der Reproduktion. In *Gesammelte Schriften. Musikalische VI*, vol. 19. Frankfurt am Main: Suhrkamp.

Adorno, T. 1978 [1958]. Musik und Technik. In *Gesammelte Schriften. Klangfiguren (I)*, vol. 16. Frankfurt am Main: Suhrkamp.

Adorno, T. 1977 [1958]. Music and Technique, trans. Wes Blomster. *Telos* **32**: 79–94.

Austin, L. and Denis, Smalley. 2000. Sound Diffusion in Composition and Performance: An Interview with Denis Smalley. *Computer Music Journal* **24**(2): 10–21.

Austin, L. and Ambrose, Field. 2001. Sound Diffusion in Composition and Performance Practice II: An Interview with Ambrose Field. *Computer Music Journal* **25**(4): 21–30.

Brümmer, L. et al. 2001. Is Tape Music Obsolete? Is Spatialization Superficial? *Computer Music Journal* **25**(4): 5–11.

Clarke, E. 1999. Subject-Position and the Specification of Invariants in Music by Frank Zappa and P.J. *Music Analysis* **18**(3): 347–74.

Desantos, S. 1977. Acousmatic Morphology: An Interview with François Bayle, trans. Curtis Roads. *Computer Music Journal* **21**(3): 11–9.

Delalande, F. 2003. Sense and Intersensoriality. *Leonardo* **36**(4): 313–16.

Emmerson, S. 2007. Diffusion-Projection: The Grain of the Loudspeaker. In *Living Electronic Music*. Burlington, VT: Ashgate, pp. 143–70.

Garnett, G. 2001. The Aesthetics of Interactive Computer Music. *Computer Music Journal* **25**(1): 21–33.

Goodman, N. 1976. *Languages of Art*. Indianapolis, IN: Hackett.

Goehr, L. 1992. *The Imaginary Museum of Musical Works*. Oxford: Oxford University Press.

Goehr, L. 1989. Being True to the Work. *The Journal of Aesthetics and Art Criticism* **47**(1): 55–67.

Harrison, J. 1999. Diffusion: Theories and Practices, with Particular Reference to the BEAST System. *econtact* **2**(4), http://cec.sonus.ca/econtact/Diffusion/Beast.htm (accessed 7 June 2012).

Hirt, K. 2010. *When Machines Play Chopin: Musical Spirit and Automation in Nineteenth-Century German Literature*. Berlin: Walter de Gruyter GmbH.

Levinson, J. 1980. Autographic and Allographic Art Revisited. *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* **38**(4): 367–83.

Milutis, J. 2008. The Biography of the Sample: Notes on the Hidden Contexts of Acousmatic Art. *Leonardo Music Journal* **18**: 71–5.

Paddison, M. 2007. Performance, Analysis, and the Silent Work: The Problem of Critical Self-Reflexion in Adorno's Theory of Musical Reproduction. In A. Nowak and M. Fahlbusch (eds), *Musikalische Analyse und Kritische Theorie: Zu Adorno's Philosophie der Musik*, vol. 33. Tutzing: Verlag Schneider.

Schaeffer, P. 1966. *Traité des objets musicaux*. Paris: Éditions du Seuil.

Stockhausen, K. and Jerome, Kohl. 1996. Electroacoustic Performance Practice. In. *Perspectives of New Music* **34**(1): 74–105.

Stuckenschmidt, H. H. 1994 [1925]. The Mechanization of Music. In J. Hermand and M. Gilbert (eds), *German Essays on Music*, trans. Michael Gilbert. New York: Continuum.

Tutschku, H. 2011. On the Interpretation of Multi-Channel Electroacoustic Works on Loudspeaker-Orchestras: Some Thoughts on the GRM-Acousmonium and BEAST, trans. George Goodman. www.goethe.de/ins/us/bos/kue/aoi /abo/int/enindex.htm (accessed 30 May 2012).