

Rebalancing the discussion on interactivity

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Abstract

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In two papers presented in 2011 (2011a, 2011b), I suggested that there had been a fundamental misunderstanding on the issues of *perceiving* interactive processes in music making. Understandably there has been much discussion of the *dislocation* of ‘cause’ and ‘effect’ in many interactive music systems, that is, the apparently arbitrary relationship of instrumental gesture to ‘resultant’ electroacoustic sound. ‘Resultant’ in inverted commas means that we may not perceive the sound as *resulting* from the instrument or action at all. Some have argued that the perception of causal chains must be reestablished for meaningful interactivity to take place, others that the connections may remain opaque and almost mystical – that it simply doesn’t matter.

I will develop the argument that the listener perceives, first and foremost, *effects* not *causes*. The degree to which we might then reconstruct a possible cause from the effects will vary as it always has – but it may be the wrong question. Indeed it may not be needed at all in appreciating the expressive content of the music. That is not to say that the relationship is not important – only that we do not need *consciously* to uncover it for the music to ‘make sense’. We need to distinguish the functions of composer, performer and audience because each have very different needs in this respect – these may overlap, reconfigure and even disappear. Thus we have composer-performers, improvisers, or group music making without any further participants.

The paper will aim to place the performer back at the centre of the discussion on interactivity. What does the performer need to know, to understand and assimilate? The composer has insufficiently addressed this in recent years, focusing too much on what the audience may experience in the crude terms of ‘getting the message across’ of the cause/effect chains s/he has created. This discussion will allow us to rebalance the language, acknowledging the technology of production on the one hand, while restoring discussion of the expressive potential of the medium on the other – with the performer at the fulcrum.

Dislocation

‘Dislocation’ has a negative feel about it in English – a dislocated shoulder or hip needs medical attention. Dislocated transport or communications systems must be ‘remedied’. The meaning has drifted from simply ‘not where it was before’ towards ‘not where it should be’. I have discussed the ‘acousmatic dislocations’ as the consequences of the development of the

new ‘technologies of sound’ in the last quarter of the 19th Century – telephone (1876) and radio (1890s, transatlantic 1901) allowing us to displace sound in space, while recording (1877) allows displacement in time (Emmerson, 1994, 2012a).

Relocation

Dislocation gives way to *relocation* – that is technological change has led to a relocation of the apparently live causes of sound. It need not be ‘within earshot’ or happen ‘at the time’ (that is usually a few milliseconds before) we hear it. This distancing might make us feel anxious. The root of the problem is verification and trust – I trust my eyes and ears that you are here in front of me as I talk. However as technology is extending our perception to far off places (and times), mediated (audio-visual) links replace direct soundpath and siteline. We learn only slowly to trust the system. This is maybe a generational matter - younger people have grown up to use (and basically have learnt to trust) such systems. Although impersonation on social media is not uncommon and such trust can clearly be misplaced.

Beyond ‘liveness’: from reply to response

Interactivity in live electronic music is the substitute of machine for human response. If remote we may never know from the sound flow alone whether a musical partner is ‘really’ alive; there have been efforts to establish a kind of Turing test for this condition (Emmerson, 2012b). But maybe we don’t need to; perhaps this is the wrong question. I am increasingly of the view that concerns about *liveness* in music making with technology are not as important as some notion of *meaningful response*.

My dictionary tells me –

Interaction: reciprocal action or influence.

Response: a verbal or written answer to a question, possibly a reaction to something; but this sounds like ‘reply’. More relevant is the Latin origin (*responsum*) which my dictionary then tells me means ‘something given in return’ which has a much closer ring to how I understand it. Thus I suggest a response is more than a reply: a true response adds value or meaning, solves problems or develops ideas; it engages and addresses the receiver almost personally. This is illustrated well in the phrase which describes one of the basic types of musical exchange – *call and response*. ‘Call and answer’ does not have the same ring in English!

I am arguing for a shift of focus here. The perception of an appropriate and meaningful link in this interactive chain pertains to the *nature of the perceived results* not simply to the *nature of the known causes* (which we may never fully know). Where the nature of the result is appropriate and meaningful crude interaction becomes true response – and even more importantly ‘appropriate and meaningful’ are *musical* judgements.

Interactivity and causality

In computer processes we often set up simple causal chains. Let us establish a world of agents called X, Y, Z, etc. which might do actions A, B, C, etc.

A single causal *action* is simply of the form: Agent X does action A.

And a causal *reaction* is: Agent X does action A which causes agent Y to do action B.

Then *interaction* adds the return path: Agent X does action A which causes agent Y to do action B; in turn this causes Agent X to do action C – and so on...

But we must be careful about the word ‘cause’ here. As a human musician if I ‘call’ and you ‘respond’ – I have not *caused* your response in the same deterministic sense that we might programme in a patch, even if we build in some statistical (say Markov) procedures. I might be said to have *provoked* your response through social and musical convention. But can I provoke my computer into action? Does it have free will to say ‘no thanks’?

What exactly are we examining?

Christopher Small (1998: 193) has written: “[...] it is the relationships that it brings into existence in which the meaning of a musical performance lies. [...]”. He goes on to discuss the relationships between those taking part, the physical setting, and the sounds being made, to which I would add the relationship of those taking part to the sound production (means and methods).

The relationships between the sounds that are being made is the domain of ‘traditional’ musicology for music on fixed media. This tends to an abstract neo-platonic idea of the music, related to notions of *Werktreue*. Nothing much outside of the sound is considered ‘the music’. However considering the relationships of those taking part to the sound production (means and methods) is the domain of a more holistic ‘live and interactive’ musicology. This does seek to look at the whole process of creation and reception – all participants in the act of performance have a role.

Hearing causes

There are three related questions that are too often left as assumptions, insufficiently interrogated themselves: in listening to music do we hear (or otherwise perceive) causes? Indeed do we really want to search them out? And is it useful to know them?

What we hear is the result of an action or process: we do not hear a cause, we hear an effect. Of course we may work out a possible cause from the sounding flow. In evolutionary terms this was fundamental to our survival (Pierre Schaeffer’s *écouter* (listening for information) of the *four listening modes* (Chion, 1983) or Barry Truax’s *listening-in readiness* (Truax, 1984)). But this survival search was largely to do with primary causes – tiger, water, enemy or friend. So a crude equivalent for music might be – piano, metal sound, electronic source. But cause in a deeper musical sense may pertain (for example) to composition and performance strategies – and these may simply not be obvious from the sound alone if you did not know something already from a programme note or a composer’s presentation, or previous knowledge and experience of a performer’s ‘vocabulary’.

Guessing games

In our search for causes our musical attention might be distracted into *guessing games*. We can do this in several ways; firstly where the sounds came from, how they were made, for example whether the sound sources are real objects or synthesised (as above); then we have

guesses on ‘characteristic’ signal processing (what Denis Smalley has called *technological listening* (Smalley 1997), where we might persistently recognise a particular DSP plug-in; finally we have higher level guesses concerning how the sounds are organised – for example ‘by ear’, system, method or algorithm. Typical guesses might cluster around abstract versus abstracted schema, or systems derived from chaos, fractals, swarms, etc.

Such games may be fine for professional composers (and EMS conferences) because we really do want to know the answers for a variety of professional reasons. But I do not think this is helpful for a wider audience in gaining an expressive musical experience... We are poor role models for that.

Hearing systems

I have always doubted the very limited discussion about ‘hearing systems’ or indeed any generative procedure whatsoever. As a direct parallel with the earlier discussion of cause and effect, I want to make a clear distinction between *hearing an action* or process and *hearing the result of an action* or process.

Very rarely we might ‘hear a system’ directly as in the early works of Steve Reich where a process is ‘set in motion to run its course’, for example *Come Out* or *Piano Phase* (Reich 2002). We do not hear ‘star maps’, or indeed stars, as causes directly in Cage’s *Etudes Australes* or Stockhausen’s *Sternklang*, but we hear the results (effects) clearly and we possibly group the point sounds by ear in a similar way we group the stars by eye to create imaginary associations (constellations).

I do not believe composers necessarily intend us to ‘decode’ the likes of chaotic and fractal generators, swarm algorithms or neural networks (as such) as generators of musical material. Yet each of these may have *clear consequences in the sounding result* even if we cannot consciously articulate the generational cause. If that relationship is strong (with clear characteristics which appear not arbitrary) then the process has at least functioned effectively. Of course it *may* be possible to learn these relationships – you might listen to so much ‘swarm music’ that you learn to recognise characteristic sound traits of this generative procedure. Most composers would hope at least to claim *coherence* and *consistency* in their results – though we might like to test them on this! These are *effects* not *causes*.

Rebalancing

The guessing games we described above relate to the two approaches to what we are looking at: (a) music as the sound alone (b) music as activity and action to which we all contribute in the act of performance (Small). For our interactive system this distinction is crucial: for the first approach we can ignore the complex processes of production, the musical meaning lies in the relationship of the sounds and how we make sense of that; for the second, the picture gets more complex – hardly surprisingly as there are many more components.

Perhaps this complexity roughly equates to how Aristotle’s *material*, *efficient* and *formal* causes relate to music and what we want to know –

The *material cause* of music is the sound (alone), its physical existence. That’s the first approach we just dealt with.

The *efficient cause* of music is the performer (and other participants);

The *formal cause* of music is its design (score, generative procedure - or lack of one) – what causes something to follow another thing.

I am suggesting that the real issue is the *differing needs* of the participants because of their various roles – composer, performer, audience. These roles may overlap, reconfigure and even disappear as separate individuals but probably not as roles. Thus we have composer-performers, improvisers, or group music making without any further participants such that all the boundaries are blurred. I would argue that these roles do not disappear but simply ‘remix’ in different ways.

The composer

The composer knows the *real* efficient and formal causes: s/he has constructed (for example) a Max patch, established causal chains, created the vocabulary of possible responses and how those are chosen. The composer sometimes tends to assume these are communicable directly to the audience through the performer. Autosuggestion is clearly often at work – composers tend to ‘hear’ their composed interactivity because they know it’s ‘really’ there in the patch. ‘But can the rest of us in the audience hear it?’ has been the dominant question for many years. The composer can try to get the audience to ‘hear this’ through programme notes, talks and publications (as already discussed).

The performer

The performer of a traditional acoustic instrument is used to highly consistent cause-effect chains, for example those for the control of pitch intonation or vibrato; s/he is particularly acute at listening and generating intricate and multiple feedback loops: listen > modify action > modify sound > listen. Of course this loop is non- (or perhaps that should be ‘pre-’) linguistic though usually not unconscious, often being the result of many hours of practice. The speed of action is very fast: the latency in such a loop can be of the order of the ‘duration of the present’ in perception.

With the addition of interactive electronics a new complication is added: a more ‘conscious’ layer of performance, which in time must ideally be learnt and sublimated into normal practice. But the performer may or may not know the actual workings of a Max patch. They might learn ‘by sound’ how the electronics performs without detailed knowledge how the patch really functions, or they might choose to get inside the system to better understand the process. Getting to know how something works may seem to us to be a better approach yet many performers still rely on composers to run systems and do not themselves ever get to know the detailed working of the electronics.

But either way it may very well be more difficult (if not impossible) to reach that same degree of control assimilation as for pitch or vibrato control. Nonetheless that must remain an ideal, and something better addressed in the pedagogy of both performers and composers. That (I would suggest) would make the possibility of *meaningful response* discussed above more likely.

The performer, performance and audience

I will have to make an unjustified assertion here –

When the performers *feel* the meaningful responses from their co-performers and interactive systems then the whole ensemble becomes a *meaningful response* network of relationships. This will better succeed in conveying musical expression or meaning to other participants and to the audience. As fellow human beings we will detect and empathise with this relationship, for example through attunement and entrainment. It is the essence of conveying musical meaning and expression through performance.

Whether the *mechanics* of the interaction between performer and technology has as such been perceived and ‘decoded’ by the audience is quite secondary. We should perceive its robust result (the effect) not it (the cause). But as we have discussed this is not so true for the performer – or composer! – and here lies much of the confusion of the literature over the last few years. Different roles have different needs and those of the performer have largely been ignored.

I am arguing that for the audience the overt knowledge that we discuss at conferences such as this is sometimes misplaced. We need to get back to the experience of the music. Does it in the end give the participants (all of them) a valuable experience? Where are the transcendental, epiphany moments? – or the aesthetics of beauty, shock and provocation? These stand in front of – and are supported by – the means and tools we discuss at length at conferences such as this.

References

- CHION Michel, *Guide des objets sonores – Pierre Schaeffer et la recherche musicale*, Paris, Ina-GRM/Buchet-Chastel, 1983. Translated by John Dack and Christine North, *Guide To Sound Objects. Pierre Schaeffer and Musical Research*, London, 2009, www.ears.dmu.ac.uk/ (last accessed 09/2014).
- EMMERSON Simon, “‘Live’ versus ‘real-time’”, *Contemporary Music Review*, 10(2), 1994, pp. 95-101.
- EMMERSON Simon, “Living in a performing world – performing in a living world”, in *Proceedings of the Australasian Computer Music Conference, July 2011*, Auckland (New Zealand), 2011a, pp. 9-15.
- EMMERSON Simon, “Music Imagination Technology”, in *Proceedings of the International Computer Music Conference, July-August 2011*, Huddersfield (UK), 2011b, pp. 365-371.
- EMMERSON Simon, “Location – Dislocation – Relocation (Where is live electronic music?)”, in *Proceedings of the IV Seminar – Music Science Technology: Frontiers and Ruptures, July 2012*, São Paulo (Brazil), 2012a, pp. 7-16.
- EMMERSON Simon, “Live Electronic Music or Living Electronic Music?”, in *Bodily Expression in Electronic Music – Perspectives on Reclaiming Performativity*, D. Peters, G.Eckel, A. Dorschel (eds), New York & London, Routledge, 2012b, pp. 152-162.
- REICH Steve, *Writings on Music 1965-2000*, Paul Hillier (ed.), New York, Oxford University Press, 2002.

SMALL Christopher, *Musicking – The meanings of performing and listening*, Hanover (UK), Wesleyan University Press, 1998.

SMALLEY Denis, “Spectromorphology: Explaining Sound-shapes”, *Organised Sound* 2(2), 1997, pp. 107-126.

TRUAX Barry, *Acoustic Communication*, Norwood (NJ, USA), Ablex Publishing Corporation, 1984.