REVIEW ESSAY

NUSSBAUM'S VIRTUAL MUSICAL SPACE

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Charles O. Nussbaum. *The Musical Representation: Meaning, Ontology, and Emotion*. Cambridge, MA: MIT Press, 2007, xii + 388 pp. ISBN 978-0-262-14096-6 (hbk.); Cambridge, MA: MIT Press, 2013, xii + 388 pp. ISBN 978-0-262-51745-4 (pbk.)

Charles Nussbaum claims that all Western tonal art music since 1650 is programme music, in the sense of possessing extramusical significance of a certain sort.[1] He identifies two kinds of extramusical significance: extramusical form and extramusical content. Extramusical form is semantic field structure, the form of lexical semantic fields: groups of related terms are organized into semantic fields in certain determinate ways – by 'affinity and contrast, hyponomy and superordination, cyclical relations, kinship relations, partonymy, observer-relative and object-relative motion, and ownership relations' (p. 103), for example – and the form of semantic fields is 'the fact that they are structured by relations of affinity, contrast, cycles, hyponomy, and superordination', and so forth (p. 123). Extramusical content is semantic[2] content, which is constituted by 'layouts' and 'scenarios' in an imaginary musical space (pp. 21, 125–26), by 'actions, events, and objects in virtual musical space' (p. 141), in which the listener acts off-line (pp. 21, 126), in which the listener moves in imagination (p. 21). Nussbaum's claim is that every musical work that falls within his chosen field possesses some of each kind of musical significance, but, depending on its style, emphasizes the one kind or the other. And it is in virtue of possessing extramusical content, not extramusical form, that all such music is programme music.[3] So the idea is that the comprehending listener of a musical work will perceive or experience some

1 Charles O. Nussbaum, *The Musical Representation: Meaning, Ontology, and Emotion* (Cambridge, MA: MIT Press, 2007), 126; all subsequent unspecified page references are to this book. The limitation (see also the prototypicality point on p. 40) is imposed because Nussbaum does not care to make claims about music he is unfamiliar with. But the possibility that other kinds of music might not be programme music immediately raises the question 'Precisely which feature possessed by Western tonal art music since 1650, but perhaps lacking in other music, endows it with the representational character Nussbaum attributes to it?' It is unclear to me what Nussbaum's answer would be.

2 Or 'conceptual', for example, pp. 88, 126, 141.

3 Henceforth by 'music' I mean Western tonal art music since 1650.

mixture of two things. The first is movement between semantic fields, and the listener will experience this in virtue of the fact that tones, chords, phrases, motifs, rhythms (constantly) change their musical significance 'because they are simultaneously and sequentially drawn into varying fields of affinity […] and contrast' (p. 113). The second is scenarios, layouts, actions, objects, and events in virtual musical space. The reason the listener will experience this will be examined later. Nussbaum does not make clear whether, if every work possesses some of each kind of extramusical significance, this means that parts of a work may have no scenario content. Or will the scenario content of each work be continuous but in some works (in parts) minimal? I believe that he intends the latter, but in what follows I shall not presuppose this.

Now Nussbaum's claim about music's extramusical content derives from his conception of the representational character of music, of what he maintains that we experience, or what we hear-in music, when we hear music with understanding. His claim is that it is intrinsic to listening to music with understanding that we undergo a certain kind of spatial experience in which movements occur – namely, movements in virtual musical space. So his conception of extramusical content is dependent on the idea of musical space. But the idea of musical space is not needed for the idea of extramusical form, which can be embraced as a significant feature of music without countenancing music's supposedly ubiquitous extramusical content. My concern is musical space. So I shall leave extramusical form aside.[4]

The idea of musical space and of the movements within it that Nussbaum maintains are integral to the experience of listening to music with understanding is quite different from other notions of musical space and movement that have been advanced.[5] What exactly is this idea and does his conception of musical space withstand scrutiny? These questions are not as easy to answer as one would like because a number of threads are introduced into and run through Nussbaum's exposition; they intertwine; and sometimes they reveal their true nature only late on.

At an early stage Nussbaum embraces the idea of musical space and of movements within it (both movements of objects and the listener); he proposes partial explanations of why motion is heard in music – why 'sequences of

[4] I find Nussbaum's idea that music can model and so suggest movement between semantic fields, and so both anaphoric reference and good or bad musical 'logic' (pp. 113–15), convincing.

[5] See, for example, Carroll C. Pratt, *The Meaning of Music* (New York: Kessinger, 1931); Susanne K. Langer, *Feeling and Form* (London: Routledge, 1973), 107–8; Roger Scruton, 'Understanding Music', in *The Aesthetic Understanding* (London: Methuen, 1983), 88–115, and *The Aesthetics of Music* (Oxford: Clarendon, 1997), chaps. 2 and 3.

evanescent tones' are heard as '*movement* through *space*' (p. 50) – and of why 'higher-frequency tones tend to be heard as located higher in musical space' (p. 53); he deals with apparent difficulties about the movement heard in music; and he attributes a variety of properties to virtual musical space.[6] But, when its true nature is eventually revealed, musical space turns out to be, fundamentally, an egocentric behavioural space, 'a three-dimensional space whose origin coincides with the observer's body and in which the observer can *act*' (p. 219). Furthermore, it emerges that the conception of scenarios (mentioned above) is not the ordinary one but Christopher Peacocke's,[7] and that the idea of objects moving in virtual musical space must be qualified. We have been told that 'musical virtual spaces and objects are not subject to the limitations of the physical environment, and […] the listener […] is not limited to the possibilities of physical motion that constrain' the human body (pp. 61–62). But in fact musical space is 'not a space (like physical space) containing fully reidentifiable particulars and places' (p. 226): it has neither reidentifiable places (p. 243) nor reidentifiable objects.[8] It is, rather, a so-called feature space, a virtual feature domain (p. 237), consisting entirely of Peacockean scenarios. In Nussbaum's formulation, a scenario

6 It is not easy to reconcile all the features that Nussbaum assigns to musical space. For example, he asserts that musical space is cyclical (pp. 56–60). It is said to be cyclical on the ground that a tone separated from another tone by an octave sounds higher or lower than that tone but also sounds 'the same again', so that a movement up (or down) an octave in musical space is a movement away that is also a return. And Nussbaum seeks to resolve this seeming incoherence, apparent paradox, by offering an explanation of how the two relationships between a tone and a higher or lower octave actually cohere in the construction of musical space. But in fact there is no need to attempt to build this into an egocentric, feature space: the apparent paradox is mere sleight of hand. For of the two relationships between a tone and an octave, only one is 'spatial'. Certainly we hear an octave as being higher or lower than the tone of which it is an octave, but the sense in which we hear them as being the same is one of perceived (phase-frequency) similarity. The so-called movement away that is also a return is just a movement away to a similar point of the scale, one that stands in the same relations to the following notes of the scale. But these relations between notes occupying different points of the scale are not themselves spatial (or 'spatial'). The 'return' is *not* a return to the same position in space (musical space).

7 See Christopher Peacocke, *A Study of Concepts* (London: MIT Press, 1992), 61–74.

8 'There are […] no Strawsonian reidentifiable particulars in acousmatic space, only musical virtual objects. A reidentifiable particular must maintain its identity while unobserved. This requires that it persist through time in space, and any such claim regarding musical virtual objects is doubtfully coherent' (p. 243); 'given problems of individuation and reidentification of objects and locations in musical space, there can be, strictly speaking, no virtual musical objects' (p. 21); 'music depicts no identifiable objects, not even fictional ones' (p. 200); 'musical scenarios do not contain identifiable intentional objects', but 'musical scenarios may contain musical virtual objects, that is, the objects of representations with nonconceptual content […] [musical virtual objects] are not identifiable in the way virtual objects of literary and cinematic fiction are, for the latter are understood to occupy locations in public space' (p. 201).

is 'an array of surfaces in egocentric space not yet fully reified, or differentiated into persisting objects and properties. It is, in effect, an unconceptualized feature domain, an (as yet) unconceptualized content' (p. 220), 'not a space (like physical space) containing fully reidentifiable particulars and places' (p. 226).

This means that a listener perceives in musical space only surfaces, features of them, layouts of these features and changes in them. Accordingly, the representational content of perceptions of such a space can possess only nonconceptual scenario (and perhaps 'protopropositional')[9] content, 'representing feature environments that contain only virtual objects that cannot be individuated in the full-blown metaphysical sense' (p. 235), an environment 'through which the listener is able to move by following cognitive trails or experiential lines of force through that virtual feature domain' (p. 237). But 'there is only one way to move along the cognitive trails established by the composer' – namely, by starting an episode at its beginning and following it seriatim to the end (p. 245). So 'perspective independence is in principle not achievable in the musical feature domain', that is, musical space is nonconceptual (pp. 244–45). In sum, the leading idea is that anyone who listens to music with understanding perceives virtual movements – their own or not their own – in their own egocentric behavioural space, the representational content of these perceptions being nonconceptual. So 'the listener is immersed in the musical environment as if in a watery surround' (p. 269). Since Nussbaum holds that 'feature domains constitute the environments inhabited by all nonlinguistic life, which includes all nonhuman terrestrial life' (p. 236), his view implies that in listening to music and experiencing its extramusical content we undergo an experience of what it is like to be such an inhabitant, to be highly perspective-dependent. Furthermore, Nussbaum maintains that because, as Strawson argued, 'a necessary condition for nonsolipsistic consciousness is the possibility of there being unobserved but reidentifiable particulars *for that consciousness*' (p. 217), musical space is '*really* […] solipsistic' (p. 246).[10]

But we need, first, to take a step back to Nussbaum's introduction of the idea of musical space and motions within it. For it is vital to understand how our

[9] For protopropositional content, see Peacocke, *Study of Concepts*, 74–86. The possibility of protopropositional content is of no significance for my concern with virtual musical space, and henceforth I shall ignore it.

[10] 'Real' is Strawson's term and 'really' contrasts with 'philosophically' (p. 237). Although he does not signal it, Nussbaum here diverges from Peacocke, for Peacocke argues that nonconceptual representational content is not autonomous and that a creature that has states with nonconceptual representational contents must be able to employ states with such contents in identifying places over time and must employ 'at least a rudimentary form of first-person thought' (Peacocke, *Study of Concepts*, 90–91). If Peacocke is right, Nussbaum's theory needs significant alterations.

experience of the sounds we hear is related to the spatial movement supposedly perceived in music. Nussbaum raises and seeks to answer the question 'Why do we hear spatial movement in music?' However, the fundamental issue is not this, but 'In what sense do we (supposedly) hear spatial movement in music?' And Nussbaum slides between three conceptions of our perception of musical movement that must be distinguished: the (perceptual) illusion of movement, the 'off-line' simulation of movement (which is equated with the imagination of movement), and the suggestion of movement.

I shall consider, first, the idea that the experience of listening to music involves the illusion of movement, of change of position in space, of temporal spatial displacement. Nussbaum invokes the idea of the illusion of motion in a number of places.[11] For the present purpose, this one will suffice:

> Nothing in the musical surface really moves: discrete tones simply sound and cease to sound in specified sequences. Why should we find it so natural, indeed so irresistible, to interpret heard sequences of evanescent tones as *movement* through *space*? There is little doubt that the experience of motion in music is an illusion that bears *some* analogy to the illusion produced by motion pictures, where it is also the case that there is nothing literally in motion on the surface of the projection screen: regions of the screen are illuminated in various sequences. There may be no real motion in motion pictures; but the screen is, at least, a two-dimensional, apparently continuous, spatial surface. Why do we hear sequences of discrete tones as defining a space in which motion occurs?
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> Notice that in order to produce the cinematic effect of motion, the sequence of individual frames must be rapid enough to preclude their individual perception. Otherwise, the illusion of continuous motion is lost. Music is not like that. Individual tones, even ones of very brief duration, are easily identified and do not blend into apparently continuous motion. This suggests that the illusion of musical motion is produced in some other way […]. (p. 50)

Nussbaum rightly rejects the idea that the phenomenon of musical movement – continuous motion through musical space despite the discontinuity of the musical scale – is 'an auditory version of the visual Phi phenomenon' (pp. 55–56). But although, given the assumption that musical motion is an illusion, the reason he gives for this rejection is effective, he fails to recognize the more basic disanalogy between the two cases. For whereas the visual Phi phenomenon, in which two lights flashing successively appear as one moving light, *is* an instance

[11] For example: 'Like music, cinema creates an illusion of motion by way of a carefully ordered sequence of perceptions' (p. 32); 'musical structure allows the creation of the *illusion* of retracing a path' (p. 33); 'hearing musical virtual objects and scenarios in the informationally structured musical surface' is like seeing a scene in a painting, which is 'a case of perception, albeit a controlled *perceptual illusion*' (p. 47); 'These are artful illusions, made possible by the structure of musical space' (p. 64); 'In the middle section of Debussy's *Fêtes* […] the illusion of an approaching parade is achieved […]' (p. 73).

of perceptual illusion, musical motion *is not*. The Phi phenomenon is a visual illusion precisely because it looks to the spectator as if a patch of light is moving continuously from one position to another, when in fact this is not so. But musical motion is not an auditory illusion: it does not sound to the listener as if a sound (something making a sound) is moving from one point to another.[12] For musical motion to be an analogue of the Phi phenomenon, it would have to be the case that musical motion consists in the perceptual illusion of the movement of a sound (something making a sound). But of course in listening to music no sound (or anything else) even seems to move (up or down, from one position to another). Construing musical motion as an illusion, and recognizing the inadequacy of the Phi phenomenon explanation, Nussbaum regards musical motion as requiring a different explanation. But what is needed first of all is a correct characterization of the phenomenon, not an explanation of it. The experience a person has in undergoing a perceptual illusion is for the perceiver indistinguishable from the experience he would be having if he were perceiving what he seems to be perceiving: the experience seems to the perceiver to have a certain representational content, which in fact misrepresents the world. For as long as the illusion endures, it seems to the perceiver (falsely) as if he were perceiving a certain state of affairs. The phenomenology of so-called musical movement is not like that. This point becomes crystal-clear if we press the question 'What is (illusorily) perceived to move?' Not a sound (or source of sound) and not a scale passage or theme or melody.[13] In fact, in musical movement nothing is (illusorily) perceived to move (along any spatial dimension),[14] whereas in the visual Phi

[12] In fact, the conception of musical movement that Nussbaum eventually advances does *not* present musical motion as an *auditory* illusion. To anticipate: it is not that it is supposed to seem to us as if some (virtual) object is moving in space emitting the sounds we hear. Rather, we are supposed to imagine, not sounds (sounding things), but haptic-like explorations of surfaces in three dimensions. However, not only is musical movement not an auditory perceptual illusion, it is not a perceptual illusion of any kind. In particular, it is not a haptic illusion (of bodies moving in relation to me or of my moving in relation to them): in listening to music we do not auditorily-cum-haptically undergo the illusory experience as of objects moving, or the illusion of haptic exploration of surfaces in three dimensions. (See below for the idea of musical experience's including the experience of virtual bodily movement and the emphasis on haptic-like exploration.)

[13] Writing of an episode of the *Finale* of Beethoven's Ninth Symphony, Nussbaum asserts that 'if we acknowledge the phenomenology of virtual motion in musical or acousmatic space, these sweeping eighth notes and vaulting fugal subjects, all the while exchanging registral positions, do not sound as if they are traversing distances of mere *inches* in musical space: they sound as if the motions in question must be measured in *leagues*' (p. 62). This represents the notes and subjects as moving. But perhaps this is a slip.

[14] Since musical space is supposed to be a feature space, a feature-placing environment, nothing – no particular, enduring thing – *could* be perceived (illusorily) to be moving.

phenomenon something is illusorily perceived to move from one position to another, namely a spot of light.[15]

Although Nussbaum embraces an illusion view of musical movement, he often slides into a much weaker claim, namely that musical movement is a matter of suggestion. For example, he states that music 'can suggest both object motion and observer motion' (p. 49). In his explanation of why music is heard as spatial at all, he claims that 'sequential stimulations on the skin surface can easily suggest both observer and object motion. The same could hold for sequential mechanical stimulations along the frequency-tuned length of the organ of Corti. After all, musical motion requires change of pitch, and change of pitch is mediated by just these sequential stimulations.' (p. 53)[16] And he mentions more specific suggestions: 'The continuous flight of a numerically identical bumblebee somehow can be suggested by a sequence of discrete tones. Continuously flowing water somehow can be suggested by sequences of discrete descending violin and viola thirds. How are such things possible?' (p. 55) Now for one thing to suggest another is not for it to produce the illusion as of being that other thing. It is, rather, a matter of indirectly bringing that other thing to mind through some apparent connection between the two. Accordingly, if musical movement is a matter of suggestion, musical movement is a matter of music's bringing to mind the idea of movement in space. In this sense, musical movement is an undeniable phenomenon: music does sometimes suggest movement (and when it suggests the movement of some specific kind of thing it is likely to be the composer's intention that it should do so). Furthermore, whenever music suggests movement in space there is a question of explanation: why does it bring it to mind (and why observer, rather than object, motion or *vice versa*)? But the fact that music can suggest movement, does not imply that it always does, that the suggestion of movement through space is intrinsic to the experience of tonal art music, or that it must suggest spatial movement if the listener is properly to appreciate a piece of music.[17]

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15 The speculative explanations that Nussbaum offers of why music is heard as spatial at all and why higher-frequency tones are heard as being higher in musical space do not support the idea of musical motion being a perceptual illusion. Note that this latter explanation may explain why we associate 'high' and 'low' with higher- and lower-frequency tones, but it does not elucidate the sense in which we hear them as being higher/lower (in 'musical space').

16 In his General Summary and Conclusion Nussbaum writes that music is 'in motion because its action plans *suggest* modes of movement, both observer motion and object motion, an *effect* that is *enhanced* by the flow of stimulation along the tuned length of the organ of Corti in the inner ear' (p. 301, my emphases). He also writes: 'music (or its mental representation in the listener) is, as we have seen, *not* spatial but *suggests* spatial organization' (p. 279, my emphases).

17 Nussbaum's use of 'suggests' is uncertain. It often seems to approximate to the normal usage mentioned above, as, for example, when he considers music's 'ability to suggest

Because Nussbaum conceives of the seeing of a virtual object in a picture as being a controlled perceptual illusion (p. 47), it is unsurprising that another thread in Nussbaum's thought is the alignment of hearing-in with seeing-in – of hearing movement in musical space with seeing a picture as a depiction of a state of affairs.[18] If hearing-in is likened to seeing-in, pictorial space to musical space, then just as only the visual can be seen in pictures, only the audible can be heard in music. Now although only sounds are immediately audible, there is a sense in which things other than sounds can be heard in music. For, of course, sounds don't happen of themselves but are, necessarily, the sounds of things, of sound-sources, of birds, thunder, footsteps, movements of all kinds. Accordingly, whatever the sounds (and silences) of music can be heard as, so these things can be heard in music. It is clear that the sounds of music can be heard as the sounds of a sounding thing of some sort, a bell, say, or the sounds of something approaching or receding, for example. And it is clear that if music is heard in this way it will be based on an experienced resemblance between the sounds of the music and the sound of what is heard in it (even if the nature of the perception is captured, not by the notion of resemblance, but by that of imagination). Hearing something approaching or receding is nearly always to some extent a matter of hearing sounds of increasing or diminishing strength. But it often comes to more than this. For as things approach, the heard character of the sounds made by them is likely to change and more sounds are likely to be heard. It is by exploiting all these features that Debussy, in the middle section of *Fêtes*, through 'skillful manipulation of orchestration and dynamics', achieves the impression – not, as Nussbaum asserts, the *illusion* (p. 73) – of an approaching parade, which, accordingly, can, in the sense indicated, be heard in the music. But insofar as sounds can be heard as the sounds of the movement of an object only through hearing the sounds as coming from different directions (as when I might hear you walking overhead), and given that in musical understanding the spatial positions from which the instrumental sounds are coming are bracketed off (p. 73), such movements cannot be heard in music. Now in the sense in which we see one thing in another, we don't in general hear anything in music. In music in which nothing (audible) is heard, no virtual objects in a virtual space (analogous to pictorial space) are heard, that is, no virtual sounds, the sounds of virtual things, are heard as coming from points in virtual space: it does not in any way seem to

good and bad inference (i.e., the failure of a phrase to "follow" musically)' (pp. 116–17), or, perhaps, 'suggesting, by indirect symbolic hypotyposis, a sudden expansion of vista along with a radical slowing of time' (p. 276). At other times it seems nearer to 'represents' (and on p. 114 is equated with 'models').

18 In many places, but see, above all, p. 232.

us as if some (virtual) body is moving in space emitting the sounds we hear. So Nussbaum would do well not to present his view in terms of our hearing in music virtual objects moving, and not to press the analogy between seeing-in and hearing-in.[19]

Given that Nussbaum is concerned with 'the phenomenology of virtual motion in musical or acousmatic space' (p. 62), the removal of the idea of perceptual illusion leaves Nussbaum with just two possibilities for what constitutes the experience of musical spatial movement: the suggestion (the bringing to mind) of movement and the imagining of movement. What really he has in mind all along is, I believe, imagining, not illusion,[20] and what he needs is an account of how the imagining of movement figures in the experience of hearing music with understanding: if it is an essential constituent, the crucial question will be how it is integrated with the other constituents of the experience.

At this point, if not before, it is necessary to engage with the most crucial move in the construction of Nussbaum's theory of movement in virtual musical space, which I shall present to a large extent in his own words. Nussbaum credits music not just with a semantics but with a syntax. The syntax is provided by some version[21] of Lerdahl and Jackendoff's generative theory of musical understanding. In brief, Nussbaum's idea is that a musical work has a plan. The musical surface produced by a performer communicates to an adequately equipped listener the musical plan, which the listener implements as it evolves.[22] The musical plan is the work's 'version of the hierarchically organized representational structures postulated by the Lerdahl and Jackendoff theory' (p. 47), 'the Lerdahl and

19 In one place Nussbaum, while affirming the analogy, is in position to distance himself from it: 'just as virtual physical space is "seen in" pictures, musical space is "heard in" music' (p. 118). For (the perception of) musical space is not comparable to (the perception of) virtual physical space: the relation between the nature of the virtual objects perceived and the sense by which they are detected is different in the two cases (as I shall later elaborate). A further obviously distancing fact is that observer motion, which Nussbaum claims that music can suggest, is not something that can be heard in music in any sense comparable to that in which whatever might be included in a depicted scene can be seen in a picture of that scene. (For Nussbaum the musical experience of observer motion is, as I later explain, a haptic-like feeling as of moving. Accordingly, observer motion is not something that is, in the relevant sense, perceived in musical space.)

20 Nussbaum explicitly rejects 'imaging', 'subjective imagery', 'a mere subjective image', as constituting the experience of a virtual object perceived in an informationally structured surface, and seems to think that the alternative must be controlled perceptual illusion (pp. 46–47). But not all imagining is merely subjective image-making and imagining can be controlled by perception, as in the case of the appreciation of dramatic representations.

21 See pp. 95, 138.

22 'The comprehending listener need not grasp every detail of the musical plan, but he must grasp it to some degree.' (p. 341n37)

Jackendoff metric structures, grouping structures, and trees', which 'are used to recover the informational structure from the musical surface' (p. 82), 'the hierarchical representations whose content is the organized musical surface' (p. 99).[23] Now there is an 'affinity between Lerdahl and Jackendoff's time-span and prolongation reduction trees and control hierarchies and action plans', which 'makes it possible for musical organization to *suggest* movements in a virtual space. *This, in turn*, motivates the construction of internal representations (musical mental models) that represent the features of the layouts and scenarios in which these virtual movements occur' (p. 82, my emphases). 'The internal representations employed in recovering the musical structure specify motor hierarchies and action plans, which, in turn, *put the listener's body into off-line motor states that specify virtual movements through a virtual terrain or a scenario possessing certain features.*' (p. 47) So the plan mandates an appropriate set of imaginary motions in virtual musical space and it 'generates an appropriate set of complementary musical mental models' (p. 232), which are constantly updated as the music unfolds, the virtual layouts and scenarios of the music being the nonconceptual contents of these musical mental models (p. 48). Accordingly, the listener constructs an appropriate set of mental models and these mental models are action-oriented: 'the listener constructs mental models of the musical field as he parses the musical surface' (p. 118), and this 'parsing of the musical surface […] recruits the motor systems and is analogous to *haptic exploration of surfaces in three dimensions*' (p. 117). The music 'puts the listener's body into states that would fit with or be appropriate to interacting with and stimulating scenarios and terrains with certain features' (p. 82); the listener simulates action, acts 'off-line', adopting certain bodily sets and having motor areas of the brain activated whilst their signals are inhibited;[24] the listener 'perceive[s] virtual scenarios in musical space and […] act[s] (off-line) in that virtual space' (p. 87). So 'musical experience includes the experience of virtual (off-line) bodily movement' (p. 273). Moreover, the listener 'must […] move through [the music's] virtual tonal space in imagination and simulate the virtual entities contained in this space'(p. 99).[25] In sum, the imaginative construction of 'musical virtual scenarios in virtual musical space' (p. 87), the representation in an analogue manner of virtual layouts and scenarios, arises through simulation of the perception of virtual layouts and

[23] I shall leave aside the question of the validity of Lerdahl and Jackendoff's generative theory of musical understanding (or any cognate theory of musical syntax, p. 280).

[24] 'Listening to a piece with understanding [is] an attempt to grasp a complex plan by trying it out, adopting it and acting on it by way of simulation or imagination.' (p. 214)

[25] The idea that the listener should simulate the virtual entities contained in musical space needs to be understood in conformity with there being 'strictly speaking, no virtual musical objects' (p. 21).

scenarios 'by means of an *analogy* between musical perception and the haptic exploration of surfaces, areas, and volumes occupied by media of differing densities' (p. 82, my emphasis).

In effect, Nussbaum indicates two (possible) moves or transitions effected by mental representations: (i) from hearing the musical surface as unorganized to hearing it as organized, that is, from hearing successive tones merely as successive tones to the hearing (supposedly effected by the representations postulated by Lerdahl and Jackendoff) of these tones as a temporal succession of tones grouped into phrases, with strong and weak beats, subordination and superordination of tones and increase and decrease of harmonic tension, and so on, and (ii) the consequent move to the perception of musical virtual objects and movements in musical space, which involves off-line 'charade-like bodily displays' (p. 66), the taking on with our body of a 'miming or charade-like activity imaginatively or off-line' (p. 230), the simulation of 'actions imaginatively without engaging the relevant motor systems' (p. 35). The crucial move is, of course, the second. And the move is suspect. In the first place, the postulation of this move as an essential feature of listening to music with understanding cannot be justified by the claim that music induces a perceptual illusion of motion, which effect requires an explanation. For, as I have argued, there is no such perceptual illusion. Furthermore, an analogy between one thing and another does not imply that the creation of the first leads, or is intended to or should lead, to the creation of the second. It may be true that the fact that action is hierarchically organized enables us

> to understand how hierarchical musical structures that are partonymic (metrical and grouping structures) and those that are tree-like (time-span and prolongation reductions) could generate mental models that model (by exemplified properties) the domains of a range of hierarchically organized *nonmusical* human actions, extending from quotidian movement in musical space, to agency and social interaction. (p. 126)

But 'could' does not imply 'should'. And in fact in listening to music I never imagine auditorily-cum-haptically exploring (with hands, feet, tongue, …?)[26] surfaces, areas and volumes occupied by media of differing densities, as I move in a watery-like environment or as items in that environment move in relation to me.[27] Neither do

[26] Nussbaum thinks of musical polyphony as requiring the imagination of 'simultaneous haptic exploration using independent digits and limbs' (p. 33). And he believes that in order to understand a piece of music a listener might need (in imagination) physical abilities that greatly exceed those of the human body (pp. 61–64).

[27] Nussbaum does not to my mind offer a crystal-clear account of the character of the experience of hearing movement in music, an experience that aligns hearing with haptic perception. For example, we are told that by exploiting the cochlear structures of the inner ear, which are homologous with the lateral line of fishes, music yields 'a *quasi-spatial* musical perception with a quality of immediate touch', the environment

any of the musical listeners I have consulted.[28] Moreover, there is no requirement that demands that imagining of this kind must occur on pain of failing to understand or appreciate the music.

Nussbaum claims:

> Music is presented as a two-dimensional surface,[29] rather in the manner of a motion picture (though with some important differences), but a surface appealing to a haptic-style exploration rather than the visual exploration of a field. Unlike the motion picture screen, the musical surface consists of elements that are phenomenologically discrete. […] In addition, the attention of the musical listener is more directed to the musical surface as an intentional object than is the attention of the moviegoer to the cinematographic surface. In this way, the musical surface functions more like a painting in which surface characteristics (e.g., brushstroke, impasto) enter into awareness in aesthetically significant ways. (p. 47)

It is true that the attention of the musical listener is more directed to the musical surface as an intentional object than is the attention of the moviegoer to the cinematic surface. But the comparison with (representational) painting is off target. For the truth is that the attention of the musical listener is fully occupied by the organized musical surface, the musical surface as (let us grant) transformed by the appropriate version of the hierarchically organized representational structures postulated by the Lerdahl and Jackendoff theory. There is (in general) for the musical listener – at least for this listener – no further representation, no representation of musical virtual scenarios in virtual musical space, no illusion or imagining or suggestion of movement in egocentric behavioural space. The musical surface has never invited me to engage, imaginatively, in a haptic-style exploration, wherein by proprioperception of and somatosensory perception through some parts of the surface of my body I am detecting the shapes, sizes, textures of objects around me;[30] and there is no evidence that

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of virtual musical space being '*spacelike*' (p. 269, my emphases). Hence my recourse to such an expression as 'auditorily-cum-haptically undergoing' an experience as of objects (or myself) moving.

28 I am assuming that Nussbaum's concern with the phenomenology of musical experience means that his equation of simulation, of running action commands off-line, with imagining acting – 'To run [motor] commands off-line is to simulate actions imaginatively without engaging the relevant motor systems' (p. 35) – means that imagining is to be understood in the normal sense in which what we are imagining is manifest to us. Accordingly, the representational content of musical experience is not supposed to be sub-personal. (See, for example, p. 42, on 'task-level action plans'.) But the dispute whether the simulation theory or the theory-theory provides the correct account of folk-psychological understanding, which dispute Nussbaum considers (pp. 69–70), appears not to be pitched at, and so resolvable at, the personal level.

29 The two dimensions are those of pitch and time.

30 I believe that Nussbaum's description of musical experience would be more plausible if the idea of exploration, which is a form of action, were dropped. But this idea follows from the crucial role assigned to action plans.

composers have intended their works to have the kind of extramusical content that Nussbaum attributes to them and to be appreciated accordingly.[31] It is instructive, I believe, to bear in mind the manifest disanalogies between pictures, moving pictures and music. Pictures have a visual surface of two spatial dimensions, in which we see a three-dimensional visual scene. Movies have a visual surface of two spatial dimensions, the appearance of which changes from moment to moment, in which we see a changing three-dimensional visual scene, one that characteristically includes spatial movement. But Nussbaum's two-dimensional musical surface (constituted by pitch and time) has no spatial dimensions in the sense in which pictures do, and although one of the dimensions is auditory we are not supposed to hear in what fills that dimension, at a time or from moment to moment, anything of an audible nature: we are supposed, instead, to experience, quasi-haptically, layouts and movements.

This brings out the fact that Nussbaum faces an acute problem about divided attention. For what is the relation between our experience of the sounds we hear and the experience of spatial movement that he postulates? If our hearing of the sounds (as transformed into musical understanding) is supposed to cause a perceptual illusion of a haptic-style experience of the exploration of surfaces, areas, and volumes occupied by media of differing densities, wouldn't the illusion be likely to distract us from attention to the sounds, especially in musical polyphony, which, as Nussbaum declares, 'allows the simulation (by independent but coordinated voices) of simultaneous haptic exploration using independent digits and limbs' (p. 33)? And this conclusion would be much the same if, without a certain addition, the idea of a perceptual illusion were to be replaced by that of imagining.[32] If imagining is to be the form in which a haptic-style exploration figures in the experience of music, it will need to be tied more closely to

[31] Given the emphasis that Nussbaum places on 'the intuitions of competent listeners concerning their musical experience' (p. 87), these facts count heavily against his theory. It is true, as Nussbaum remarks, that the second movement of Beethoven's Fourth Piano Concerto has *suggested* to many 'a conversation, or at least an extended confrontation, between two agents, one adamantine, the other conciliatory' (p. 125). And it seems reasonable to believe that Beethoven intended it to be heard on the model of a conversation. But this is not to acquiesce in Nussbaum's claim that it represents 'an unfolding, conversational *scenario*' that 'incorporates bodily sets and sequenced behaviors of two imagined *antagonists* that are simulated off-line during the musical experience' (p. 125, italics in original). In listening to the movement I do not imagine any bodily movements of antagonists – which, in fact, would appear to be inconsistent with the posited nonconceptual character of the content of musical representations of goings-on in egocentric behavioural space (see later) – nor haptically exploring surfaces, areas, and volumes.

[32] The supposed cyclical nature of musical space would, I believe, create a further distance between the experience focused on the organized musical surface and the haptic-style experience of movement in egocentric behavioural space.

the experience of hearing the sounds than by mere causation. The idea must not be that hearing the organized musical surface induces an additional experience: it must be that the hearing of the sounds is transformed by the imagining. Although there is no indication of this in Nussbaum's text, one way in which it could be more closely tied is by introducing a Kendall Walton-style amendment requiring that the listener imagines *of* his (passive) experience of hearing the sounds that it is an (active) haptic-style experience. Now if I set myself to do this, I seem sometimes, with certain music (the slow movement of Bruckner's 7th Symphony, for example), to be able for a short time to achieve it to a certain extent (in a passive, not active, haptic-like experience). But this is not something I am required to do and it certainly is not how I normally listen. Moreover, if I do manage to achieve this, the imagining not only does not endow my experience of the music with a quality I value, but distracts or distances me from engagement with the rhythmic, melodic, and harmonic qualities of the music in my normal manner, lessening my delight in the music.

A further problem, or set of problems, concerns the character of the movements that the listener is supposed to experience imaginatively. The first difficulty stems from a certain property that Nussbaum attributes to musical space, one that I have so far neglected – namely, that it is through and through animistic. Accordingly, it is never bare movements that are imagined to take place, but actions, actions of animate beings. The claim is asserted a number of times:

> music invites simulation of virtual animate objects (p. 69); music encourages a simulational animism regarding all objects, not just animate ones (p. 70); The musical environment […] is radically animistic: everything in the musical environment is the product of a charade-like simulation (p. 235); [the musical virtual] domain is […] entirely animistic, one from which material beings, all brutely existing psychically inert entities *de trop* […] have been systematically excluded (p. 256); the musical virtual object presents itself as an animate object that is to be understood empathetically via simulation: like the world of the poet, the acousmatic realm of the composer is an *animistic* realm. The brook or the storm representations in Beethoven's *Pastoral* Symphony, the sea representations in Debussy's *La Mer*, the windmill representations in Strauss's *Don Quixote* represent their objects by inviting, indeed compelling the listener to simulate the *behaviors* of these objects *as if* they were intentional beings animated by an action plan. To hear the brook, the storm, the waves, or the windmills in the music is to engage (off-line) in charade-like bodily displays. (pp. 64–66)

However, I have failed to find in Nussbaum's text a convincing argument for this view.[33] It would, of course, be wrong to derive the conclusion that virtual musical objects are all animate from the fact that they are all products of 'charade-like'

[33] Nussbaum's alignment of seeing-in and hearing-in undermines the claim about animation, for, of course, it is untrue that what we see-in pictures we see as animate.

simulations. Just as I don't animate an inanimate object by perceiving it, I don't animate an inanimate object by imagining it. In both cases the object is represented analogically by a mental model, in the second case the model being run off-line. But this difference does not amount to animation of the imagined object. Perhaps it might be thought that to imagine something other than oneself doing something is to imagine oneself in that thing's shoes, doing that thing, which is tantamount to the claim that imagined objects are imagined as being animate, and this yields Nussbaum's animation thesis. But that the premise is false is sufficient to undermine this line of thought. Moreover, to understand an animate object empathetically is to run a simulation on oneself off-line and as a result to credit the object with what one takes one's own response would be in a certain kind of situation or when behaving in a certain manner. And, as I shall soon explain, the musical listener is not presented with an object the behaviour of which requires understanding by means of empathy. However, leaving these issues aside, the representational content of music is supposed to be exhausted by scenario content, and yet more than scenario content[34] is required if movements are to be represented as animate movements, as actions by animate things.[35] Hence Nussbaum's theory is inconsistent and either the animation or the scenario content thesis must be jettisoned.

But this is not the end of the difficulties. Nussbaum emphasizes music's bringing about the running of action plans off-line, which he understands as the simulation of actions imaginatively. The two possible forms of imagining are imagining oneself acting (observer motion) and imagining other things in one's environment acting (object motion).[36] (Perhaps one is required sometimes to do both at once.) In either case, the actions performed in imagination will be those whose action plan is of the same kind as the plan of the music. But many different actions will satisfy this condition: for the action plan will not specify, in the first-person case, that one engages with one's environment with specific parts of one's body, for example, or, in the third-person case, that actions of certain bodily kinds are taking place. The action plan that the listener runs off-line derives from the plan of the music only through a structural affinity to – the sharing of structural attributes with – it, so that it will inevitably exhibit a large measure of indefiniteness as to the nature of the objects in the virtual environment and

34 The addition of protopropositional content would here be of no significance.

35 See also note 31.

36 'Observer motion' might mean only the spatial movement of an observer, rather than an action of an observer, the observer moving herself. The examples that Nussbaum gives of music's suggesting observer motion (p. 49) are of the first reading, not the second, and so have nothing to do with action plans: to feel as if (or to imagine) one is moving is not thereby to undergo the experience as of (or to imagine) moving oneself.

the nature of the actions performed on or by those objects. This means that there will be either a very considerable indeterminateness in the character of the actions one imagines oneself (or another thing) performing or an unwarranted determinacy that will vary from listener to listener.[37] Furthermore, the carrying out of an action plan presupposes a conception of the nature of the environment in which one acts, a conception provided by one's perception of that environment which will change as the action is performed. To carry out my plan of crossing the stream I will need to be aware of the stream's width and depth; the way in which I act will depend on my physical abilities (in jumping, wading, or swimming, for example); and my manner of action will determine the nature of my haptic experiences as I cross the stream. But in Nussbaum's virtual musical space my only awareness of the environment is that which is given to me by the actions I am supposed to be performing within it: I do not have a prior conception of the environment, updated from moment to moment as I carry out my action plan. Nussbaum's view of the first-person case is not that, first, I have an awareness of the character of an (imaginary) environment in which I find myself, and then I undertake (in imagination) a variety of actions as my perception of the environment develops. (His view is not that I undergo the perceptual illusion of being in a certain kind of environment, which I then imagine exploring.) Contrast looking at a picture and imagining yourself moving in the virtual environment: you first see the depicted scene and then imagine yourself at some point within it from which you move.[38] Furthermore, Nussbaum's claim that to 'run [motor] commands off-line is to simulate actions imaginatively without engaging the relevant motor systems' (p. 35) seems to leave no room in musical space for actions other than the listener's. For the relevant motor systems are the listener's own, not another thing's, and so, it would seem, the listener is imagining herself, not another, acting. And it cannot be the intrinsic nature of the action plan that is being run off-line that determines whether the listener is to imagine first-person or third-person motion, since, for the same kind of action, there is no difference in the action plans of observer and observed object. If the action plan the listener runs off-line derives from the musical plan by the sharing of structural attributes, what is it that mandates imagining another

[37] In an early footnote Nussbaum remarks that 'Any musical representation of virtual objects will tend to be highly […] "polysemous", or capable of supporting a range of different interpretations and of representing a multiplicity of alternative virtual objects' (p. 24n4). But this is not integrated into his theory of musical movement as haptic-style explorations in a virtual feature domain consisting entirely of scenarios.

[38] A representational picture can even induce the experience of observer motion, as, for example, when I imagine myself on the edge of the depicted precipice and, as a sufferer from vertigo, immediately imagine myself falling, and as a result instantly withdraw myself from the pictured scene.

thing, not oneself, acting? It would, of course, be no answer to this question to insist that the nature of the environment at any time is built into the action plan, the listener exploring this changing or static environment either by moving within it or by remaining at rest.

What would be the aesthetic significance of an exploration in this haptic-style prompted and governed by a piece of music? In particular, how would the nature of the haptic exploration offered by a work, J. S. Bach's *The Art of Fugue*, for example, be related to its musical value? Presumably, it would enhance the value to the listener of a work he values. But it is unclear how and why it should do so. Another way of advancing this sceptical consideration is to focus on the supposed extramusical representational content of a musical work. The manner in which a representational painting depicts its depictive content is integral to the appreciation of the painting. This is one aspect of representational paintings that is highlighted in discerning criticism. If musical works have the kind of extramusical content Nussbaum maintains that they have, the manner in which a work represents its content should figure crucially in musical criticism. If we leave aside music that is in the straightforward sense depictive, it is notable by its absence.[39] And a final point. Presumably the alleged extramusical representational content of music is not erased by the combination of music with words, drama, or dance. But although the idea of a haptic-style exploration might perhaps be thought suitable to the perception of one of the combinatory musical art forms, the ballet, it would appear to be entirely unsuited to the perception of song, opera, and film, where the explicit representational content provided by the words and scene would in general at best have nothing to do with the supposed representational content of the music – the words of a song might represent no kind of movement, for example – and in most cases would be likely to clash with it.

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[39] It might be objected that this overlooks the fact that 'what is *represented* by or "heard in" [...] musical structures, namely virtual musical *space and its contents* [...] *cannot* be conceptualized' (p. 246). But what this means is that it cannot be conceptualized in the very act of listening to the work: the representational content of perceptions in virtual musical space can possess only nonconceptual 'scenario' (and 'protopropositional') content, a scenario being 'in effect, an unconceptualized feature domain, an (as yet) unconceptualized content' (p. 220). Admittedly, a further point is that music 'lacks all propositional content: what it means cannot be said, and the nuances of its meanings exceed what can be said' (p. 301). But this should be read in conjunction with Nussbaum's recognition that a digital representation of nonconceptual content is certainly possible, even though it omits fine-grained detail (p. 45), so that a broad description of what is represented is not ruled out.

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