Music in Time

Phenomenology, Perception, Performance

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Musical Time, Embodied and Reflected

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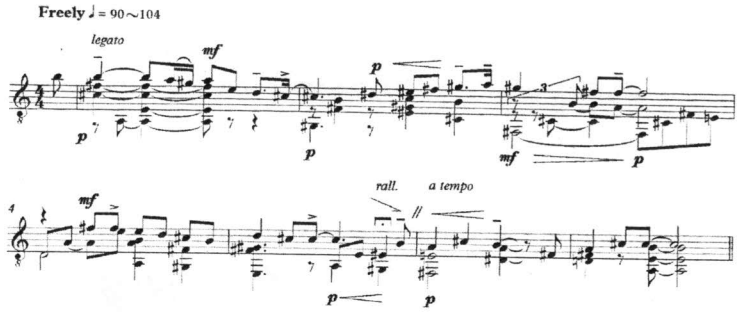
To SPEAK OF time, in any substantive way, is to court madness. And our purchase on the slippery concepts through which we would grasp time is, if anything, made less secure by differences among our phenomenal experiences of time. There is the present, the time we occupy, which we use to orient ourselves within the world and from which all our journeys through time depart. There is the future, a realm independent of our existence that we know only through inference. And there is the past, which exists for us in wholly subjective memory traces that nonetheless can, to the extent that they are shared with others or anchored in aide-mémoire, serve as a yardstick to measure time and so provide the means through which we can project the present into the future.

Things are hardly made easier by limiting oneself to musical time: restricting the domain only seems to multiply the problems of specification and definition, not least because music, especially as it is experienced through performance, is rarely complete in the moment but is instead a relentless stream within which present, future, and past swirl and bob like so much flotsam and jetsam. Yet I would like to suggest that the force of this experience—the sense of being immersed in an ongoing dynamic process—offers another way to think about time, a way focused less on the limitations of words and more on the resources of music. To paraphrase and re-purpose Augustine, time only becomes a problem when we start to speak about it.

As a way to begin the exploration of this perspective let me turn to a musical example drawn from a set of twelve arrangements of popular songs for classical guitar that Tōru Takemitsu completed in 1977. Example 1 gives the

score for the first seven measures of the eleventh song from the set; some of the points I will make in the following pages will be clearer if the reader takes a moment to imagine or play the sequence of sounds captured by the notation.

Example 1. Measures 1–8 of Song 11 from 12 Songs for Guitar, arranged by Tōru Takemitsu



The excerpt begins with a relatively static harmonic field—a quartal harmony on the downbeat of m. 1 that is quickly absorbed into an A-major harmony with an added sixth—over which a languid, predominantly descending melody unfolds. The A-major harmony is replaced, in m. 2, by a G♯-minor eleventh chord, then a C♯-dominant seventh, and then (in m. 3) an F♯-minor harmony, and over all this the melody reverses course, ascending stepwise to arrive on the concert G♯4 of m. 3 (creating a ninth above the bass that resolves to an octave on the second beat). Perhaps with this arch-shaped fragment or with the descending line of mm. 4–5 the name of the song will occur to the listener—"Yesterday," by John Lennon and Paul McCartney—an identification cemented by the melody of mm. 6–7: "Oh, I be-lieve in yes-ter-day." Assuming that this process of recognition has taken place, Takemitsu's arrangement will have drawn the listener away from a focus on the succession of musical events and toward a constellation of knowledge associated with Lennon and McCartney's tune, knowledge that might include the words of the song, memorable performances or recordings, anecdotes about the origins of the song (which, for a long period, existed only as a melody to which the words "scrambled eggs" had become affixed[1]), or random facts connected with the Beatles. Through focusing on such knowledge—knowledge summoned from the strands of memory, stretching to an indefinite extent through one's personal

[1] Walter Everett, *The Beatles as Musicians: The Quarry Men Through* Rubber Soul (Oxford: Oxford University Press, 2001), 300.

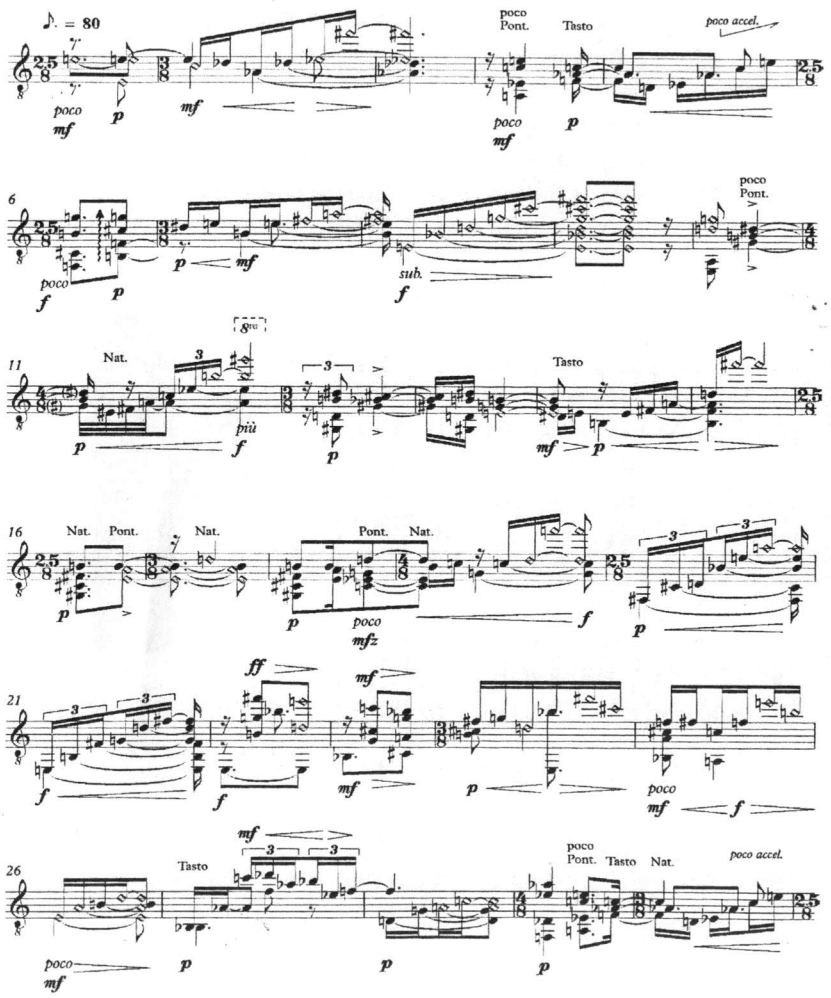
history—the listener will have stepped away from temporal experience as it is constructed by a succession of musical events and stepped into time as it is constructed by the words, thoughts, and ideas that populate our recollections.

It is, of course, possible that the listener will either fail to recognize Lennon and McCartney's tune or perhaps have no acquaintance with it. Although the latter state of affairs seems unlikely—"Yesterday" is one of the best-known songs of the late twentieth century—in either case the process of recollection I have just described would not take place or would be limited to correspondences between Takemitsu's arrangement and other music with which the listener was acquainted. The listener's musical experience would thus be more firmly guided by the succession of sounds captured by Example 1: the circle-of-fifths harmonic sequence and ascending melodic line of mm. 2–3, which pull the expectant gesture of m. 1 forward before pausing on $\hat{6}$ in m. 3; the continuation offered by m. 4, which takes up and reharmonizes $\hat{6}$ before leading the music toward an arrival on $\hat{3}$ in m. 5 (a contracting gesture that serves as a response to the expansion offered by mm. 2–3); and the completion of the phrase in mm. 6–7, a sequence that introduces longer note values, guides the melody past C♯4 to A3, and concludes with the falling fourth D3–A2 (a set of compositional strategies conventionally known as a plagal cadence). For a listener captured by Takemitsu's rendering of Lennon and McCartney's tune (and, as I have imagined, unaware of its words or history) the experience of time would be one that is molded almost exclusively by the succession of musical events.

Takemitsu's arrangement thus offers two ways to think about temporal experience as it is shaped by listening to (or imagining, or performing) music: on the one hand, that experience might be almost totally shaped by an ongoing sequence of musical events; on the other hand, it might begin with musical events but then shift to a process of recollection quite independent of those events. In the former case, the experience of time would be, of necessity, specific to our encounters with music; in the latter case, the experience of time would be similar to that engendered by a wide range of expressive media. We could also, however, imagine a species of temporal experience that is at first shaped predominantly by a sequence of musical events but then shifts to a focus on a prior moment in that sequence. To illustrate this possibility I would like to turn to another work by Takemitsu, the first movement of his 1987 composition *All in Twilight* (also for guitar), the score for which is given in Example 2. Again, I would encourage the reader to take a moment to imagine or play the sequence of sounds captured by the notation, acknowledging that the first movement of Takemitsu's *All in Twilight* presents a more formidable

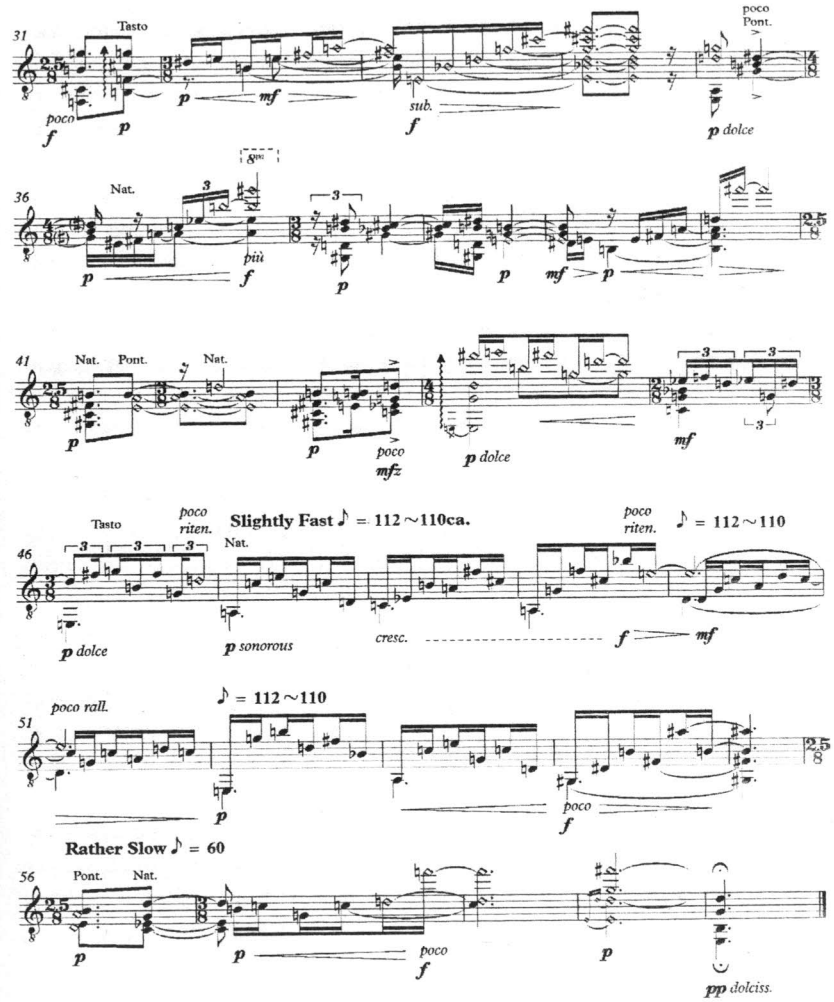
challenge to the aural imagination or performance than did the first seven measures of his arrangement of "Yesterday."

Example 2. Tōru Takemitsu, All in Twilight *(1987), first movement*



Most will find that their encounter with the musical events notated in Example 2 places them on unfamiliar terrain. Gone are harmonies and harmonic progressions shared by a wide range of Western music of the past two

Example 2, continued



hundred years, as well as anything resembling a regular rhythmic or melodic pattern. In their place is an incredibly varied musical surface, one in which fragmentary phrase follows fragmentary phrase, and in which dynamics, timbre, and pitch content are in a constant state of flux. That said, novelty is not the only principle through which the music is organized. For instance, in m. 29 Takemitsu initiates a reprise of musical events first encountered in m. 4;

indeed, mm. 30–43 are a literal reprise of mm. 5–18 (which, for the sake of convenience, I will call the A section). In addition to this out-and-out repetition Takemitsu makes use of partial returns of melodic fragments, sonorities, and gestures within the A section. Examples include the restatement of the melodic passage first heard in m. 7 an octave lower in m. 14; the return of the two-chord sequence of m. 4 in m. 13, a half step lower and without a specified timbral contrast; and the approximate recollection of the gesture of mm. 4–6 in mm. 10 and 11.

On the one hand, these restatements or recollections—whether exact or approximate—point to the ways Takemitsu organized his musical materials. On the other hand, each return has the potential to take the listener out of the flow of musical events to reflect on the larger course of those events: recognition that mm. 30–31 are an exact repetition of mm. 5–6 must come at the expense of devoting one's full attention to the ongoing process of musical events of which mm. 30–31 are a part. Although this interruption may not be as marked as that which follows from identifying Lennon and McCartney's "Yesterday" as the basis for Example 1—the focus of the listener to *All in Twilight* will, after all, remain largely within the domain of musical events—there will still be a moment when the guiding hand of music is stayed by the process of reflection. The first movement of Takemitsu's *All in Twilight* thus offers a third way to think about how temporal experience is shaped by listening to (or imagining, or performing) music: in addition to the possibilities I outlined previously (temporal experience as shaped by an ongoing sequence of musical events, or by a process of recollection independent of musical events), it may be that the ongoing sequence of musical events prompts us to reflect on that very sequence.[2]

In the following pages I explore further the idea that sequences of musical sound have the potential to shape temporal experience in ways that are different from those of language. This exploration will require forays into two topics that might at first seem distant from that of time: consciousness and memory. Understanding some of the key characteristics of consciousness is nonetheless necessary if we are to make sense of temporal experience, as experiences (in the full sense of the term) only come to us when we are conscious.[3]

[2] The ideas about temporal experience that I sketch here are similar to those John Rahn developed around the pair of terms "in-time/time-out"; see his "Aspects of Musical Explanation," *Perspectives of New Music* 17/2 (1979), 213–15.

[3] An argument could be made that dreams are a form of experience, but it must be acknowledged that dreams are generally not subject to the kind of rich perceptual input that marks our waking—and conscious—experiences.

Memory is among the cognitive capacities that are central to consciousness, not least because memory is one of the chief means by which we know we are conscious—indeed, the biologist Gerald Edelman's catch phrase for consciousness was "the remembered present."[4] And, as my opening comments suggest, memory is key for the sort of mental time travel that allows us to return to the past and to imagine the future.

It will not, of course, be possible to deal with topics as complex as consciousness or as involved as memory in any detail here, but in what follows I hope to show how our understanding of consciousness and memory can be specified for music. Such a specification can help to explain how sequences of musical sound can shape temporal experience in ways that are different from what is possible with other communicative media, something I shall explore in greater detail through a closer look at aspects of the first movement of Takemitsu's *All in Twilight*.

CONSCIOUSNESS AND MEMORY, MUSIC AND TIME

Consciousness

Let me begin with a slightly obscure but still useful distinction, between *awareness* and *consciousness*.[5] To be aware of something is, in some measure, to take note of it: for instance, you are presently to some extent aware that you are reading a chapter in a Festschrift for Christopher Hasty. Consciousness is quite closely affiliated with awareness—as unconsciousness is typically construed, were you unconscious, you would not be aware that there was a Festschrift for Christopher Hasty to be read, much less that you were reading a chapter from it—but complications quickly ensue. Had you started playing Julian Bream's 1992 recording *Nocturnal* (which includes his interpretation of Takemitsu's *All in Twilight*) and been lulled to sleep by his performance of the sixth movement of Benjamin Britten's *Nocturnal* ("Dreaming [Sognanti]"), some part of your cognitive faculties would continue to register the presence of music in the

[4] Gerald M. Edelman, *The Remembered Present: A Biological Theory of Consciousness* (New York: Basic Books, 1989). William James, working from a somewhat different perspective, similarly drew a close relationship between what he called elementary memory and consciousness; see James, *The Principles of Psychology* (New York: Henry Holt and Company, 1890), 646–47.

[5] Portions of the following replicate the approach to consciousness and memory that I took in "Music, Language, and Kinds of Consciousness," in *Music and Consciousness: Philosophical, Psychological, and Cultural Perspectives*, ed. David Clarke and Eric Clarke (Oxford: Oxford University Press, 2011), 179–92.

room. When, a little bit later, the last movement of Leo Brouwer's *Sonata para guitarra sola* got under way ("La toccata de Pasquini"), those same cognitive faculties could set up an alarm at this change in your proximate environment and stir you to wakefulness. You might then become aware that you had dozed off, conscious of a gap in your conscious experience. This points to a special kind of awareness—an awareness that we are aware—that is of the substance of consciousness as it is typically construed.

One of the marks of awareness is that it is under cognitive control.[6] In the case of the cognitive faculties that kept track of aspects of your environment while you dozed, these would not count as awareness for the simple reason that they are not subject to a control mechanism that could direct them elsewhere: you could not shift those faculties from keeping track of Bream's recording, to noting the surface and resistance of the chair in which you slumbered, and then go back to Bream's recording. Awareness, then, involves having various mental images derived from perceptual and proprioceptual cognitive activity, and being able to in some fashion control which images are at the center of attention. (I should emphasize that "image" in this context is conceived quite broadly, and extends far beyond vision to include any sensory information.) Following the neuroscientist Antonio Damasio, who has written extensively on the issue of consciousness, I call the capacity for this sort of awareness *core consciousness*; the mark of such a capacity is a kind of phenomenological presence that is lacking from unconscious states. In addition to having the sort of awareness that is necessary for core consciousness humans also have the rather more remarkable capacity that they are aware *that* they are aware—that is, they have the capacity to reflect on their own thought processes, to realize that they *have* thought processes. Again following Damasio, I call the capacity to take thought as an object for awareness *extended consciousness*.[7]

One of the crucial cognitive supports for both core and extended

[6] Jesse J. Prinz, "Emotions, Embodiment, and Awareness," in *Emotion and Consciousness*, ed. Lisa Feldman Barrett, Paula M. Niedenthal, and Piotr Winkielman (New York: Guilford Press, 2005), 364. See also Endel Tulving, "Varieties of Consciousness and Levels of Awareness in Memory," in *Attention: Selection, Awareness, and Control. A Tribute to Donald Broadbent*, ed. Alan Baddeley and Lawrence Weiskrantz (Oxford: Clarendon Press, 1993), 283–99.

[7] Antonio R. Damasio, "Core Consciousness," in *The Feeling of What Happens: Body and Emotion in the Making of Consciousness* (New York: Harcourt Brace & Company, 1999), 82–106; *idem*, "Body, Brain, and Mind," in *Looking for Spinoza: Joy, Sorrow, and the Feeling Brain* (Orlando, Fla.: Harcourt Inc., 2003), 183–220. Gerald Edelman, in his extensive writing on consciousness, used the terms "primary consciousness" and "higher-order consciousness"; see Edelman, "Perceptual Experience and Consciousness," in *The Remembered Present*, 91–105; "Consciousness: The Remembered Present," in *Bright Air, Brilliant Fire: On the Matter of Mind* (New York: Basic Books, 1992), 111–23; and "Consciousness, Body, and Brain," in *Second Nature: Brain Science and Human Knowledge* (New Haven: Yale University Press, 2006), 12–22.

consciousness is memory, for it is memory that makes possible the retention of information that can be the focus of awareness. Equally important are a number of distinctive features of the memory systems of organisms endowed with consciousness, for these features shape the kinds of consciousness available to such organisms.

Memory

In what follows I shall sketch four important aspects of memory that connect directly with consciousness and that also inform our temporal experience. My purpose here, as with my discussion of consciousness, is not to provide a comprehensive account of an incredibly complex cognitive process but to draw out those features of the process that shape musical understanding.

Memory within biological organisms

Although it is sometimes convenient to think of memory as a kind of storage system, memories are actually highly dynamic cognitive constructs that are constrained by the biological mechanisms through which they are maintained. Put another way, every time we revisit a memory we change it slightly, strengthening certain of the synaptic connections proper to the memory, weakening others. One of the challenges faced by biological memory systems, then, is to develop means to stabilize memories while still allowing them to change as environmental circumstances change. In general, cultural practices—including those associated with music and language—offer our species an additional means to stabilize memories, a point to which I shall return in my concluding remarks.

Memory levels

For a number of years it has been common to distinguish between three different levels of memory, each with its own temporal frame and cognitive mechanisms.[8] The briefest of these, with a duration of perhaps two to three seconds, comprises various sensory memory systems that function as components of

[8] A thorough discussion of memory levels within the context of musical listening is offered in Bob Snyder, *Music and Memory: An Introduction* (Cambridge, Massachusetts: MIT Press, 2001).

perceptual processing; there is fairly robust evidence, for instance, for a visual memory store often called iconic memory, and for an acoustic storage system that Ulric Neisser called echoic memory.[9] At the middle level of memory systems is what has come to be called working memory, which is understood to be a limited capacity temporary storage system that provides support for complex human thought.[10] Although specifying the limits of working memory capacity has generated lively discussions there is converging evidence that it extends to approximately four "chunks" of information (a span that could, for instance, accommodate the gesture comprised by mm. 4–6 of the first movement of Takemitsu's *All in Twilight*).[11] There are any number of situations where buffers like this are important, but one ready example is provided by the task of comprehending language, which often requires taking in a certain amount of information, evaluating it, and, subsequent to this process, figuring out what to do with it. The highest level of memory systems (in the sense of being the most comprehensive) is what is typically called long-term storage, although it should be kept in mind that "long-term" is a relative notion and refers chiefly to the sort of changes to synaptic connections that are the biological basis of memory. These kinds of memory are all, of course, intimately related to one another but also appear to involve different brain structures for their support.

Types of long-term memory

The third aspect of memory I wish to consider concerns a distinction made between types of long-term memory. The first type is semantic memory, which is thought to deal with general knowledge of the world not tied to any specific temporal frame. An individual might, for instance, know that Tōru Takemitsu was a Japanese composer of the later twentieth century without being able to specify how or when she came to acquire this knowledge. Episodic memory, by contrast, is connected to a specific temporal framework. Although that same individual might not be able to say when she acquired knowledge about

[9] Ulric Neisser, *Cognitive Psychology*, The Century Psychology Series (New York: Appleton-Century-Crofts, 1967).

[10] Alan Baddeley, *Working Memory, Thought, and Action*, Oxford Psychology Series, no. 45. (Oxford: Oxford University Press, 2007), 6–7.

[11] Recent considerations of working memory capacity include that offered in Nelson Cowan, "The Magical Number 4 in Short-Term Memory: A Reconsideration of Mental Storage Capacity," *Behavioral and Brain Sciences* 24/1 (2001), 87–185 and responses to that article. See also Cowan, *Working Memory Capacity, Essays in Cognitive Psychology* (New York: Psychology Press, 2005) and Baddeley, "Individual differences and working memory span" and "What limits working memory span?" in *Working Memory, Thought, and Action*, 175–210.

Takemitsu, she might be able to say with some assurance that her knowledge that Julian Bream recorded Takemitsu's *All in Twilight* was acquired in the course of reading a chapter in a Festschrift for Christopher Hasty while riding on a Metro-North train in early spring. As my example suggests, although episodic memory is oftentimes characterized in terms of being able to provide specific information—the *what*, *where*, and *when* of a given memory—this identification may be more or less approximate; far more important to the construal of episodic memory is the notion that the knowledge being recollected is associated with a personally experienced event.[12] Episodic memory is regarded by some researchers as providing the basis for mental time travel—that is, the ability to shift awareness from the present moment to a sequence of events in the past or to imagine a sequence of events in the future—a capacity that they have argued is unique to humans.[13] Others, however, have offered evidence that humans are not the only species to be able to imagine a future; were this to be the case it would suggest that language (which is often regarded as one of the key tools through which episodic memories are anchored) is not necessary for some forms of mental time travel.[14]

Memory: Basic systems

The final aspect of memory I would like to explore builds on recent work by the psychologist David Rubin and his colleagues, who have proposed that our model of human memory should reflect what is currently known about both brain and behavior. Rubin notes that one of the striking features of the mind and brain is that they are divided into networks of cognitive operations (or basic systems), "including separate systems for each of the senses, spatial imagery, language, emotion, narrative, and motor output. Each system has its

[12] Endel Tulving, *Elements of Episodic Memory*, Oxford Psychology Series, no. 2 (Oxford: Clarendon Press, 1983) and "Episodic Memory and Autonoesis: Uniquely Human?" in *The Missing Link in Cognition: Origins of Self-Reflective Consciousness*, ed. Herbert S. Terrace and Janet Metcalfe (Oxford: Oxford University Press, 2005), 3–56.

[13] Thomas Suddendorf and Michael C. Corballis, "Mental Time Travel and the Evolution of the Human Mind," *Genetic Social and General Psychology Monographs* 123/2 (1997), 133–67 and "The Evolution of Foresight: What is Mental Time Travel, and is it Unique to Humans?" *Behavioral and Brain Sciences* 30/3 (June 2007), 299–351.

[14] Nicola S. Clayton and Anthony Dickinson, "Mental Time Travel: Can Animals Recall the Past and Plan for the Future?" in *Encyclopedia of Animal Behavior*, ed. Michael D. Breed and Janice Moore (Amsterdam: Elsevier B.V., 2010), 438–42; William A. Roberts, "Evidence for Future Cognition in Animals," *Learning and Motivation* 43/4 (2012), 169–80; in the same issue of that journal, Madeline J. Eacott and Alexander Easton, "Remembering the Past and Thinking About the Future: Is It Really About Time?", 200–208.

own functions, neural substrate, processes, structures, kinds of schemata, and types of errors that have been studied individually."[15] Reflecting this, the model developed by Rubin and his colleagues assumes that each system has its own forms of memory, including subsystems for the storing of sensory information, for working memory, and for long-term memory. One of the results of this approach is a richer view of episodic memory: according to the model, each basic system comprises a separate network of behavioral properties, storage, and neural substrates, which interact to produce episodic memories. Episodic memories are thus constructed "not from a general, abstract, propositional cognitive structure of homogenized information, but rather from sensory, language, emotion, and other systems, each of which uses fundamentally different structures and processes for fundamentally different kinds of information."[16]

As a way to illustrate this perspective on memory Rubin invited his reader to consider six questions:

1. What is your name?
2. What is the color and shape of winter squash?
3. How many windows are there in your home?
4. Is the first note of your national anthem higher than, or lower than, or the same as the second?
5. Where is the letter "a" on your keyboard?
6. How do your feelings when you have a manuscript accepted differ from your feelings when you have a manuscript rejected?[17]

The first question, which requires the retrieval of linguistic information, evokes a paradigmatic memory task. Note, however, the recall process associated with the second question, which seems very different from the first, not the least because it involves tactile and visual information. Of a different sort is the third question—as Rubin notes, while there is a strong visual component to this question, to answer it many people will take an imaginary walk through their home as a way of taking inventory of the windows therein. The fourth question takes us some distance from the first and involves the sort of auditory information with which musicians are quite familiar. The fifth question typically activates motor skills, and many people will answer it by summoning

[15] David C. Rubin, "The Basic-Systems Model of Episodic Memory," *Perspectives on Psychological Science* 1/4 (2006), 277.

[16] Rubin, "The Basic-Systems Model of Episodic Memory," 278.

[17] Ibid., adapted.

an imaginary keyboard on which to enact the solution. The sixth question is of yet a different sort, and engages with a memory for emotion that can be as vivid as it is elusive.

The basic systems model set out by Rubin has two important consequences for our understanding of memory. First, the model pushes to the forefront the notion that long-term memory may include a wide range of information—including that associated with perceptual input, motor systems and the emotions—some of which is but inadequately captured by language. Second, the model suggests an important adjustment to the way episodic memory is construed, as the temporal index for a specific episode may be less important than the part the knowledge associated with that episode plays in the construction of personal identity.

Memory and consciousness

Although consciousness may appear to be a relatively stable cognitive phenomenon, what stability it has is a productive illusion created by cognitive processes designed to anchor and inform behavior. These processes include working memory, which provides a buffer for the evaluation of information from perceptual storage such that it can be integrated into existing knowledge before being transferred to long-term memory. Although consciousness, as an ongoing process, is procedurally occupied with operations that take place in working memory, the substance of thought—that is, the information secure enough that we might call it knowledge—typically involves long-term memory. Some of this information is of a general sort (and associated with semantic memory), some is fundamentally subjective (and associated with episodic memory). Although any absorptive recollection of information from long-term memory will at least temporarily draw us away from the present moment, there is broad agreement that episodic memory makes possible a kind of mental time travel: in focusing our awareness on impressions or experiences gathered by our former selves (or that we can imagine being acquired by our future selves) our consciousness shifts to a temporal frame only tangentially related to that of everyday life. Finally, the different kinds of memory that follow from the basic systems model proposed by Rubin and his colleagues suggests that there are conscious states that are quite different from one another—as different as remembering the color and shape of winter squash is from remembering the opening of the national anthem—and that some of these states may be captured only imperfectly by the resources for conceptualization offered by language.

Musical Memory, Musical Consciousness, Musical Time

In my work over the past couple of decades I have taken the position that our understanding of music is shaped by cognitive capacities that are quite general but that can nonetheless be recruited for the rather specialized task of conceptualizing music.[18] Accordingly, I would propose that the features of memory I have outlined are not only broadly manifested in human cognition but—as illustrated by some of the examples I offered in my discussion—also inform how we think of music. That said, the task of understanding music may place rather special demands on human memory systems. For instance (and with respect to the basic systems model offered by Rubin), while memory systems connected to audition are clearly important for musical understanding, there is good evidence that systems connected with motor function and emotions are equally important.[19] Put another way, musical practice, especially as a cultural phenomena, includes sounds, and kinesthetic experiences, and the emotions associated with both. To the extent that memory processes shape consciousness, then, conscious states that are structured by sequences of musical events may be markedly different from those structured by other communicative media.

I can expand on this last point by making recourse to some of my recent work in which I have put forth distinctions between the basic functions of language and music in human cultures.[20] Drawing on the work of the developmental psychologist Michael Tomasello, I have taken the position that the basic function of language within human culture is to direct the attention of another person to objects or concepts within a shared referential frame.[21] The

[18] The fullest statement of this position is provided in Zbikowski, *Conceptualizing Music: Cognitive Structure, Theory, and Analysis*, AMS Studies in Music (Oxford: Oxford University Press, 2002).

[19] I have discussed the role of motor function in musical understanding in Zbikowski, "Music, Dance, and Meaning in the Early Nineteenth Century," *Journal of Musicological Research* 31/2–3 (2012), 147–65 and "Music and Movement: A View from Cognitive Musicology," in *Bewegungen zwischen Hören und Sehen: Denkbewegungen über Bewegungskünste*, ed. Stephanie Schroedter (Würzburg: Königshausen & Neumann, 2012), 151–62. I have offered my perspective on the way the emotions shape musical understanding in Zbikowski, "Music, Emotion, Analysis," *Music Analysis* 29/1–3 (2011), 37–70.

[20] Zbikowski, "Dance Topoi, Sonic Analogues, and Musical Grammar: Communicating with Music in the Eighteenth Century," in *Communication in Eighteenth Century Music*, ed. Kofi Agawu and Danuta Mirka (New York: Cambridge University Press, 2008), 285–92.

[21] Michael Tomasello, "Linguistic Constructions and Event Cognition," in *The Cultural Origins of Human Cognition* (Cambridge, Mass.: Harvard University Press, 1999), 134–60.

basic function of music, by contrast, is to represent through patterned sound various dynamic processes that are important within human social interactions. Chief among these dynamic processes are the sequences of physiological and psychological events associated with the emotions, the spontaneous gestures that accompany speech, and the movements of bodies—including our own—through space. The patterned sound of music offers sonic analogs for these dynamic processes, and these analogs provide the basic components of musical grammar.

For an example of a sonic analog let me return once more to the opening of the first movement of Takemitsu's *All in Twilight*. In my initial discussion I noted that the gesture comprised by mm. 10 and 11 recalls, if imperfectly, the gesture of mm. 4–6. My use of the term "gesture" is, of course, purely metaphorical—performing the sweeping ascending passage of m. 5, for instance, requires hardly any movement of the guitarist's left-hand fingers—and yet the musical events of these passages do provide an apt sonic analog for the sequence of motor actions that make up a physical gesture.[22] Perhaps more importantly, sonic analogs such as these can also summon our own sense of making such gestures: our understanding of these passages is to some extent grounded in our embodied experience of making physical gestures.[23]

My broader proposal, then, is that language and music draw on different communicative resources to realize their functions within human cultures, and that these resources are supported by equally different memory systems. To the extent that consciousness is shaped by memory, the kind of consciousness that is created through language will be markedly different from the kind of consciousness that is created through music. And to the extent that different kinds of consciousness shape our experience of time, music and language will lead us toward different ways to experience time. Language is particularly good at capturing objects and relations, and so leads us toward places in time: a present that is coextensive with our interpersonal space, a future that is ahead of us, and a past that is behind us.[24] Language is less good at capturing the

[22] I discuss correlations between musical materials and physical movement in more detail in Zbikowski, "Musical Gesture and Musical Grammar: A Cognitive Approach," in *New Perspectives on Music and Gesture*, ed. Anthony Gritten and Elaine King, SEMPRE Studies in the Psychology of Music (Farnham, U.K.: Ashgate, 2011), 83–98.

[23] Zbikowski, "Music and Movement," 154–57.

[24] Rafael Núñez and Kensy Cooperrider, "The Tangle of Space and Time in Human Cognition," *Trends in Cognitive Sciences* 17/5 (2013), 220–29. It is worth noting that it is possible to characterize time in terms of space in other ways—among Aymara speakers in South America, for instance, the past is in front and the future is behind. For a discussion, see

phenomenal experience of an ongoing dynamic process. We can, of course, use language to *describe* an ongoing process, but if we really want to summon, say, the phenomenal experience associated with the descent of a falling body we typically resort to physical gestures or to sonic analogs of the sort that are regularly exploited by music.

I should hasten to add that the view I have sketched here leaves out much, not least because it gives the impression that the cultural practices associated with language and music are as simple and straightforward as the two-syllable words we use to conjure these practices. This would be wrong: both language and music involve a complex mosaic of cognitive and social skills, collocations that are anything but simple. That said, the view I have offered gives some sense why temporal experience that is shaped by listening to (or imagining, or performing) music is different from that created by other communicative media: music's sonic analogs provide representations of dynamic processes that can be correlated with physical movements and emotional processes, activating memories of embodied experience that shape consciousness in a distinctive and compelling way.

EMBODIED AND REFLECTED TIME IN THE FIRST MOVEMENT OF TAKEMITSU'S *ALL IN TWILIGHT*

As I observed in my initial comments, the first movement of Takemitsu's *All in Twilight* offers two distinct ways to think about how music shapes temporal experience: as shaped by an ongoing sequence of musical events (the sonic analogs of which would provide an opportunity for embodied immersion); and as shaped by a process of reflection prompted by that very sequence. Indeed, among the things I find striking about the movement are the range of opportunities it offers for both embodied immersion and (momentary) detached reflection. An example of this range is provided by mm. 4–6, which offer a holistic structure that could serve as a sonic analog for the dynamic process of a physical gesture. This potential is a consequence of the coordination of three features: (1) the passage begins and ends with two-chord sequences, in which the first chord is longer than the second, (2) there is a smooth continuity to the melody, which opens with a descending major third (E4–C4) and continues with a sequence of sixteenth notes that stretches from D3 up through E4 to arrive on the repeated G4s of m. 6, and (3) the passage ends

Rafael Núñez and Eve Sweetser, "With the Future Behind Them: Convergent Evidence from Aymara Language and Gesture in the Crosslinguistic Comparison of Spatial Construals of Time," *Cognitive Science* 30/3 (2006), 401–50.

with a kind of harmonic stasis in that the second chord of m. 6 is simply a revoiced version of the first chord. Together, these features provide analogical correlates for the preparation, stroke, and retraction typical of the spontaneous gestures that accompany speech.[25] I should also note that the sonic analog offered by mm. 4–6 could correlate equally well with the movements of a physical body through space or with a sequence of emotions. While all of these options would connect with embodied experience, the specifics of these connections—whether they involve physical movements we could make ourselves or emotional states we might experience—will of necessity be different.

As I noted earlier, the passage comprised by mm. 10–11 is very similar to that comprised by mm. 4–6 and indeed replicates a number of its distinctive features: it opens with a two-chord sequence, the melody begins with a descending major third followed by a rapid sequence of shorter note values that sweeps upwards, and the passage concludes with a sustained chord (here colored by harmonics). Were these similarities to be noted by a listener, mm. 10–11 could be heard as an approximate recollection of mm. 4–6; if we assume this recollection informs consciousness it could lead to the kind of mental time travel associated with episodic memory, although in this case the span traversed would only be a handful of seconds. It is of course also possible to imagine a listener who does not notice the similarities between the passages and who thus accepts mm. 10–11 as unique, and whose temporal experience is, at least at this point, not transformed through reflection.

A similar set of possibilities is offered by the restatement of the two-chord sequence of m. 4—a half step lower, and with its rhythmic and timbral character changed—in m. 13. The held chord is followed (as it was in m. 5) by an ascending passage in sixteenth notes that terminates in a sustained chord, but here the melody is borrowed from m. 7. On the one hand, Takemitsu arranges his material to call attention to the moment: it comes close on the heels of mm. 10–11 and begins, in m. 12, with what could be taken as a false start; on the other hand, the passage is different enough from those of mm. 4–6 and 10–11 (in its timbre, halting beginning, and conclusion on a recognizable diatonic chord) that it could be regarded less as a reference to the earlier passages and more as a distinct utterance.

The potential for hearing these passages as referring to one another (or as manifestations of some more general prototype) expands with the repetition of the A section in mm. 30–43. Although one could imagine an attentive listener

[25] David McNeill, *Hand and Mind: What Gestures Reveal About Thought* (Chicago: University of Chicago Press, 1992), 15.

coming to an appreciation of the importance of these passages (and the sonic analogs they offer) for the rhetoric of the movement, one could also imagine a listener becoming lost among the multiple statements. I would propose that each of these alternatives would have an influence on the listener's temporal experience: appreciating the importance of the passages to Takemitsu's larger design could lead to a more reflective (and less engaged) stance, but one that also affords an opportunity to view the whole from a point of remove; becoming lost could lead to a feeling of being guided only by the whim of the composer.

A somewhat different, and slightly more abstract, set of references is provided by the E-minor ninth chord first heard in m. 21. The chord appears near the beginning of what will ultimately serve as contrasting material (in that almost all of the material of mm. 20–28 is unique to those measures) and reappears in m. 44—now in shimmering, languidly unfolding harmonics—to interrupt the completion of the A section. The arpeggiated melody that results is then restated, an octave lower, in m. 46 and leads to the steady succession of sixteenth notes of mm. 47–54. The minor ninth harmony returns in m. 52 (where it is followed by the same angular pentatonic material used in m. 47) and then—transposed up a major third to create a G♯-minor ninth—appears again in mm. 54–55 and brings an end to the succession of sixteenth notes. Measures 56–58 then gather the threads lost when the A section was interrupted, only to have the E-minor ninth reappear—first in harmonics (replicating the voicing of the G♯-minor ninth in m. 55), then voiced low in the guitar's tessitura—to conclude the movement. This concluding passage brings into prominence a passing detail of the end of the A section that goes almost unremarked the first time—the incomplete C-minor ninth chord at the end of m. 18 (lacking a seventh) leading to the sustained chord of m. 19—whose restatement in m. 43 is interrupted by the E-minor ninth of m. 44 and which is then recovered in m. 56.

What unites these events is not similarity of pitch contour or rhythmic figuration but their belonging to the same class of sonorities ("minor-ninth chord"). The basis for similarity among these events is thus markedly different from that which might apply to the passages comprised by mm. 4–6, 10–11, or 13–15, for what is relevant is the intervallic content of the events rather than the way that content is activated through the disposition of its constituent pitch classes in register and time. Put another way, the sonic analogs that comprise the different statements of minor-ninth chords over the course of the movement are quite various. This variety would seem to indicate that the identification of the sonorities as members of the same class is more a product

of detached reflection than embodied immersion, and yet the intervallic resources shared by these sonorities suggest that the sonic analogs produced from them would belong to a common topography. The effect is more marked with the pentatonic material first heard in m. 47, which returns (with the same pitch-class content) in different guises in mm. 50–51 and 53: although the uniformity of this material owes something to the pattern of quasi-arpeggiated sixteenth notes over a sustained bass note shared across these instances, there is also a sense that each iteration is an exploration of a common harmonic topography. In both cases, the focus on this topography at the expense of its activation through sequences of pitches would tend to attenuate engagement with sonic analogs, but it would also provide a spatial correlate for those analogs—a kind of "where" that could inform the recollection of musical events.

A set of relationships more abstract still circulates around the sonority that concludes the introductory material set out in mm. 1–3. The pitches sustained into m. 3 create an [0257]-type tetrachord, a collection that becomes a touchstone for the movement as a whole. Table 1 gathers the more prominent instances of this tetrachord, indicating the measures in which they occur, the pitch-class content of the sonority, and the transposition level relative to the first instance. What is immediately evident on surveying the pitch-class content of these instances as well as their realization over the course of the movement is their diversity: Takemitsu insures that each instance has a distinctive character such that they sound as individuals even when juxtaposed with one another (as they are in mm. 16–18/41–43). (One exception is provided by the arpeggiated instances that occur in mm. 26 and 28, which are identical save that the latter is a T_2 version of the former. I would propose that the sonorities here are part of a compositional strategy analogous to that of a semi-cadence that plays out over the course of mm. 25–28. Indeed, [0257]-type tetrachords participate in similar quasi-cadential strategies in mm. 16–19 and—interrupted by the contrasting material of mm. 44–55—mm. 41–43 and 56–58.) It must be admitted that, while these diverse instances of [0257]-type tetrachords are touchstones, they are of a rather ephemeral sort, emerging from the cloud of sonorities that make up the movement only to disappear once again. That said, few other sonorities within this cloud replicate the intervallic content that distinguishes this tetrachord (save for the pentatonic collections of mm. 47–53), which suggests that instances of the tetrachord could provide a kind of topographical marker—perhaps known through reflection, but perhaps simply felt as an essential constituent of the sound world created by Takemitsu—within the overall landscape of the movement.

Table 1: Instances of [0257]-type tetrachords in the first movement of Tōru Takemitu's All in Twilight

Measure	Pitch Classes	Transposition
3	(1,3,6,8)	T0
7–8 / 32–33	(4,6,9,11)	T3
10 / 35	(2,4,7,9)	T1
16 / 41	(6,8,11,1)	T5
17 / 42 / 56	(9,11,2,4)	T8
18 / 43	(6,8,11,1)	T5
19 / 57–58	(0,2,5,7)	T11
26	(9,11,2,4)	T8
28	(7,9,0,2)	T6

Again, the range of opportunities for embodied immersion or detached reflection offered by the first movement of Takemitsu's *All in Twilight* is striking. This range is due in part to the novelty of the musical events comprised by the work—at times it is all we can do to hang on to the current sequence of events, never mind relating that sequence to others—but it is also due to the compositional strategies Takemitsu employs. These include his practice of presenting the listener with passages that might or might not sound quite similar to ones heard a moment or two before, a practice in evidence both within the A section and in the reprise of the A section. It is good to keep in mind that, while it is easy enough to see this reprise on the printed page, most listeners would not have access to visual aids of this sort. In consequence, the similarity of passages both within and across the A sections complicates the listener's identification of individual passages: is what I am hearing now the same thing I heard earlier, is it an oblique reference to what I heard, or is it something entirely different?

I have, of course, proposed that the contrast between embodied immersion and detached reflection is linked to a contrast in conscious states, and thus to a contrast in temporal experience. Temporal experience, as it is shaped by music, is of necessity multiple rather than unitary, and conditioned in part by resources for communication—sonic analogs for dynamic processes—uniquely exploited by music. That said, reflection on certain aspects of musical events, such as the similarity of one sonority to another, may lead to a regard of musical materials that approaches the classificatory systems facilitated by language. Such a regard is certainly not to be disparaged—it is, after all, one of the strengths and pleasures of the systematic perspectives on musical organization

that distinguish work in music theory—but it is one that of necessity stands apart from the work of music and from an embodied immersion in sequences of musical events.

MUSICAL TIME, EMBODIED AND REFLECTED

My focus in this chapter has been on humans' experience of time, and on ways music shapes that experience. There are, of course, other ways to approach the topic of time that leave humans more or less completely out of the picture—the inquiries of the physicist or cosmologist must set aside humans' blinkered view of time if they are to make any progress—but such perspectives are of limited application to human cultural practices such as those that give rise to music, practices that only exist within and for human experience.

As I have tried to show here, human experience is shaped by the resources of human consciousness, and consciousness is shaped by cognitive processes related to memory. The memories of humans are also shaped by cultural practices, through which groups of humans structure and stabilize knowledge that is important to their societies.[26] I should emphasize that "knowledge" here extends beyond those concepts that can be captured through language to patterns of physical movement and to privileged emotional states. The representation of such movements and states is one of the functions of the sonic analogs that I have proposed are basic to musical grammar, and that in turn shape our experience of time.

As I endeavored to illustrate through my analysis of aspects of the first movement of Takemitsu's *All in Twilight*, our reception of a musical work can range from embodied immersion in its constituent sonic analogs to reflection on the materials comprised by those analogs, with both shaping our temporal experience of the work. And, returning to Takemitsu's arrangement of Lennon and McCartney's "Yesterday," our reception may also be informed by knowledge or events that are only tangentially related to the musical work, excursions into which can further shape our experience of time.

Perhaps it is madness to attempt to speak of time—to attempt to capture that which provides the metric for every dynamic process and is thus the essence of such processes—and yet, linguistic beings that we are, speak we will. Nonetheless, we are also beings that have developed other means to communicate about our experience of the world, means that include painting,

[26] The relationships between cultural practices and memory is given careful consideration in Paul Connerton's *How Societies Remember* (Cambridge: Cambridge University Press, 1989).

sculpture, dance, and music. Through such media we may add to and enrich our experience of the world, and also find a slightly more secure grasp on those elusive things that add both mystery and meaning to human life.

Ethnomusicologists and Questions of Temporality

STEPHEN BLUM

Reflecting on how the three nouns in the subtitle of this volume—phenomenology, perception, performance—relate to the musical scholarship of the past century, we may remember complaints that perception and performance were not receiving the scholarly attention that their centrality in musical experience demands. Only two decades ago, Regula Qureshi described "the place of performance in the study of music and time" as "conspicuous more by its absence."[1] A history of the engagement of music scholars with phenomenology, a term whose highly variable usage was already noted by Ernst Kurth in his *Musikpsychologie* of 1931,[2] might prove a more rewarding inquiry than a reckoning with the neglect of perception and performance through most of the twentieth century, a situation that, happily, no longer obtains.

Besides examining explicit responses, positive and negative, of music scholars to arguments of phenomenologists, such a history might also probe affinities in method like those some scholars have posited, and others have questioned. Examples are Leslie Blasius's comparison of "descriptive protocol" in Husserl, Freud, and Schenker,[3] Nicholas Cook's comment on Schenkerian

[1] Regula Burckhardt Qureshi, "Exploring Time Cross-Culturally: Ideology and Performance of Time in the Sufi *Qawwālī*," *Journal of Musicology* 12/4 (1994), 498.

[2] Ernst Kurth, *Musikpsychologie* (Berlin: Max Hesse, 1931), 54 n. 2.

[3] Leslie Blasius, *Schenker's Argument and the Claims of Music Theory* (Cambridge: Cambridge University Press, 1996), 35.