Analyzing Perceived Time: A Husserlian Study of Temporal-Consciousness in Gérard Grisey's *Vortex Temporum* and Morton Feldman's *Triadic Memories*

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Abstract

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This essay explores the varying effects of music on the temporal perception of listeners by closely analyzing two 20th century works: Gérard Grisey's *Vortex Temporum* and Morton Feldman's *Triadic Memories*. Although representative of vastly different compositional styles, these two composers are alike in their preoccupation with time as a compositional element and thus provide a valuable opportunity to evaluate temporal perception in two unique musical contexts. My approach is threefold: 1) I begin with an exposition of Edmund Husserl's structure of time-consciousness in order to provide the necessary philosophical framework within which the subjective experience of listeners can be accurately described; 2) I analyze Grisey's *Vortex Temporum I & II* and explore the phenomenon of compressed and dilated time, specifically in light of the composer's conception of the harmonic spectrum as an object with inherent temporal qualities; 3) I analyze Morton Feldman's *Triadic Memories* as exemplary of a highly recursive musical context that, although dependent upon a single musical object for its entire duration, lacks locatable, surface-level referents.

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I

The flux of consciousness

Introduction

The 20th century was witness to the rise of a new type of composer, one who was concerned at least as much with the process of music creation and consumption as with the musical product itself. Methodology moved to the forefront of the composer's mind as compositional process increasingly became a prescriptive category rather than a descriptive one, a shift which resulted in the menagerie of schools of composition that have come to be the focus of much of today's attention: serialism, neoclassicism, spectralism, minimalism, neoromanticism, the Darmstadt School, the New Complexity, *et al*. As these various schools came into creation and began to distance themselves from the prevailing *milieu*, there arose an increasing preoccupation with the philosophical framework in which a musical work was created – a framework which became woven, sometimes even subliminally, into the fabric of each unique school of thought (in some cases, a radical avoidance of such a philosophy was the functioning paradigm). One notices this most clearly in the writings of composers such as Karlheinz Stockhausen, John Cage, and Gérard Grisey, each of whom wrote extensively on the

philosophical or political impact that he wished his music to have on the listener and nearly as much on his own philosophic attitudes toward composition, but it was the project of every modern composer to justify him/herself in the eyes of a skeptical public, and for many individuals this required significant recourse to articulated ideology.

For the present essay I will concern myself with just two composers, Gérard Grisey and Morton Feldman – as representatives of two vastly divergent stylistic and ideological trends – and I will be focusing exclusively on their unique preoccupations with musical time. On the vastly divergent ways in which musical time can be experienced by listeners, Adorno commented:

> Musical time is really musical – in other words not just the measurable time of the duration of a piece – only as time that is dependent on the musical content and in turn determines that content, the concrete means of transmission of the successive. …That the temporal consciousness that is transmitted by the musical content of a vocal movement by Palestrina, a fugue from the *Well-Tempered Clavier*, the first movement of the [Beethoven] Seventh Symphony, a prelude by Debussy, or a quartet movement by Anton von Webern that has been reduced to twenty measures, is endlessly different, will be recognized even by the person who has remained completely aloof from superficial analogies…For the music of Webern and that of Bach, the experience of time that is specifically unique to it and that characterizes its structure may well be more essential than the fact that both unfold in time, or even that in both cases the musically established time does not coincide with that of its chronometric duration.[1]

It is the unique "musical times" inhabited by *Vortex Temporum* and *Triadic Memories* which I plan to explore in the present essay. My approach will be essentially threefold:

1. I will begin with an exposition of Edmund Husserl's structure of time-consciousness in order to provide the necessary philosophical framework within which the subjective experience of listeners can be accurately described.

[1] Theodor Adorno, "On the Contemporary Relationship of Philosophy and Music (1953)," in *Essays on Music*, ed. Richard Leppert and trans. Susan H. Gillespie (Berkeley: University of California Press, 2002), 143-44.

2. I will then embark on an analysis of Gérard Grisey's *Vortex Temporum* and explore the phenomenon of compressed and dilated time, specifically in light of the composer's conception of the harmonic spectrum as an object with inherent temporal qualities.
3. Lastly, I will analyze Morton Feldman's *Triadic Memories* as exemplary of a highly recursive musical context that, although dependent upon a single musical object for its entire duration, lacks locatable, surface-level referents.

Husserl's structure of time-consciousness

Edmund Husserl's theory of time-consciousness – the manner in which one's consciousness is aware of the temporal dimension – underwent significant changes during the years of its working-out (1905 to 1917), and has consequently been handed down to us as something of a flux of redefinitions, changing terminologies, and apparent contradictions.[2] The earliest source for his theory is the product of Edith Stein, one of Husserl's students, who transcribed her teacher's notes on the subject of time-consciousness and compiled them, with the editorial help of Martin Heidegger, into a single volume, published in 1928, that is known as the Main Text. This was later embellished, under the surveillance of Husserl, by the addition of thirteen appendices (*Beilagen*). It was not until 1966 that Rudolf Boehm compiled an exhaustive collection of Husserl's writings on time-consciousness into the tenth volume of the extensive *Husserliana* text.[3] In spite of the author's frequent revisions, the core of Husserl's account is a highly functional and coherent methodology for describing the phenomenon of time

[2] J.N. Findlay, "Husserl's Analysis of the Inner Time-Consciousness," *The Monist* 59, no. 1 (1975): 4.

[3] Ibid.

consciousness, one which proves particularly useful for investigating the cognitive apprehensions of the inherently temporal medium of music.

Husserl found a good deal of inspiration for his structure of time-consciousness in the philosophy of Franz Brentano, whose lectures he attended in 1884-6. Although Husserl in many of his early writings is at pains to distance himself from the ideas of his teacher, a similar structure of temporal awareness can be found in the two philosophers' work;[4] namely, both assert that objects of consciousness can be characterized as existing "in a boundary…They exist as a continuous sequence of that which has existed."[5] In other words, all percepts and apprehensions occur only in the momentary, constantly progressing boundary line at which the past and the future meet:

> For the now is not temporally extended but exists only as a boundary between the past and the future. Or to speak more accurately (for 'the now' does not refer to an *ens reale* ['thing that is', or concreta]), *things that exist now* – in short, *things that exist* – exist only as boundaries of what did exist or of what will exist or of both.[6]

The important distinction here, one which Husserl readily adopted from ideology of Brentano, is that in a perceptually-based conception of time the present moment is not a discrete point to which all past and future points may be added to constitute a complete temporal continuum. Rather, our perception of time is much more accurately compared to an unbroken line extending backward to an increasingly obscure past and forward into an as-yet-unrealized future, which

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[4] Dainton, Barry. "Temporal Consciousness," *The Stanford Encyclopedia of Philosophy* (Fall 2017 Edition), Edward N. Zalta (ed.), accessed August 13, 2018, https://plato.stanford.edu/archives/fall2017/entries/consciousness-temporal/.

[5] Franz Brentano, *Philosophical Investigations on Space, Time and the Continuum*, trans. Barry Smith (New York: Croom Helm, 1988), 84.

[6] Stephan Körner and Roderick M. Chisholm, "Editors' Introduction to the English Edition," in Brentano, *Philosophical Investigations*, xx.

Husserl characterizes as a "continuity of 'modes,' in a 'continuous flux.'"[7] The distinction is between a mathematical conception of a continuum on which an infinite number of points can be derived – as in Zeno's well-known paradox – and a phenomenological conception of a continuum as an unbroken line, which is much more in agreement with our temporal experience.[8]

The distinction between a mathematical and a phenomenological conception of time has rather serious ramifications that work in the service of one of Brentano's great preoccupations: the possibility of a unified experience of succession.[9] In order for a succession of events to be perceived as continuous and, for that matter, in order for it to be possible to perceive any degree of change or endurance, it is essential to be conscious, not of a "succession of experiences," but an "experience of succession."[10] To describe this experience, Brentano proposes the following structure of consciousness: "When that which was first of all given as present appears as more and more past it is *not other objects* which are accepted as existing, but the same objects which are accepted *in a different way*, with a different *modus* of acceptance."[11] For example, when we hear a melody with tones A, B, then C, there is some sense in which tone A continues to be accessible to our consciousness *as past* even while B is sounding; further, when B yields to C, B continues to be accessible as *just past* and A is pushed further back into an increasingly *remote*

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[7] Edmund Husserl, *The Phenomenology of Internal Time-Consciousness*, ed. Martin Heidegger, trans. James S. Churchill (Bloomington, IN: Indiana University Press, 1964), 44.

[8] This is not to say, of course, that an unbroken temporal continuum is absent of discrete objects and events, but rather that our moments – if such a word can be used without too grievous self-contradiction – of perception are characterized by such a continuum.

[9] Husserl seems to have accepted this conception of time rather implicitly, as shall be seen shortly in the description of his modes of appearance.

[10] Körner and Chisholm, "Editors' Introduction to the English Edition" in Brentano's *Philosophical Investigations*, xviii.

[11] Brentano, *Philosophical Investigations*, 79.

past. Brentano refers to the process by which we understand this sort of temporal succession as "proteraesthesis,"[12] a term which Husserl abandoned in favor of "retention," though the meaning of these terms remained fairly similar (a more thorough description of the nature of retentions will be made shortly).[13]

At this point, it is important to comment on the nature of the temporal continua and apprehensions which are being evaluated. In Husserl's famous "phenomenological reduction," or *epoché* – a method which was developed around 1906 in his *Ideas* and was later incorporated into his lectures and writings on time-consciousness[14] – the philosopher proposes that "the phenomenological description of a given act and, in particular, the phenomenological specification of its intentional content, must not rely upon the correctness of any *existence assumption* concerning the object(s) (if any) the respective act is about."[15] In other words, the accuracy of a phenomenological account – characterized by the apperception of an external object or the awareness of such an apperception – does not rely on the veracity of any claim about the object in itself. By divorcing perception from percept, Husserl advances an essentially empirical ideology in which the phenomenological experiences of an individual are not dependent on the accuracy of that individual's "existence assumptions" about the nature of

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[12] Ibid., 90.

[13] Husserl, *The Phenomenology of Internal Time-Consciousness*, 52.

[14] Edmund Husserl's primary exposition of the Phenomenological method is most cohesively expounded in his 1913 publication, *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy—First Book: General Introduction to a Pure Phenomenology*, trans. F. Kersten (The Hague: Nijhoff, 1982). A description of the phenomenological reduction can be found in *The Phenomenology of Internal Time-Consciousness*, Appendix VI.

[15] Christian Beyer, "Edmund Husserl," *The Stanford Encyclopedia of Philosophy* (Summer 2018 Edition), Edward N. Zalta (ed.), Accessed October 16, 2018, https://plato.stanford.edu/archives/sum2018/entries/husserl.

objects in themselves (concerning qualities of extension, movement, duration, etc.). Husserl explains that such a phenomenological account of temporal apprehension involves a "bracketing" of "every assumption, stipulation, or conviction concerning Objective [*objektive*][16] time (of all transcendent presuppositions concerning existents);" this *epoché* is necessary in temporal contexts because "world-time, real time, the time of nature in the sense of natural science including psychology as the natural science of the psychical, is not such a [phenomenological] datum."[17] Drawing heavily on the philosophy of Immanuel Kant, Husserl relegates Objective time to the unknowable category of *noumena* and turns to the *phenomenal* realm wherein the primary concerns are "the apprehensions of time, the lived experiences in which the temporal in the Objective sense appears."[18] Consequently, when a phenomenological analysis is made of a musical work, the primary data for inquiry are lived experiences, as they appear to the perceiver. Findlay summarizes this distinction nicely:

> What are important for phenomenology are not distinctions between the time of intuitively given sense objects [e.g., trains, chairs, etc.] and the time of objects not adequately given by sense [eg. tones, color, etc.], but the distinctions between *the time we live through without making it an object*, *the time we perceive in the objects* we perceive around us, and *the time, lastly, that provides the framework for objects* that extend far beyond what we can perceive or imagine.[19]

Now, following this brief discussion of the nature of phenomenological data, we can reach an understanding of Husserl's model of time-consciousness. Borrowing heavily from

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[16] Husserl uses two different words for "object": *Objekt* and *Gegenstand*. The distinction is used to differentiate between objects in their "transcendent existence" and objects in their "immanent existence," which is to say, between the unknowable *noumena* of an object and the quality of being fixed within objective time, but still capable of *phenomenal* perception.

[17] Husserl, *The Phenomenology of Internal Time-Consciousness*, §1.

[18] Ibid.

[19] Findlay, "Husserl's Analysis," 6. (Emphasis is my own)

Brentano, Husserl describes temporal awareness as being of tripartite construction, composed of "primal impressions" which give way to retentions and are preceded by protentions. It is only within the momentary "source-point" of the present, which we are aware of through primal impressions, that temporal Objects can truly be said to exist.[20] For instance, the playing-out of a melody in our apprehensions is only factually immanent in the momentary boundary of the present. How then can we be said to be aware of the unity of such complex, extended temporal events as "melodies," or even sustained tones, for that matter, when the entities themselves are presented to us only as fleeting successions? Husserl's response was to introduce the concepts of retentionality and protentionality to the structure of consciousness:

> The actual [*leibhafte*] tonal now is constantly changed into something that has been… However, when the tonal now, the primal impression, passes over into retention, this retention is itself again a now, an actual existent. While it itself is actual (*but not an actual sound*), it is the retention of a sound that has been…Every actual now of consciousness, however, is subject to the law of modification. The now changes continuously from retention to retention. There results, therefore, a stable continuum which is such that every subsequent point is a retention for every earlier one. And every retention is already a continuum. The sound begins and steadily continues.[21]

What begins to take shape is a form of consciousness in which the just past is accessible, via retention, to every momentary apprehension of the present; or, perhaps more accurately, there is a continuous sequence of compounding retentions that terminate in the boundary of the present. This process of "sinking back" from the "tonal now," in Husserl's words, is part of what is referred to as the "flux of consciousness," wherein the objective [*gegenständlich*] temporal location of every primal impression (and, by relating two such temporal locations, objective temporal extension) on the temporal continuum is maintained in the consciousness though an

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[20] Husserl, *The Phenomenology of Internal Time-Consciousness*, 51.

[21] Ibid., 50-51. (Emphasis is my own)

ever-changing mode of apprehension that "appear[s] in a modified gradation going back into the past."[22]

Protentions, on the other hand, are characterized by an openness or anticipation of future moments – these are, from the perspective of the present, less detailed in constitution than retentions. Further, because of their open intentionality, protentions receive "continuous fulfillment or 'disappointment' of a decisive kind by what thereupon is impressionally given, whereas retention can look forward only to indirect, indecisive fulfillments."[23] With the addition of protentions, Husserl's tripartite structure of time-consciousness is completed and attention can be given to the structure as a unity, the aforementioned flux of consciousness. Curiously, Husserl denies the possibility of Objective [*objektive*] duration within the primordial flux of consciousness in a passage which is worth quoting at length:

> In this original flux there is no duration. For duration is the form of an entity that lasts, something that endures, that remains the same through the time-series which functions as its duration…For objective [*objektive*] time is a form pertaining to enduring objects, to their changes, and to the events which happen to them. An event is therefore a concept that presupposes persistence, and persistence is something that gets constituted in the conscious flux, a flux which is essentially such that nothing persists in it. *In the conscious flux there are phases of experience and continuous series of such phases*…If I live in the appearance of a tone, the tone stands before me, and either persists or changes. But if I attend to the appearance of the tone in consciousness this likewise stands before me and has its temporal spread, its persistence or change…*But now the absolute flux of conscious states is in its turn to be made our object and given its place in time.*[24]

In this passage, two different kinds of flux are being compared: the original (primordial) flux of consciousness, which we have been discussing, and the Objective flux of reproduction (or

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[22] Ibid., 93.

[23] Findlay, "Husserl's Analysis," 12-13.

[24] Husserl, 1928 Edition, Appendix VI, 463-68. Quoted in Findlay, "Husserl's Analysis," 15. (Emphasis is my own)

memory).[25] According to Husserl, it is only in the retroactive apperception of a particular phase, or segment, of a flux of consciousness that we become aware of its temporal spread *in memory*. He is careful, however, to specify that the temporal spread of which we become aware is that of an objectified phase of a flux, and not the temporal spread of an object as expressed in Objective time – this, of course, is in conformity to the phenomenological reduction. This mode of attending to the past, properly referred to as intentionality of recollection,[26] does not imply (returning to our earlier question) that we are unable to perceive a unity while attending to the present flux of consciousness, for "to be aware of a developing whole incompletely, as it develops, is yet always to be aware of it as a whole."[27] But the impression of persistence (and the potential therefrom to form a unity) in the primordial flux of consciousness does not equate to the perception of duration, a distinction which Husserl is careful to make.

The creation of a method

Having arrived at an understanding of the fundamental components of Husserl's structure of time-consciousness, a model for the interpretation of the temporal flux of consciousness within the context of a musical experience can be ventured. Based loosely on a diagram of Husserl's creation, Example 1.1 depicts a phase of the flux of consciousness wherein four primal impressions (A, B, C, and D) are successively presented in the tonal now before sinking back in the form of retentions; to the right of the tonal now is a potential primal impression (E), a

[25] Findlay refers to these as the time *of* consciousness and the time *for* consciousness.

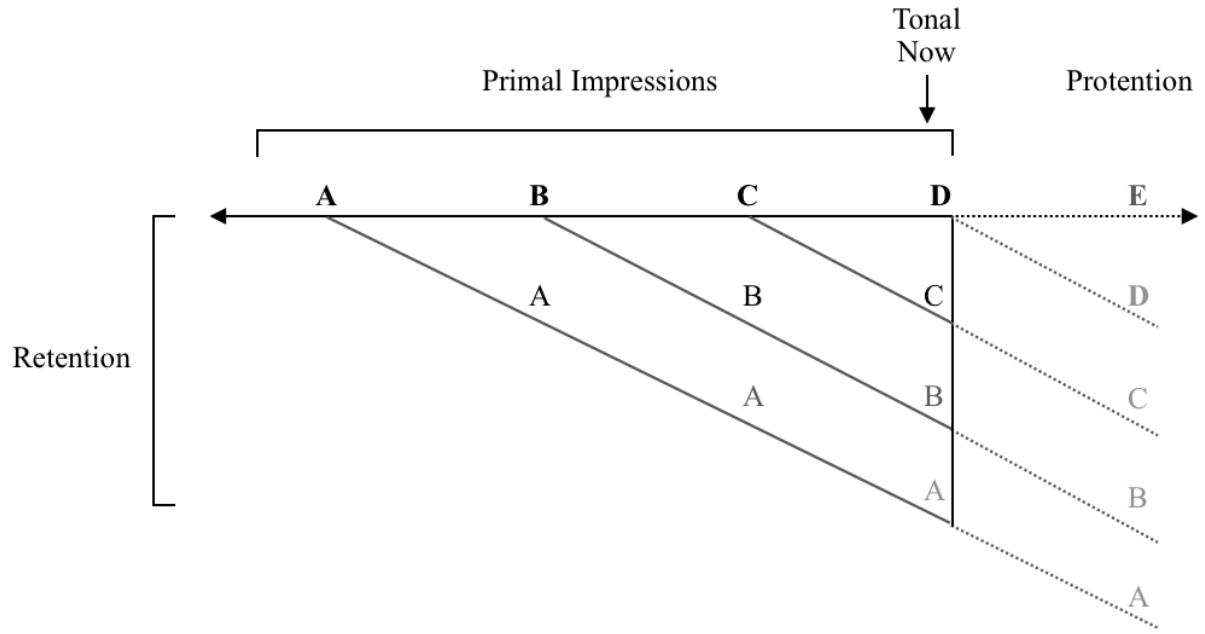
[26] Husserl, *The Phenomenology of Time-Consciousness*, 77.

[27] Findlay, "Husserl's Analysis," 8.

protention, which may or may not be actualized.[28] Mapping this model onto the experience of a melodic phrase is not necessarily as simple as it may appear at first glance. To allocate each successive point on the horizontal line to a single note of a five-note melody would be a dramatic oversimplification of the experience for, clearly, this entire model could potentially fit within the temporal extension occupied by a fraction of a single note. In fact, because each point in Example 1.1 is a singular moment of time-consciousness, their isolation is something of a misnomer. Rather, this figure should be interpreted as representing the way in which retentions "nest" within the tonal now, remaining accessible for a time but gradually rarefying until they fade away completely from the present consciousness.

A more accurate account of how Example 1.1 provides a map for our perception of a melodic phrase is through Husserl's description of "phases of flux." These phases are small segments from the temporal continuum that embrace any extended experience of change or persistence in the phenomena of temporal objects. Because phases are composed of a series of retentions which, in turn, contain retentions of retentions (i.e. retention C of Example 1.1 retains the impression of both A and B), they are complex entities that in recollection provide the consciousness with a fullness of experience. Functionally, this means that phases can reliably be recalled in the now-consciousness as objects with fixed temporal extension and the same character of succession which was present in the original impressions. These phases are of variable length, defined primarily by "a certain continuity of appearance…of the time-

[28] Husserl, *The Phenomenology of Time-Consciousness*, 49.



Example 1.1. *Model of the Flux of Consciousness*.[29]

constitutive flux."[30] Therefore, a sustained tone, or even a succession of tones, may be reconstituted in memory and presented to the consciousness:

> In such a memorial replay it may be (more or less) *as if* we were experiencing the original series, and we are then in a sense *re*-presenting it in its original successiveness and in the sinking of retained contents under the weight of later retained contents. There are, however, other cases where we merely rehearse isolated phases of what was previously given…[Such memorial replay] makes of the original time-object, or any phase of it, a time-object that can be recurred to and replayed.[31]

Husserl is careful to explain that if there is a rearranging of the original succession of phases in recollection or a durational augmentation or diminution (as when we slow down the

[29] A more accurate depiction of this continuum would perhaps be realized by a completely filled-in triangle in which the gradient of pigment becomes gradually lighter the farther a point is from the 'top-right,' or 'tonal now.' However, because the isolation of retentional events allows for their literal presentation under each successive impression, thus illustrating that retentions are accessible "in the now," the current formatting is preferable.

[30] Husserl, 1928 Main Text, 429. Quoted in Findlay, "Husserl's Analysis," 16.

[31] Findlay, "Husserl's Analysis," 12.

temporal extension of a melodic phrase in order to hold it up for evaluation or recall in a glance the phrase as a whole), the recollection is no longer reliable, compared to the original perception.[32] Nevertheless, through the intentionality of recollection, past phases and groups of phases (i.e. unified experiences of succession) can be presented in the now-phase of consciousness as if unfolding in their original succession – barring any deviations of memory. Therefore, treating the triangular space enclosed by the solid lines of Example 1.1 as a representation of a phase (e.g. the experience of a sustained note), the now-consciousness can apprehend through retention or recollection the 'closed' experience of hearing a note begin, persist, and end – defined, for the purposes of this essay, as an "event." This model can be expanded by analogy to experiences of longer duration, such as that of a melodic phrase. In this case, the triangle of Example 1.1 would represent a much longer event – one which consists, potentially, of numerous phases of consciousness – but a unified event nonetheless, and one which can be apprehended in retention or recollection just like the single phase. To speak of an event, therefore, is to speak of a closed experience of succession, one that can be objectified in recollection and that contains all the information of the original lived experience: the fulfillment or disappointment of protentions as they become primal impressions, and the subsequent retentions of this process. Importantly, the quality of being closed lends them the additional advantage of being measurable in their temporal extension.[33]

Protentions have a special role in this method because they incorporate intentionality that is forward-directed, thus establishing anticipations that can be met by fulfillment or

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[32] Ibid.

[33] In the upcoming discussion I will also refer to "event-types," which are simply categories by which multiple events can be grouped based on similarity in rhythm, pitch, contour, register, etc.

disappointment as the sliding boundary of the present gradually materializes the protentions in the tonal now. Unlike the way in which primal impressions and retentions are created in a musical context (which is largely determined by the way that the listener attends to immanent musical events), protentions are formed and met in an environment that is determined primarily by the composer. As soon as musical material is realized in the present, the way in which the listener apprehends this material is outside of the composer's control – it becomes an event which will be perceived in intricate contingency with the information provided by prior retentions and the quality of being a respective fulfillment or disappointment of formulated protentions. However, because the creation of a score allows the composer to preestablish the succession of events which will be perceived by the listener, there exists the opportunity to create and forestall the expected musical progression. A simple way in which this experience is often realized in tonal music is the deceptive cadence. Referring back to Example 1.1, given that the points A-D describe the basic harmonic progression I–IV^{6}–ii^{6}–V^{7} (and remembering that an experience of this duration is only represented in Example 1.1 by way of analogy), point E will likely be expected to represent a tonic harmony. In the case of a deceptive cadence, however, the protention E is frustrated – though not necessarily with any of the negative connotations which that word holds – and a vi chord is substituted for I. In avoiding a direct fulfillment of the protention E, a moment of disorientation is experienced by the listener, followed by a mental recalibration that incorporates the unexpected manifestation of E into the retentional consciousness. Further protentions may be created as a result of this diversion, such as the expectation that the piece will continue until a perfect cadence is reached. Although this progression is so familiar that it has perhaps lost all of its capacity for disorienting the informed

listener, many musical works from the 20th century make use of a complex network of events, operating on the same principles, to great effect.[34]

The last component to be introduced to the present methodology is the concept of layering. Although not based on Husserl's own theory of time-consciousness, it is founded on a fundamentally phenomenological approach to music perception. That is, when listening to a work of music which is composed of more than a single voice, the listener is required to act attend to numerous layers of musical events, many of which may be operating independently from one another. These layers, when isolated, are fundamentally identical to the previously supplied examples in that they consist of all of each element of the tripartite structure of consciousness and are formed in our perception through an appearance of unity, but upon their juxtaposition, they have the potential to interact in complex ways. To use the example of a three-voice fugue by Bach, there is the potential to have up to three independently functioning layers presented in simultaneity – a complex network of voices to which a listener can attend in many different ways. On one side of the spectrum, an uninformed listener may hear the fugue as a single layer, a wash of sound without differentiation but for the familiar entry points of the subject. On the other hand, someone with a trained ear may be able to hear the independently moving parts and their formal designations (e.g. subject, answer, countersubject, episode, stretto,

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[34] Composers' exploitation of listeners' expectations is well-documented in the analytical literature. On pattern completion and its ability to create an expectation of fulfillment: Joseph Straus, "A Principle of Voice Leading in the Music of Stravinsky" *Music Theory Spectrum* 4 (Spring, 1982), 106-124. For a critical evaluation of perception in serial music: Michael Rofe, "Dualisms of Time," *Contemporary Music Review* 33, no. 4 (2014), 341-354. For a description of musical structure that precludes the formation of expectations: Jonathan D. Kramer, "Moment Form in Twentieth Century Music," *The Musical Quarterly* 64, no. 2 (Apr., 1978), 177-194. For a more optimistic approach to seemingly discontinuous music: Christopher F. Hasty, "On the Problem of Succession and Continuity in Twentieth-Century Music," *Music Theory Spectrum* 8 (Spring, 1986), 58-74. For an attempt to formalize the process of expectation-creation from a phenomenological viewpoint: David Lewin, "Music Theory, Phenomenology, and Modes of Perception," *Music Perception: An Interdisciplinary Journal* 3, no. 4 (Summer, 1986), 327-392.

etc.), while also intelligently combining the three layers to create composite information, such as harmonic progression and location within the music's global structure.

Fundamentally, layers are the result of perceptually partitioning immanent musical sound into smaller events which can be evaluated as parts of the larger whole or as isolated units. Although the creation of layers is entirely a function of the listener's attention, some musical textures lend themselves more readily to layering than others. Many of Mozart's piano sonatas, with their lyrical melodies floating atop a characteristic Alberti bass, may tend toward the creation of two layers, whereas some movements of Mahler's symphonies are a challenge for even experienced listeners to parse; the perception of layers can be made more or less unavoidable through the implementation of independent lines that contrast in timbre, dynamic, rhythm, contour, etc. Once a layer is perceived, it can be developed in congruency with the prevailing musical texture – as in a Bach chorale where each voice is contributing uniquely to the harmony but is largely unified in rhythm – or independently, with its own pacing, duration, and expectations. The individual's flux of consciousness as presented in Example 1.1 in a single continuum will remain unchanged, as it is impossible to have multiple independently functioning fluxes of consciousness, but the events on the vertical line will be more dense – an aggregate of each contributing layer.

What has begun to emerge is a structure for understanding the complex ways in which music is temporally perceived by our consciousness:

1. Immanent musical material is parsed into comprehensible units, called events, which contribute retentions, by way of their presentation in the tonal now, to the flux of consciousness.

2. Based on recollections, retentions, and the present impression, protentions are formed for future musical events.
3. Protentions are either fulfilled or disappointed, the latter resulting in a moment of disorientation and recalibration in the flux of consciousness.
    (a) Layers are potentially formed, operating in congruency with or in opposition to the protentions present in other layers.
    (b) The number of layers attended to by the consciousness is functionally limited by the attentional capacity of the individual listener.

II

Vortex Temporum: the spectrum of time

Gérard Grisey on time

The significance of time-consciousness to the compositional methodology of Grisey cannot be overemphasized. In fact, the designation of "Spectralism," given by Hugues Dufourt to the group of composers working with harmonic spectra in the 1970s, was considered by Grisey to be too narrow in conception – primarily because the spectral content of his music was of only secondary interest, his vital preoccupation being the way that his music unfolded in the listener's temporal perception.[1] In an interview with David Bündler, Grisey shared the central objectives of his method: 1) treating sounds "like living objects with a birth, lifetime, and death"; 2) attempting to "find a better equation between *concept* and *precept*"; and 3) a "fascination for extended time and for continuity."[2] The first of these objectives fundamentally relates back to

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[1] Julian Anderson, "A provisional history of spectral music," *Contemporary Music Review* 19, no. 2 (2000), 15.

[2] David Bündler, "Interview with Gérard Grisey," *Musical Time Articles, Interviews, and Essays*, Mauricio Vázquez (ed.), Accessed August 20, 2018, http://www.angelfire.com/music2/davidbundler/grisey.html.

temporal extension by highlighting the fact that Grisey treated sound not as a fixed object but as a *force* with inherent transformational and dynamic tendencies:

> Since sound is transitory, let us go further and say: *object and process are analogous. The sound object is only a process which has been contracted, the process nothing more than a dilated sound object*…The process makes perceptible what the rapidity of the object hides from us: its internal dynamism.[3]

This directly relates to Grisey's second objective, which was to establish a more direct correlation between the processes developed in precompositional planning and their perceptibility to the listener. Of course this also relates to temporal extension in that the processes spoken of are presented *in time*. Grisey is not so much concerned with presenting the *concept* of something in his music (the *Objekt* in Husserl's theory) as with conveying an *experience of extension* – of continuity or change. Therefore, the third objective motivates and animates the other two. Grisey's primary compositional project was to explore the possibility of writing music in which sound is extended through time; these explorations eventually led to his use of the harmonic spectrum, for he believed its sonic extension of a fundamental tone to be conceptually analogous to temporal extension:

> How to compose an extended type of time…What language does that extended time imply? That is really the start of spectralism and not the writing of spectrums or whatever…[Extended time] implies not to use just long durations. If you extend time, you extend in all directions. You extend in this direction – going up – and in depth…And this extended time and continuity forced me to deal with all sorts of spectrums.[4]

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[3] Grisey, "Tempus ex Machina," 269. (Emphasis is original to text)

[4] Bundler, "Interview with Gérard Grisey."

Thus, it is entirely consistent with Grisey's view to conceive of harmonic spectra as having an implicitly temporal quality.[5] This quality is expressed at three different levels of hierarchy within a composition's structure, as Grisey outlines in detail in his essay, "Tempus ex Machina": the skeleton of time, the flesh of time, and the skin of time.[6]

The skeleton of time refers to the quantitative "temporal divisions that the composer uses to organize sounds" – they are the larger sections of a work that serve to structurally delineate the music's passage through chronometric time, while being too submerged and extended to be perceptible.[7] However, the way in which these temporal divisions are segmented and juxtaposed *is* of immediate consequence to the way in which musical time is perceived. Grisey conceived of a scale of complexity, reproduced as Example 2.1, in which the processes of a piece are more or less predictable, based on their degree of relative continuity or discontinuity. These different structures are derived from the composer's precompositional decision to introduce change periodically (at regular intervals), gradually (by way of arithmetic, geometric, or exponential change in the density of events), or spontaneously. Introduced in this scale is the concept of

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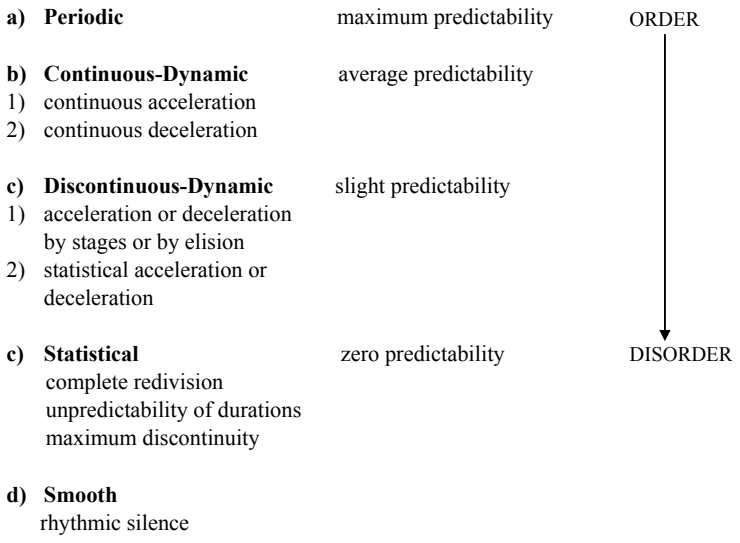
[5] It is important to note that in Grisey's conception, the temporal quality inherent to the harmonic spectrum is substantiated as two distinct, but closely analogous, temporal processes: 1) "compressed/dilated time" as the structural prolongation of a musical object through time (typically achieved through pre-compositional means), and 2) "compressed/dilated time" as a perceptual phenomenon (which is often the effect of the former procedural operation). "Compression" and "dilation" can also refer, in the small scale, to the simple transformation of spectral partials, though this operation has little effect on temporal perception.

[6] I maintain that these levels of temporal expression are present in all music that is not expressly chronometric, a term which refers to music that has a sufficient degree of metric uniformity to permit the quantitative measurement of durations across the piece's total length (such as that of Mozart, Webern, and Stravinsky, to name but a few). In general, this chronometric quality is ubiquitous in the common practice period, though a few late composers (such as Wagner, Mahler, etc.) display inklings of what Grisey would term "composing musical time directly," in which duration is divorced from meter and, consequently, the listener is parted from his or her standard of measurement, the metric pulse. However, a full defense of this view would be tangential to the current investigation.

[7] Grisey, "Tempus ex Machina," 239.

acceleration and deceleration, which has a direct impact on time-consciousness. Grisey explains that "through acceleration, the present is made more dense…and the *listener is literally propelled* towards something which he does not yet know," and by contrast, "a slowing down induces a sort of expectancy in the void of the present…With deceleration, *the listener is pulled backwards*…But because our listener also perceives that the arrow of his own biological time has not changed course, he will oscillate indefinitely…in a sort of state of *temporal suspension*."[8] Thus, in Grisey's conception of the global form of a piece, the rate at which acceleration and deceleration occur will have an enormous impact on the listener's perception of temporal duration, a domain which can be manipulated for the desired affect. Taking this a bit further, Grisey also points out that listeners will typically only "tolerate a long acceleration followed by a short deceleration rather than its opposite," a phenomenon which he attributes to their limited patience for the "temporal suspension" that accompanies deceleration (acceleration, according to



Example 2.1. *Grisey's Scale of Complexity*.[9]

[8] Ibid., 249. (Emphasis is original to text)

[9] Ibid., 244.

Grisey, causes the listener nearly to forget about chronometric time, which is perhaps why a long acceleration is more tolerable).[10] Grisey concludes his discussion on the skeleton of time with the imperative that "*structure*, whatever its complexity, *must stop at the perceptibility of the message*," recalling his second concern, as discussed above.[11]

The flesh of time refers to the qualitative approach to "the immediate perception of time in its relationships with the sound material."[12] Because Grisey structures the skeleton of his music by chronometric divisions, the unit of measurement for duration is no longer the conventional metric beat but increments of temporal extension.[13] This means that the duration of a sound event "is perceived quantitatively by its relationship to preceding and successive durations."[14] Of particular significance within this structure is the inherently *localized* mode of perception that becomes necessary, due to the limitation of memory.[15] Which is to say, a listener's ability to perceive relative duration will be confined to those events which can be recalled accurately – those found within the immediate context of the present. Grisey believed that in such a system "the real material of the composer becomes the degree of predictability," which can be influenced only by "composing musical time directly – that is to say perceptible

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[10] Ibid.

[11] Ibid., 257. (Emphasis is original to text)

[12] Ibid., 257-58.

[13] "Increments of temporal extension" should not be read as "chronometric units," for although these increments can be represented absolutely by milliseconds, seconds, minutes, etc., they will not be perceived as such by the lister who does not have access to such an objective scale of duration.

[14] Grisey, "Tempus ex Machina," 240. Grisey goes on to clarify that although meters remain necessary for performative reasons, the "micro-pulse…exists as a way of working and has no perceptual reality."

[15] Husserl's "reliability of recollection" is correlative with this localized mode of perception: "immediate retention is thus not open to the errors to which recollection and memory are plainly subject: the just past must be given to us just as it was."
Findlay, "Husserl's Analysis," 11.

time, as opposed to chronometric time."[16] This leads to the heart of Grisey's theory of temporal manipulation:

> There must exist holes in time, analogous to what aeroplane passengers call "air pockets." Chronometric time is never obliterated, but our perception of it can overshadow the linear aspect for a more or less brief instant.
>
> Thus, for example, an unexpected acoustic jolt causes us to skate over a portion of time. Sounds perceived during the ensuing moment of readjustment…no longer have anything like the same emotional or temporal value. This jolt which disturbs the linear unfolding of time and which leaves a violent impression in our memories, makes us less likely to grasp the shape of the musical discourse. *Time has contracted*.
>
> On the other hand, a series of extremely predictable sound events gives us ample allowance for perception. The slightest event acquires an importance. Here, *time has expanded…the acuity of auditory perception is inversely proportional to that of temporal perception*.[17]

Finally, the skin of time refers to the way in which a listener experiences the perceptual time of a composition. At this level, the perceptual effect of a given piece of music is largely out of the composer's hands. Nevertheless, Grisey notes that because memory plays an important role in the listener's ability to perceive the processes at work in a piece of music, the composer can use thematic repetition and contrast to foster the creation of memories. On the other hand, by avoiding points of contrast and creating instead a smooth, procedurally-driven composition, "the memory slips. It has nothing to latch on to…and all that emerges is a hazy memory of the contours of the sound's evolution. Time past is no longer measurable: I would call this process psychotropic, or better still chronotropic."[18] In other words, the smoothness of such a composition would result in a perceptually unbroken continuum of sound that is difficult to organize in recollection, much less perception. Retentions and protentions become nearly

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[16] Ibid., 258.

[17] Ibid., 258-59. (Emphasis is original to text)

[18] Ibid., 273.

impossible to form and the listener's perception is limited to the sliding boundary line of the present. Without recourse to the "map" of a formal structure, the listener's understanding of the time that a piece inhabits is attenuated, potentially to the point where, in recollection, linear time is completely abolished. Nevertheless, the way in which a listener attends to the music has the last word in determining how the skin of time will be perceived:

> It is in fact the listener who selects, who creates the changing angle of perception which will endlessly remodel, perfect, sometimes destroy musical form as the composer dreamed it. In turn, the listener's sense of time is in correlation with the multiple times of his native language, social group, culture and civilization…We will never know exactly the capacities of perception, the culture, receptivity and psycho-physiological state of this ideal listener.[19]

Grisey has brought to the surface one of the central problems of every phenomenological investigation into musical experience: how can the experience of a musical work be generalized in a predictable, meaningful way so as to permit reliable conclusions about its perceptual effect? Further, is such a generalization even desirable when each individual's experience will, to some degree, deviate from the proposed model (contingent upon various extenuating factors such as environment, culture, education, etc.)?

Here lies the true merit of Husserl's structure of time-consciousness: as a general description of the phenomenological experience of time, the tripartite model of consciousness represents an attempt to describe the process by which every individual is aware of the temporal continuum. That is, although Husserl's phenomenological project is aimed at validating the *individual's* experience – of which there will be as many variants of a single event as there are perceivers – he accomplishes this end by providing a framework for *generalized* experience. I hope to determine, through the lens of this framework and to the extent possible, what effect

[19] Ibid.

Vortex Temporum and *Triadic Memories* will have on the average perceiver's temporal experience. The "ideal listener," in Grisey's words, may be a mere chimera, but from an ideal description of temporal experience can be derived innumerable real descriptions; much like Husserl, my aim is the validation of the latter through the confirmation of the former.

Grisey's phenomenology

Before turning to musical examples, there are some clear points of convergence between the Husserlian structure of time-consciousness and the methodology propounded by Grisey in "Tempus ex Machina" that should be elucidated in order to better understand the conceptual framework of a piece like *Vortex Temporum*. At its core, Grisey's conception of time-consciousness is fundamentally phenomenological, a philosophical persuasion which surfaces quite clearly in his discussion of dilated and compressed time as distinct from chronometric time. In giving credence to the listener's "sense of time" through the inclusion of perceptual experience as viable data, Grisey is endorsing Husserl's *epoché*: the chronometric, or *objektive* time which a composition inhabits at a background level is bracketed from his discussion of time-consciousness at the middleground and foreground levels. But despite the expedience with which the dilation and compression of time maps by analogy onto the dilation and compression of the harmonic spectrum – a common practice among spectralist composers – Grisey's phenomenology seems to be more than just a philosophical justification for his compositional practices. In his definition of the flesh of time, Grisey explicitly states that "it seem[s] to me virtually impossible to reflect on structures of musical time without immediately touching on

phenomenological and psychological aspects."[20] This philosophical conviction, like most of his methodology, is a direct result of his conception of sound as a fundamentally temporal phenomenon. It is hard not to think of Brentano's unbroken temporal continuum when reading Grisey's description of sound: "Sound is transitory. It is not defined by an isolated moment, nor by a series of isolated moments fastidiously realized and placed in sequence."[21] Rather, the tripartite model of the flux of consciousness which Grisey implements implicitly in his methodology requires that sounds are perceived as part of an unbroken continuum.

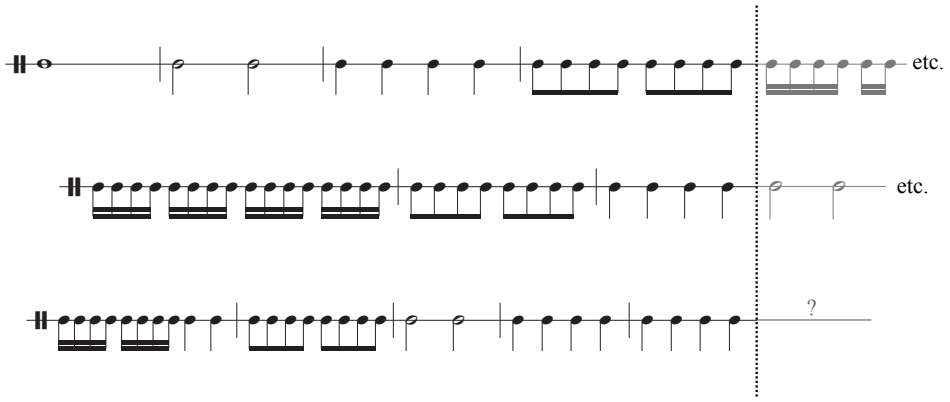
Beneath the skin of time: Husserl's model in practice

Putting Grisey's understanding of musical time into practical terms is most easily accomplished by way of an illustration. Example 2.2 displays three different rhythmic processes from Grisey's Scale of Complexity on continua of consciousness. The first represents continuous-dynamic acceleration within the fixed span of a measure; by clapping this pattern, the experience of temporal contraction can be simulated in small scale. As the beats grow closer together, the consciousness is afforded less time to hear each one individually and must group them as subdivisions of larger pulses – this grouping becomes increasingly necessary in proportion with the acceleration of rhythm. As larger pulses begin to take on primary significance and subdivisions become faster "the present is made more dense," which forces listeners to attend more carefully to the musical events at hand.[22] In my experience, as attention increases, awareness of time decreases; becoming immersed in the act of reading provides a

[20] Ibid., 257.

[21] Ibid., 268-69.

[22] Grisey, "Tempus ex Machina," 249.



Example 2.2. *Three rhythmic processes.*

useful analogy, for who has never been so engrossed in a story that when they are eventually recalled to their ordinary mode of consciousness they are shocked to see how much time has passed? The outward directedness of attention draws individuals' focus from their own linear internal awareness of temporality and causes them to "forget" about the passage of time.[23] In this way, time seems to proceed at an accelerated pace, resulting in the shocking revelation that what seemed like an hour of reading has in fact been three. On the other hand, the increase of information, taken beyond the limits of perception, imposes a passive, or anoetic, mode of attending upon the listener – an atrophy of perception. This passivity can be exploited in either direction – temporal dilation or contraction – depending on the musical context.[24]

By contrast, the second process represents continuous-dynamic deceleration, which has the effect of temporal dilation. As this rhythmic pattern is clapped, the longer beats acquire

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[23] This phenomenon seems to be more than anecdotal, for it has received philosophical and literary attention in genres far afield from phenomenology. Perhaps the most famous example would be James Joyce's *Ulysses*, where one day in the life of Leopold Bloom is presented a stream-of-consciousness style to make the reader acutely aware of the way in which time passes irregularly – sometimes it takes numerous pages to describe the events of a single moment.

[24] While an atrophy of perception can certainly be brought about by a surplus of information that cannot be cogently organized in the time afforded by a performance, the converse is also possible: the hypnotic and tedious (though not in any pejorative sense of the word) process by which *Triadic Memories* progresses can create a similar experience, to be discussed in the following chapter.

increasing significance, resulting in an "expectancy in the void of the present."[25] When more time is allowed to pass between the presentation of events to the consciousness, listeners begin to anticipate each new event. Again, in my experience, as anticipation increases, awareness of time also increases. There are innumerable anecdotal accounts of this phenomenon, such as the common complaint that the last half hour of work is the longest, or that meetings which are scheduled to go until lunch seem to be interminable. In these and many other experiences, the anticipation of a future event makes the individual acutely aware of the passage of time, giving each event (be it a minute on the clock or a succession of sustained notes) increased significance. Note that both of the first two processes are characterized by extreme predictability and allow for the creation of accurate protentions. Therefore, an increase of predictability does not, in itself, create the experience of compressed or dilated time.

In the third process presented in Example 2.2 two separate layers of growth are alternated, in one possible iteration of discontinuous-dynamic deceleration.[26] In this example, the simple alternation between an eight-note group and a two-note group that are doubled in duration upon each iteration all but obscures the process of accumulation to the listener. While the deceleration may be obvious in the sterile environment produced here on paper and without extraneous information such as pitch, instrumentation, dynamics, and so forth, even the perception of a simple example such as this one would be difficult to describe quantitatively from listening alone (without the aid of any notation or repeat performances); the absence of a clear expectation in

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[25] Grisey, "Tempus ex Machina," 249.

[26] Grisey also refers to a species of the discontinuous-dynamic model which is achieved by simply removing segments of a process so that the stream of continuity is broken. For example, if the process was such that each number in a sequence increases by two, a discontinuous-dynamic model might remove the second and fifth numbers to decrease predictability, resulting in the series: 1, 5, 7, 11, 13, 15, etc.

this example is represented by a question mark. In certain circumstances, the difficulty with which discontinuous-dynamic models are intuited by listeners can result in an atrophy of perception, where listeners becomes passive in their attending to the music. At other times, the discontinuous-dynamic models of progression is suppressed and even contravened by other musical processes, resulting in the phenomenon of temporal acceleration when the model is one of deceleration, or vice versa.

This leads to an important conclusion, which is that not all processes influence listeners' temporal perception in the same way. I propose that processes can be divided into two categories, positive and negative, depending on the way in which they will be perceived. Positive processes are those which aid listeners in following the shape of the musical discourse and thus provide the opportunity for an increased level of attention to musical events. For example, recognized musical forms, such as the sonata, are essentially sets of processes that composers follow to provide shape to their musical material. Listeners, aware of these processes (such as the sonata's thematic structure, developmental processes, key regions, etc.), can easily organize the musical data from a performance and follow the progression of the work without any great confusion. This means that listeners will be more likely to attend to the music – thus lapsing in their own internal sense of time and "putting on" instead the temporal pacing of the music (a phenomenon discussed with regard to Example 2.2). Taken to their extreme, positive processes result in complete predictability and passive attending. Negative processes influence listeners' sense of time by confusing their understanding of the musical discourse. One example might be rhythmic ambiguity, where syncopations, tuplets, cross rhythms, and so forth, make the formation of an accurate sense of meter more difficult, thus forcing listeners to attend more closely in order to

understand the music. Again, taken to their extreme, negative processes result in complete unpredictability and passive attending. Fundamentally, positive and negative processes are just tools that composers can use to increase or decrease the predictability of progression in a work: their final impact on the temporal consciousness is determined only by their global interaction with other processes.

Husserl's model of consciousness (Example 1.1) operates somewhere between the flesh of time and the skin of time. Because it claims to be a generalized structure of temporal awareness, native equally to the musically trained and untrained, Husserl's model permits substantive claims to be made about how the concrete music events that issue from the skeleton of time into the flesh of time will impress themselves upon listeners' perception. For the present purposes, Grisey's levels of hierarchy for the temporal construction of a work will also be taken as general (applicable to any musical work that is not expressly chronometric at the surface), resulting in the following methodology: an analysis of the skeleton and flesh (background and middleground/foreground) of a work allows various immanent musical processes to be isolated and mapped onto the model of the flux of consciousness; the phenomenological data gleaned from this mapping can then be compared against those from other musical processes to create a global sense of the perceptual time that the work inhabits. There are two primary levels of immanent musical material in *Vortex Temporum* which influence the listener's ability to maintain an accurate sense of chronometric time:

1. The rate of change in the internal parameters of events, which could include changes in duration, tempo, dynamics, spectrum, timbre, rhythm, etc.

2. The relative density of events, referred to as layers, which is determined by the aggregate effect of 1).

Following Grisey's Scale of Complexity (Example 2.1), the manner in which change is introduced to the governing processes of these events or layers will have a significant effect on the possibility of forming accurate protentions (or any protentions at all), and the likelihood of maintaining accurate retentions and memories.

The wave form of a human in *Vortex Temporum I*

In his program notes to *Vortex Temporum*, Grisey describes the conceptual basis of each of the three movements:

> The three aforementioned archetypes will progress from one movement to another in time constants as different as that of men (time of language and of breathing), that of whales (spectral time of sleep rhythms), and that of birds or insects (time contracted to the extreme where the contours fade). Thus, thanks to this imaginary microscope, a note becomes a timbre, a chord becomes a spectral complex, and a rhythm a swell of unpredictable durations.[27]

I will model my approach on this account of the archetypes of the three movements, beginning with the time of humans – "the time of language and breathing."[28] The final movement will not be analyzed in the present essay, due to its great length, but the conclusions drawn from the first

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[27] Gérard Grisey, "Vortex Temporum I, II, and III (1992-1994)," Program Notes for *Festival Musica 96*, Accessed October 24, 2018, http://brahms.ircam.fr/works/work/8977/. (Translation is my own) «Les trois archétypes précités vont circuler d'un mouvement à l'autre dans des constantes de temps aussi différents que celui des hommes (temps du langage et de la respiration), celui des baleines (temps spectral des rythmes du sommeil) et celui des oiseaux ou des insectes (temps contracté à l'extrême où s'estompent les contours). Ainsi, grâce à ce microscope imaginaire, une note devient timbre, un accord devient complexe spectral et un rythme une houle de durées imprévisibles.»

[28] Grisey seems to have considered these three categories of time – that of language, compression, and dilation – to be general, for he refers to them in his personal manifesto "Did You Say Spectral?" as the natural temporal products of spectral sound material.
Gérard Grisey, "Did You Say Spectral?," trans. Joshua Fineberg, *Contemporary Music Review* 19, no. 3 (2000), 2.

two movements should be sufficient for arriving at an understanding of Grisey's compositional approach and its influence on temporal perception.[29] Elsewhere in the program notes, the first movement is said to represent a harmonic spectrum, treated in three different ways: "a sine wave (vortex formula), a square wave (pointed rhythms), and a sawtooth wave (piano solo)."[30] The three waveforms constitute the skeleton of the movement and are located between rehearsal numbers 1-38, 38-68, and 68-85; these notational designations act only as signifiers, however, for Grisey is explicit in his view of "time as the very object of form."[31] Notably, the sections do not gradually decrease in duration, as the rehearsal numbers may seem to imply, but describe something of an arch,[32] lasting 3′00″, 4′38″, and 3′52″ respectively (Example 2.3).[33] Although the skeleton provides the chronometric form for the movement, it must be remembered that listeners' perceptions of time are affected most strongly by middleground and foreground material – the musical flesh. The amplitude graph of Example 2.3 illustrates the unique sonic character of each of the first movement's three sections, but to fully understand the cause of this idiosyncrasy and its perceptual ramifications, an investigation of the processes which control

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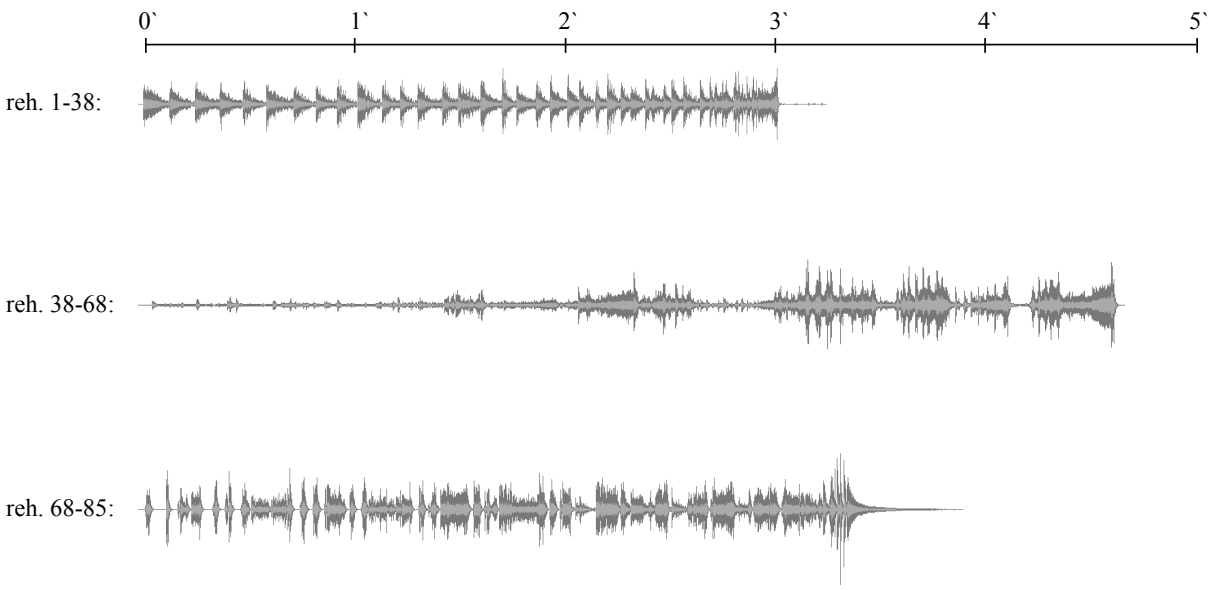
[29] There is some precedent for excluding the final movement of *Vortex Temporum*, including the composer's own performance instructions (see footnote 33).

[30] Grisey, "Vortex Temporum I, II, and III," Program Notes. (Translation is my own) «Les trois sections du premier mouvement…développent trois aspects de l'onde originelle, bien connus des acousticiens : l'onde sinusoïdale (formule tourbillonnaire), l'onde carrée (rythmes pointés) et l'onde en dents de scie (solo de piano). Elles déroulent un temps que je qualifierais de jubilatoire, temps de l'articulation, du rythme et de la respiration humaine.»

[31] Grisey, "Did You Say Spectral?," 2.

[32] Perhaps this lopsided arch is intended to keep the movement from seeming like a self-contained unit, for Grisey explicitly states in the rehearsal notes that the first two movements of *Vortex Temporum* are interdependent and if they are performed by themselves, they, should "end with the second Interlude. In no case play the third movement alone."
Gérard Grisey, *Vortex Temporum* (Paris: Ricordi, 1996), performance notes.

[33] Gérard Grisey, *Vortex Temporum*, Tito Ceccherini & Risognanze Ensemble, Stradivarius B000QGEWM0, 2007, CD.



Example 2.3. *Amplitude of volume for the three sections in* Vortex Temporum I.

each section is necessary. Example 2.4 presents a chart of the most perceptually significant processes in the first movement, each of which will be described, in turn, throughout the following analysis.

Section 1:

The first process that I will address is that governing the primary melodic material. Even a brief examination of Example 2.3 reveals that there is cyclic process at work in reh. 1-38; this process is evident primarily in the repeating pattern of the 1-2′ span, after which the attack points grow too close in proximity to allow any discernible periodicity. The constituent musical material of this cyclic pattern is presented in Example 2.5, which reproduces the music following reh. 1, and Example 2.6, which shows the number of sixteenth notes following each rehearsal number in Section 1. Example 2.5 functions as the basic event-type for the first section, with the contour of the flute, clarinet, and piano parts being preserved throughout. As the first statement

Section:	Section 1, reh. 1-38		Section 2, reh. 38-68		Section 3, reh. 68-85	
Process:	Duration of a single event-type	Pos.	Duration of five event-types	Neg.	Duration of eight event-types	Neg.
	Spectral periodicity	Neg.	Rhythmic fragmentation	Neg.		
			Textural growth	Pos.		
Model:	Discontinuous-Dynamic (Fragmentation)		Discontinuous-Dynamic (Accumulation)		Statistical (Fragmentation)	

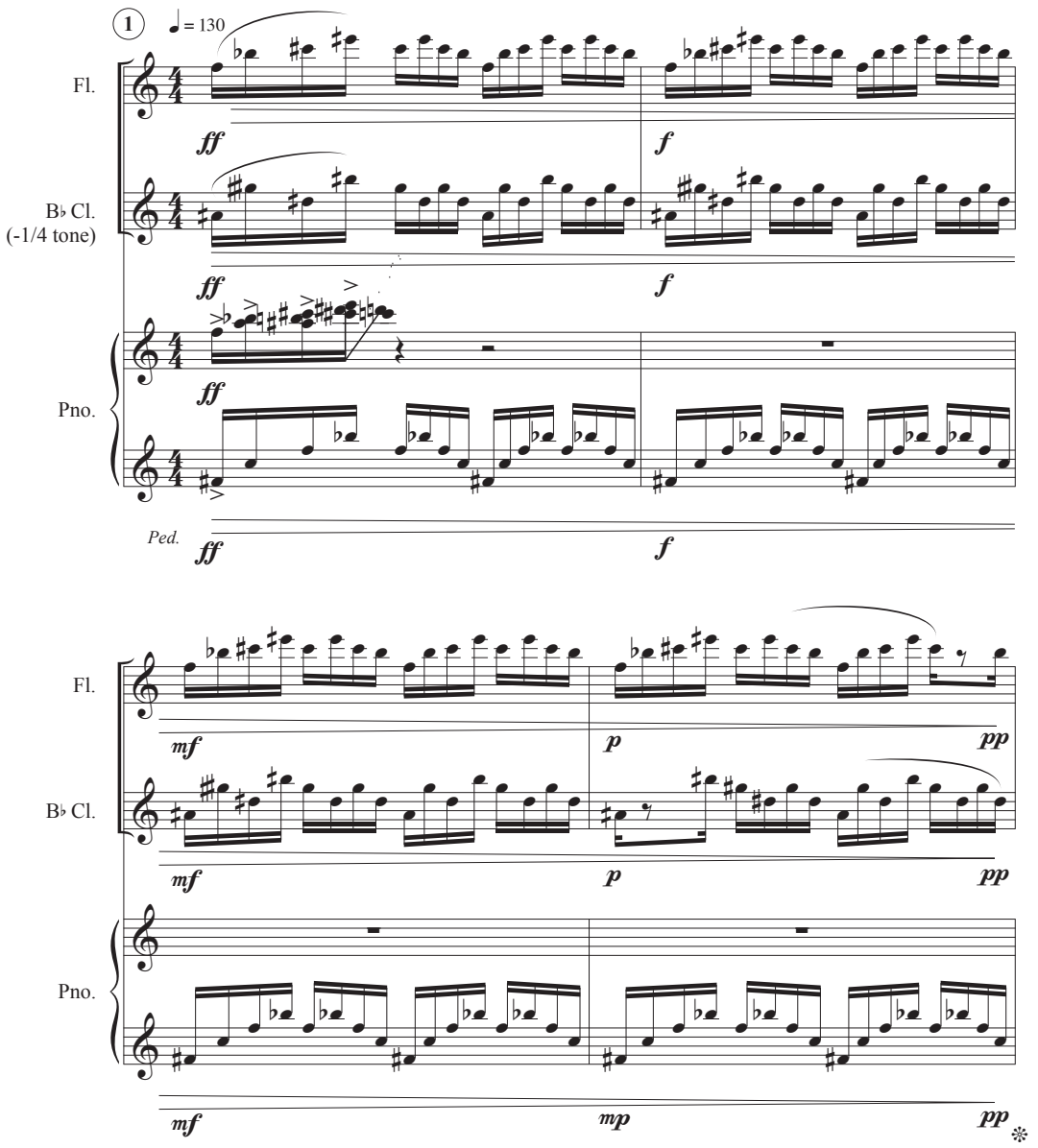
Example 2.4 *Chart of processes in* Vortex Temporum I.

of this event-type, the music following reh. 1 takes on the special function of a "primary event" – one which introduces new musical material and will consequently be accepted by listeners as the basis for motivic development in the ensuing passage. In this instance, the event initiates an active, sixteenth note rhythm within a relatively stable duple meter, a long diminuendo, and a timbre that draws from a spectrum with fundamental C# and partials expanded at a factor of 1.046 (to be explained shortly).[34] Subsequent iterations of this event will be altered according to the processes shown in Example 2.4.

As Grisey's compositional style matured, he grew increasingly interested in manipulating the harmonic spectrum through compression or dilation. Although this could be accomplished in numerous ways, two operations are most common in his music: distortion and frequency shift.[35] Distortion is accomplished by manipulating the factor by which the fundamental frequency is multiplied to generate upper partials, using the equation: frequency = (fundamental)($rank^x$). If x is any number less than one, the resultant harmonic spectrum will be compressed; if x is greater than one, the spectrum will be dilated. For example, to compress the harmonic spectrum built on

[34] Jérôme Baillet, *Gérard Grisey: Fondements d'une écriture* (Paris: l'Harmattan, 2000), 217. Although it contains a few errors, this text contains a great trove of largely uninterpreted data from which I will draw significantly for the present analysis.

[35] Joshua Fineberg, "Guide to the basic concepts and techniques of spectral music," *Contemporary Music Review* 19, no. 2 (2000), 93-94.



Example 2.5. Vortex Temporum I*, rehearsal 1*.

D2 (73.4 Hz) by a factor of 0.95, each partial is generated by multiplying the fundamental frequency by the partial ranking, raised to a factor of 0.95, resulting in partials at D3-quarter-flat (142.65Hz) G#3 (207.65 Hz), etc. With distortion, the spectrum is exponentially altered from its natural form, becoming increasingly divergent as the partials ascend in register. Frequency shift, on the other hand, is additive: a fixed number is added or subtracted from the frequency of each

partial. Because the partial frequencies get larger as the register increases, the addition of a fixed number becomes less significant and results in decreasing divergence from the natural spectrum – the inverse of spectral distortion.[36]

The information presented in Example 2.6 is largely middleground material, illustrative of the way in which Grisey used the concept of a sine wave to structure the durational and spectral content of the first section of *Vortex Temporum I*.[37] Each of the five rows represents a different stratum of the music, delineated as such by their use of five unique registral spaces. Beginning in the middle register, the registral limits are gradually expanded throughout the duration of the section (reh. 6, 20, 31, and 37) until all five layers are activated at the section's close. Each discrete event is represented by an integer that indicates the number of sixteenth notes that constitute its duration. As shown to the right of the table, the durations in each of the five registral layers are multiples of the integers 3, 5, 8, 13, or 21 (with a few exceptions which will be discussed shortly).[38] The model of progression for this section is one of diminution, as seen by the gradually decreasing durations within registral layers, though the process is perceptually obscured by the mobility with which the music moves between layers, gradually describing the pattern of a sine-wave.

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[36] Appendix 3 contains the compressed, natural, and dilated spectral collections that I used for the present analysis. Although I have made some modifications and corrections, these spectra are similar in content to those presented by Jean-Luc Hervé in his analysis of this work. See: Jean-Luc Hervé, *Dans le vertige de la durée: Vortex Temporum de Gérard Grisey* (Paris: Editions L'Harmattan, 2001).

[37] For the content and format of this example I am heavily indebted to Dr. Joël-François Durand, who presented this material in a seminar on *Vortex Temporum*. He, in turn, was drawing on Baillet's previously-cited text, *Fondements d'une écriture*, which contains similar examples that have been reproduced in Appendix 1 of the present paper.

[38] It will be noted that these are, of course, Fibonacci numbers. Grisey seems to have had a distinct predilection for using the Fibonacci sequence as formal proportions, though I have not found this explicitly acknowledged by the composer anywhere. In addition to its function as a readily perceivable model of progression, he may have valued the sequence for its affinities to the harmonic spectrum, insofar as it is also a naturally occurring phenomenon.

Reh.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33		34		35	36		37				Mtpl.
Register																															39						26		13					13
						65				60			55		50	45		40				35		30						25		20				15		10		5				5
	64	61	57	54	51		48	45	42		39	36		33			30		27		24		21		18		12		15				9		6					3			3
																				40						32		24					16								7		8
																																											21	21
Spec.:	C#									G	C#				G		C#					G	C#	G			A#	G	C#	A#	G	A#	C#	A#	C#	G	E	A#	E	G	C#	E	A#	

Example 2.6. *Chart of duration in sixteenth notes and spectral content from* Vortex Temporum I, *Section 1*.

Example 2.6 is quite useful in illustrating the deeply architectonic nature of Grisey's compositional method which famously treats the harmonic spectrum as a reservoir of material; the proportions of a spectrum's partials are regularly employed in the determination of processes completely independent of pitch. In this example and throughout the first movement of the work, the very contour of a sound wave is used to control the gradual diminution and growth of melodic cells, serving pragmatically as a "map" for the model of progression of each section (referring back to the scale of complexity in Example 2.1). However, because the present investigation is primarily concerned with such middleground formations insofar as they have a perceptual effect, most of the most of the forthcoming discussion will be focusing primarily on the "becoming" of these processes rather than on their structure qua structure.[39] Remembering that Grisey was very concerned with the perceptibility of the processes in his music, it is crucial, for the present analysis, to understand how/if a listener may become aware, in time, of something like the formal structure presented in Example 2.6.

To that effect, it is striking to note that in Example 2.6 only a single musical domain is altered at a time. The addition of a new registral layer never coincides with the introduction of a new spectral fundamental; on the contrary, the first three layers are presented within the context of the original C# spectrum and it is not until reh. 31 that the uppermost layer is introduced in a new spectrum, G, which has at this point been firmly established. Grisey explains this somewhat pedantic manner of guiding the listener, saying, "I am always trying to first establish the rules of the game — the process of the form – for the listener rather clearly – very often too clearly – in

[39] Nizan Leibovich, "Empty Spaces: Temporal Structures and Timbral Transformations in Gérard Grisey's *Modulations* and *Release for 12 Musicians*, an Original Composition" (PhD diss., University of Pittsburgh, 2017), 108.

order later on to be able to distort it or to change directions. I do not want to put the listener behind a wall of information through which he is incapable of finding his way."[40] Thus, even when the music is moving toward fragmentation, Grisey is still desirous that listeners be able to understand how that state has been reached, even if they are unable to follow each step of the way. To achieve this end, Grisey must strike the proper balance between between perceptually positive and negative processes.

In Example 2.7a, the number of sixteenth notes in the first five events are presented on the model of consciousness, showing how the process of diminution by three sixteenth notes at each repetition would create an expectation of only 48 sixteenth notes in the event following reh. 6.[41] Each event can be perceived as discrete by way of a coextensive diminuendo and an initial flourish of four ascending sixteenth note groups (these begin in the piano right-hand and are eventually picked up by other instruments). Although it is unlikely that listeners could quantitatively identify the process at work between reh. 1-6, it is qualitatively very clear that the process is one of diminution by a small, regular increment. Consequently, when a new layer is activated at reh. 6 – manifesting as a change in register and a break from the pattern of diminution by three sixteenth notes – the listeners' expectations are altered to accommodate the addition of a new layer of the process. The increase to 65 sixteenth notes is in opposition to the

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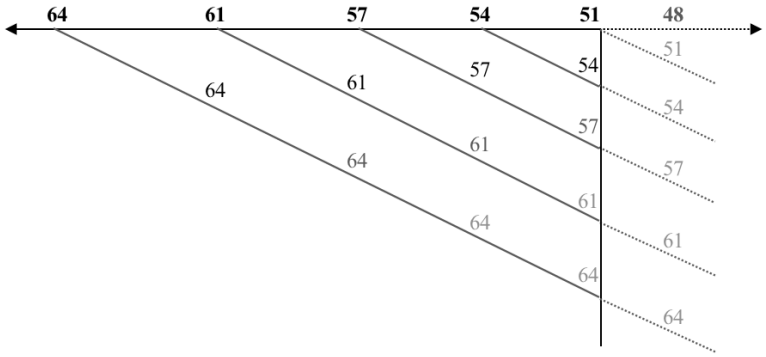
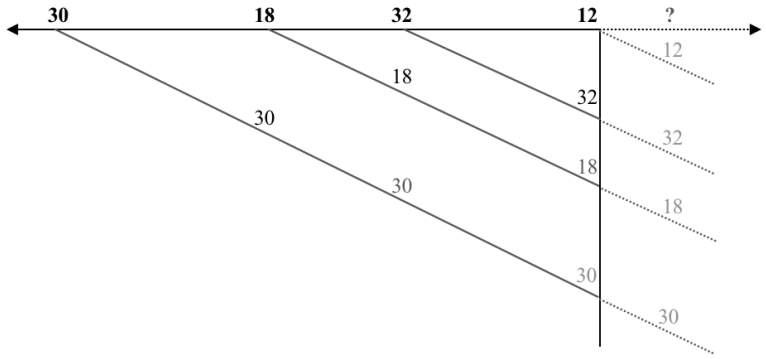
[40] Bündler, "Interview with Gérard Grisey."

[41] The decrease of four sixteenth notes in the event following reh. 3 can be accounted for in a few different ways, but the most probable reasoning for this irregularity is that Grisey's desire to begin the piece in the easily perceptible time signature of 4/4 (amounting to 64 sixteenth notes) took precedence over his wanting the number of sixteenth notes in the middle layer to be some multiple of three for the entirety of the section, thus necessitating a correction at some point. Note that there is also an irregularity between reh. 27 and 29, in which the numbers twelve and fifteen are in reverse order, and in the final iteration of second layer from the bottom, which has only seven sixteenth notes instead of the expected eight. It is possible that these anomalies were intended to further obscure the process of diminution that controls this section, or that they were simply aesthetic choices that Grisey made while translating his pre-compositional plan to the written score.



Example 2.7a. *A model of consciousness for duration in sixteenth notes of reh. 1-5*.



Example 2.7b. *A model of consciousness for duration in sixteenth notes of reh. 24-27.*

listener's expectation that the duration of each event will continue to decrease, but because the break of pattern occurs within a relatively stable context there is ample time to perceive the procedural change. Following Grisey's equation for perceptibility – "the acuity of auditory perception is inversely proportional to that of temporal perception" – the high degree of perceptibility in this particular disruption makes its impact on the listener's sense of the flow of time fairly negligible.[42] Further, the shift of register functions as an auditory cue, alerting listeners to the fact that the established pattern has been broken and thus weakening the protention displayed in Example 2.7a. Later in the section, registral identity will increase the

[42] Grisey, "Tempus ex Machina," 259.

possibility of hearing the separate processes of diminution as the music alternates between layers, though it will ultimately prove insufficient to orient listeners within an increasingly fragmented context.

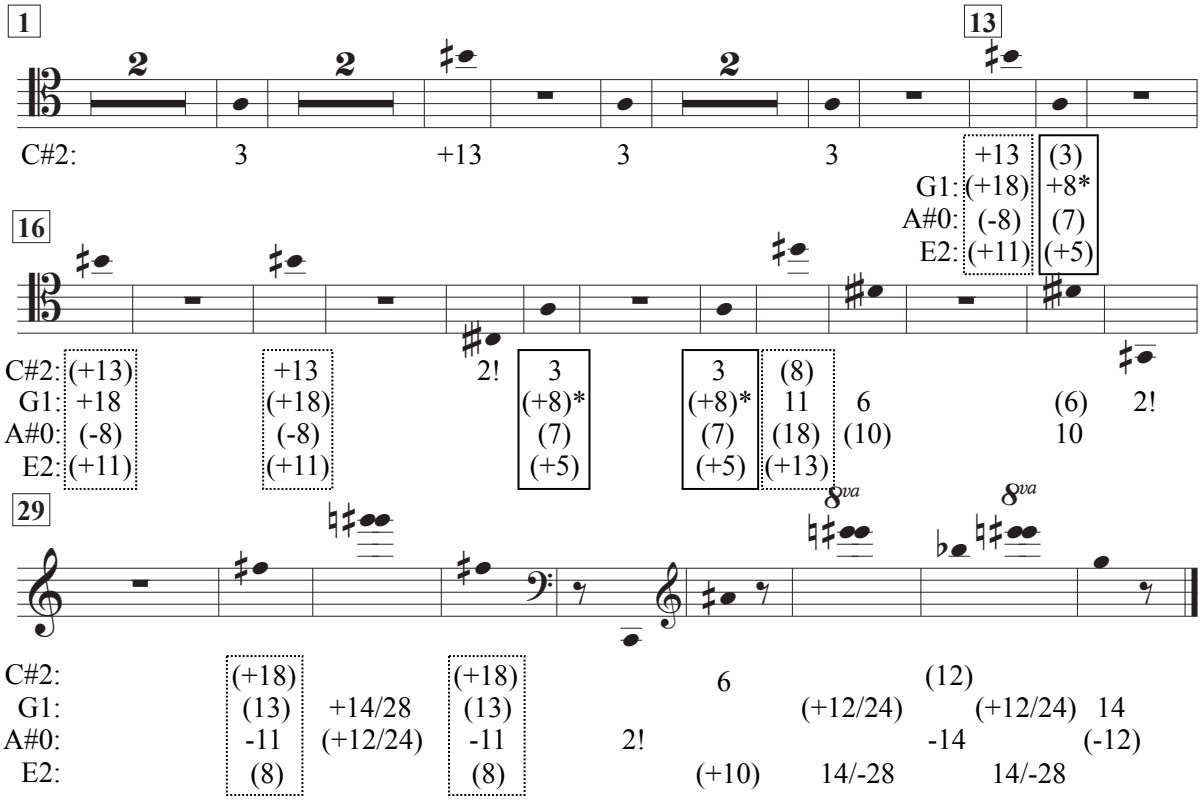
The wave-like motion through five register-defined layers effectively precludes the accurate formation of protentions regarding the duration of future events. Example 2.7b shows how reh. 24-27 would be perceived, illustrating how difficult it would be to form an expectation of future events when the juxtaposition of layers makes the process of diminution all but impossible to follow.[43] Although this may seem to imply that the diminutional process is a perceptually negative one – as it is almost certainly imperceptible in any quantitative way in the latter part of the section – closer examination reveals that the process itself is quite readily perceptible and it is only the discontinuous-dynamic model of fragmentation that makes it obscure. Were any single layer played in isolation, the process of diminution would be evident to even untrained listeners – it is actually a testament to the positive perceptibility of the process that even in such a fragmented presentation, there is still a distinct sense of gradual diminution to the end of the section. Nevertheless, the model of progression initiates in the first section a structural shift from harmonicity to fragmentation that will, to some degree, define the remainder of the movement. To understand this structural shift, an examination of the textural and spectral content of the work is necessary.

In addition to the piano, clarinet, and flute texture presented in Example 2.5, a secondary instrumental layer is gradually introduced into the texture of Section 1 by the cello, viola, and violin. With only three exceptions, this additional layer is expressed as a single sustained note,

[43] It should be noted that the limitations of memory in such an active context makes any conscious temporal continuum longer than that shown in Example 2.7b unlikely.

selected from the partials of the prevailing harmonic spectrum. Example 2.8 shows each of these partials as they appear in the section, with one measure corresponding to the span between consecutive rehearsal numbers. Beneath the staff is presented the harmonic spectrum and the partial number for each pitch. Beginning at reh. 13, after the pattern of alternation between C# partials has been established, the partial numbers from all four spectra that are used in this movement are included, with parentheses around partial numbers that are not from the prevailing spectrum. To avoid cluttering the example with too many octave changes for each fundamental pitch, a plus sign is used before a partial number if the pitch would sound an octave higher in the designated spectrum and a negative sign is used if the partial would sound an octave lower. For example, B-quarter-sharp appears literally in the A#0 spectrum as B3-quarter-sharp (eighth partial) and in the E2 spectrum as B5-quarter-sharp (eleventh partial), so a – and + sign, respectively, are used to describe their partial numbers for B4-quarter-sharp at reh. 14. In two places, reh. 14 and 33, there is a discrepancy between the notation of the partial as it appears in the score and its literal appearance in the harmonic series. At reh. 14, A3 should be A3-quarter-flat and in reh. 33, C2 should be B1-quarter-flat. Although this latter discrepancy is large, it is due only to the registral limitations of the cello. The former discrepancy is an allowance made in deference to Grisey's desire to use "common tones" – pitches that appear in the first twenty partials of all four operative spectra. A appears literally in the C#, E, and A# spectra, so the eighth partial of the G spectrum is altered slightly to accommodate these other fundamentals.

The instrumental layering in Section 1 effects a gradual shift from harmonicity to inharmonicity by slowly incorporating partials from the prevailing spectrum which are foreign to most or all of the other spectra. The first instance of this is at reh. 20, where C3-3/4 sharp



Example 2.8. *Partial usage in the texture of Section 1*.

appears as partial 2 of the C#2 spectrum. Low pitches such as those at reh. 20, 28, and 33 are less likely to be common to multiple spectra, so they are incorporated only in the latter half of the section. Somewhat less harmonically disruptive are the eight partials which occur in only two of the available spectra, found at reh. 25, 27, 31, 34, 35, 36, and 37. These pitches are found at either partials 6 and 10 or 12 and 14 of two harmonic spectra. The gradual impingement of pitches which are native to only one or two spectra becomes complete at reh. 33, after which no "common tone" pitches are used. Consequently, the textural shift from harmonicity to fragmentation is perceptually negative: as new partials are introduced to the texture and the four harmonic spectra are brought into tension with each other, the perception of continuity is diminished.

As regards those pitches which occur in all four spectra, two groups can be identified: pitches which can be found as partials 3, 5, 7, and 8 and as 8, 11, 13, and 18 (indicated in Example 2.8 by solid and dotted boxes). The former appears only as A3 but the latter appears as B4-quarter-sharp, D5-quarter-sharp, and F5-quarter-sharp. Note that these last three pitches spell a diminished triad, the 7th of which would be A-quarter-flat;[44] this is not only the pitch which would occur literally as the eighth partial of the G spectrum at reh. 14, but is exactly the pitch which defines the upper registral limit of the primary melodic material between the first four rehearsal numbers of Section 2. Thus, the process of fragmentation which is at work in Section 1 comes to its natural conclusion with the introduction of Section 2.

The perceptual effect of this discontinuous-dynamic process of fragmentation is that of a large-scale acceleration. As each melodic cell decreases in duration and spectral content becomes increasingly mercurial, the amount of data which confronts the listener grows exponentially. The dramatic influx of information, absent any paradigm or form with which a structure can be imposed upon events – via the production of such statements as "Here is the second theme" or "Now the exposition is being repeated" – results in a condensation of the present moment and ensuing retentions, thus imposing an increasingly anoetic mode of attention upon the listener. In other words, as the events on the flux of consciousness grow denser, the mode of attention tends to become more cognitively passive. Of course, dependent upon the individual's capacity, this passivity can be resisted up to a point, but given the unique harmonic context of *Vortex Temporum* it seems very unlikely that anyone could arrive at a structure like that presented in

[44] Note that, because of the vii^{o7} formed by the fundamentals of the four operative spectral collections, the four pitches discussed here, B-quarter-sharp, D-quarter-sharp, F-quarter-sharp and A-quarter flat, are formed by combining partials of identical designation: that is, the 11th and 13th. These are, significantly, the notes that are retuned on the piano.

Example 2.6 by listening alone. The very linearity of the continuum of temporal consciousness seems to preclude any awareness of the intricate stratification of layers which constitutes this section's formal structure. Rather, the juxtaposition of layers within a single continuum creates a dramatic acceleration of events with no immediately perceptible logic, the absence of which makes the formation of protentions all but impossible and causes a contraction of time.

As shall be seen, this process of fragmentation continues throughout the remainder of the first movement, culminating with the rhapsodic, pointillist third section. How, then, can this movement be said to evoke "the time of language and breathing" – the time of humans?[45] By setting this "temporal mode" against the time of whales and of birds and insects (in the second and third movements, respectively), Grisey seems to imply that something about this movement is consistent with the normative temporal experience of humans. Does the perception of a gradual dissolution of texture, rhythm, and spectral harmonicity function as a metaphor for the inconsistent way in which humans experience the flow of time? Or perhaps the architectonic framework is an expression of the subconscious scaffolding which tightly controls the way in which humans comprehend the temporal dimension? This consideration should be held in view throughout the following evaluations of the second and third sections of *Vortex Temporum I*.

Section 2:

Referring back to the table of Example 2.4, we see that Section 2 contrasts the outer sections of the movement in that its model of progression is one of accumulation rather than fragmentation. It may be important to clarify that the fragmentation and accumulation which are

[45] Grisey, "Did You Say Spectral?," 2.

said to typify these sections refer specifically to the constitution of perceptual events. In the first and third sections, the melodic cells which would be perceived as unique events are gradually diminished in duration, whereas the melodic cells in the second section are gradually increased. The discontinuous-dynamic and statistical models ascribed to the processes of fragmentation and accumulation are based primarily on my own perception – there is a certain continuity of progression discernible in the first two sections which seems to be absent from the sporadic third section. The structural reasons for this perceptual phenomenon will be discussed shortly, but I will first turn to Example 2.9, which displays the process by which the events of Section 2 increase in duration.[46] A few differences should be noted when comparing this graph to that of Section 1: of greatest importance is that the layering of events is no longer determined by register but by rhythmic divisions. Five different event-types are used in this movement, each with a unique rhythmic character; to the right of the graph is indicated the multiple for each event-type layer's eighth-note duration. The rows of this graph, unlike those of Example 2.6, are arranged so that the multiples are in ascending order, indicating that the primary process of this section is the wave-like alternation of five event-types rather than a single event-type with five distinct registers. In addition to rhythmic identity, Baillet notes that each of the five event-types has unique strictures placed upon its pitch content:

> The pitch variability of the three tones of the cell: for the cell of periodicity 2, the three pitches are fixed, in the 3-cell the central pitch is variable, for the 5-cell only the lowest pitch is fixed, for the 8-cell only the central pitch is fixed, for the 13-cell the three pitches are variable.[47]

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[46] This example draws again upon Baillet's analytical findings (see Appendix 1), though I have changed the formatting of the graph to emphasize the way in which information grows exponentially more dense as the section draws to a close.

[47] Baillet, *Fondements d'une écriture*, 219. (Translation is my own)

Reh.:	38					39				40			41		42		43	44	45	46	47	48	49			50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	Mtpl.
Event-type																														14					26			39					13
																								8							16			24							32		8
																5							10		15	20				25			30				35							5
	3	6	9	12			15		18			21	24		27		30		39	36		39					42		45					48						51			54	3
					4	8		2		10	6			12				16			14							18											22			20			2
Spec.:	D					B	D			B	D		B	D	B		D	B	D	G#	D	B	D	B	D	G#	D	B	F	B	D	G#	D	G#	D	B	F	B	F	B	D	G#	F	

Example 2.9. *Chart of duration in eighth notes and spectral content from* Vortex Temporum I, *Section 2*.

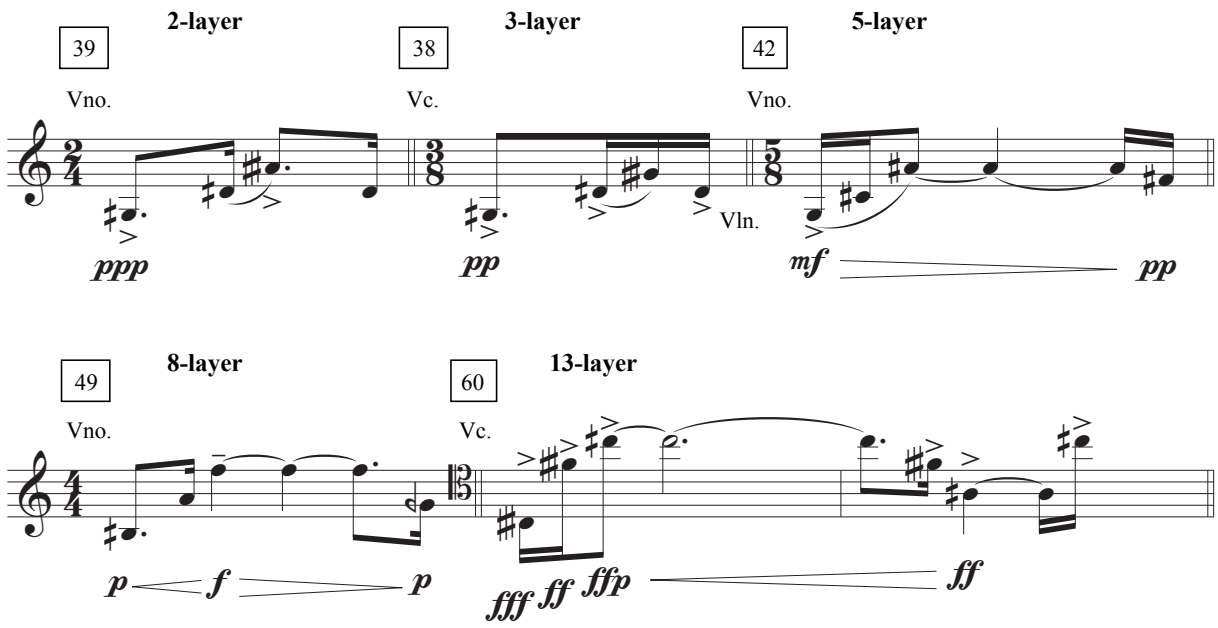
Therefore, although register is no longer a distinguishing characteristic, Grisey implements pitch limitations to aid in perceiving five unique event-types. Quantitative judgments regarding the exact parameters that define each layer (duration, pitch, spectrum, rhythm, etc.) will vary based upon each listener's ability to perceive them, but at minimum there will be a qualitative understanding that the section comprises a few distinct event-types which become more volatile in their pitch content as the section progresses.

Although the process of durational growth in Section 2 is in many ways a reversal of the diminution in Section 1 (insofar as they are both achieved by similar additive processes), the discontinuous-dynamic model of Section 2 prevents it from resulting in an experience of deceleration, as would be expected in a simpler context like that seen in Example 2.2. On the contrary, in combination with the processes of rhythmic fragmentation and textural expansion, the experience is one of acceleration. Thus, although the process of discontinuous-dynamic accumulation is certainly a propelling force in Section 2 and would have significant perceptual ramifications given a long enough duration and the appropriate musical emphasis, this model of progression can easily be obscured by the foregrounding of other, more apparent musical processes. In Section 1, every significant process was working to further the perceptual fragmentation of the primary event. In Section 2, the discontinuous-dynamic accumulation of five event-types works to reverse said fragmentation, but the processes of rhythmic fragmentation and textural expansion prevent a return of the stable musical context which initiated the movement.

The most defining characteristic of the five event-types in this section is their rhythmic profile. The multiples affiliated with each layer of this section, through which the discontinuous-dynamic model progresses, are a product of the metric implications of each event's unique rhythmic motif. Example 2.10 reproduces a single iteration from each event-type, indicating the instrument and rehearsal number at which each event can be located.[48] These basic rhythmic patterns, typically accompanied by fixed dynamics, phrasing, and articulation, form the unique identity of each event-type. As the section progresses and the events become longer, the metric units stay fundamentally the same: the 2-layer is presented in a duple meter with a quarter note pulse; the 3-layer is in a compound meter with a dotted-quarter note pulse; the 5-layer is in 5/8, alternating 2+3 and 3+2 subdivision; the 8-layer is in 4/4 with long sustained notes occurring on the beat; and the 13-layer is in varying meters with long sustained notes occurring off the beat.

It may rightly be wondered why, in Example 2.4, the durational event growth in Section 2 has been labeled as a perceptually negative event when the event diminution in Section 1 was perceptually positive, so I will take a moment to explain the reasoning behind this apparent contradiction. Functionally, the process of growth in Section 2 is imperceptible in the 2- and 3-layers, owing to their diminutive rhythmic identity. Having no built-in auditory cues to signal the beginning of a new event (such as the sixteenth-note flourishes in Section 1), listeners are much more likely to group sequential events of the same layer into a "hyper-event," perceiving its duration as the aggregate of its constituents. For example, the first four events of Section 2 will probably be perceived as a hyper-event with a duration of thirty eighth notes rather than four

[48] Note that because the motivic cell of the 2-layer is so brief, it is typically presented in pairs to create the jagged "sawtooth" contour seen in Example 2.10. In an effort to show representative iterations of each event-type, I have therefore chosen to include the 2-layer cell that is four eighth-notes in duration instead the layer's most "basic" event.

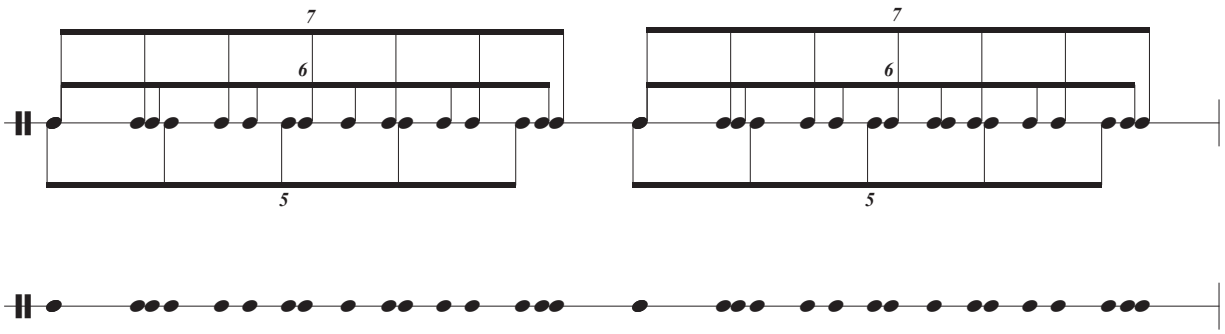


Example 2.10. *The five basic event-types of* Vortex Temporum I, *Section 2.*

discrete events with durations of three, six, nine, and twelve eighth notes. Although the score makes the division of events clear by using barlines, the events themselves have nothing in the way of internal coherence to indicate that the melodic cells which constitute their durational whole should be grouped together as a unit. In the 5-, 8-, and 13-layers, the use of sustained notes makes the repetition of melodic cells more countable, meaning that the event following reh. 59 could be perceived as having three sustained notes, approximately one 4/4 measure each, for a total of 24 eighth notes. But because the movement between layers has become so mobile by the time the longer event-types have been introduced, the perception of continuous growth is nearly impossible. Therefore, the disposition of the event-types which constitute this section make their gradual durational growth unlikely to be followed by the listener, meaning that the process has a negative – or perhaps simply neutral – perceptual effect.

Rhythmic fragmentation, on the other hand, is overtly negative in its perceptual effect. Although the rhythmic identity of each layer is constant throughout the section, rhythmic gestures from foreign event-types are increasingly juxtaposed with the active layer to reduce the clarity with which the primary rhythm can be perceived. The first such occurrence is in the event with 27 eighth notes that follows reh. 42, in which the triplet eighth note subdivision of the violin part is played against quadruplet sixteenth notes in the viola – an example of the dormant 2-layer impinging upon the active 3-layer. The first half of the section consists only of events from the 2- 3- and 5-layers, the clear rhythmic subdivisions of which can be distorted only by juxtaposing multiple layers. By contrast, the 8-layer event-type, which is introduced shortly after reh. 49, incorporates rhythmic obscurity as part of its very identity. Not included in Example 2.10 are two lower voices which play in a contour similar to that shown, but in quintuplet and septuplet eighth note groupings. Although the cardinality of the tuplets is not consistent, every event from the 8-layer is presented with three different and simultaneous subdivisions of the 4/4 meter. The 13-layer has a similar rhythmic identity, but is accentuated in its obscurity by frequently changing meters and off-beat sustained notes.

The rhythmic process of Section 2 is characterized by a move from rhythmic clarity to fragmentation, thus working in opposition to the model of discontinuous-dynamic accumulation which controls the domain of event duration. To illustrate how significantly the juxtaposition of multiple rhythmic subdivisions densifies the information presented on the continuum of consciousness, Example 2.11 presents one measure of 4/4 with three different tuplets on a single staff line (a rhythm drawn from shortly after reh. 66). The second measure presents the same attack points with the beams removed, illustrating how difficult it would be to impose any logic



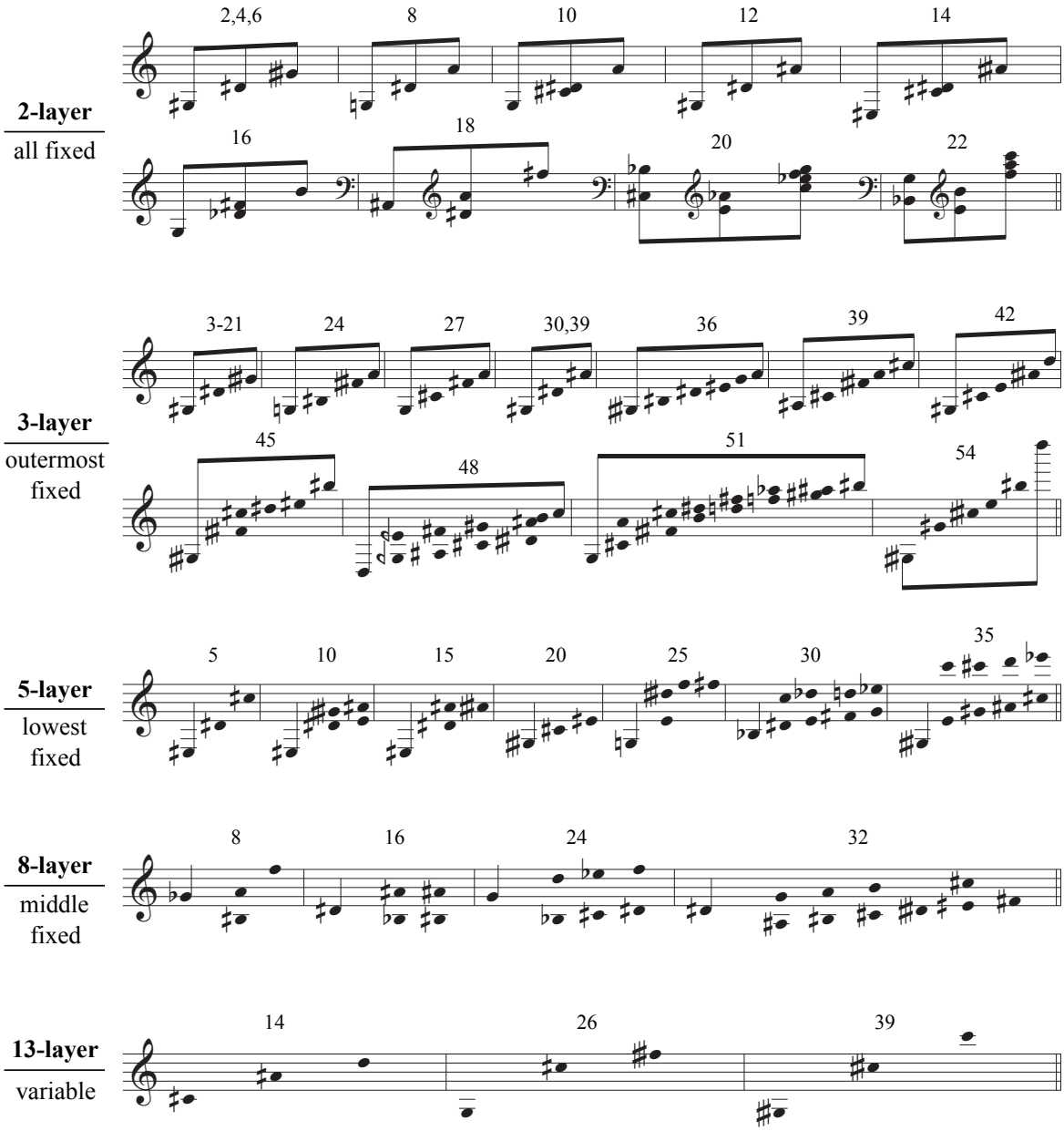
Example 2.11. *The juxtaposition of three tuplet figures on a single continuum.*

upon such a sporadic rhythm, devoid of any other musical information – even with the aid of two simultaneities per measure (on beat 1 and 3). In fact, the unpredictability of such a rhythm would likely result in an atrophy of perception – "giving up" the attempt to organize such disparate information and taking on a passive mode of attending – rather than a temporal acceleration such as that illustrated in the first system of Example 2.2. Fortunately, within the established context of Section 2, in which contour, pitch, and interspersed sustained notes provide shape to each melodic cell, the process of rhythmic fragmentation does not reach the point of perceptual atrophy but only accentuates the gradual process of temporal acceleration.

Clearly, the rhythmic fragmentation in Section 2 is a process of perceptual negation: it begins with stable material and, by increasing the density of information presented to listeners, gradually removes the possibility for perceptual certainty. Temporal acceleration is imposed by suppressing listeners' understanding of the musical material and pressuring them toward an increasingly passive mode of attending. This is not to say that rhythmic fragmentation ever progresses to a point of complete imperceptibility, only that the movement is toward one such state. Textural growth, by contrast, follows a progression that is perceptually positive, aiding

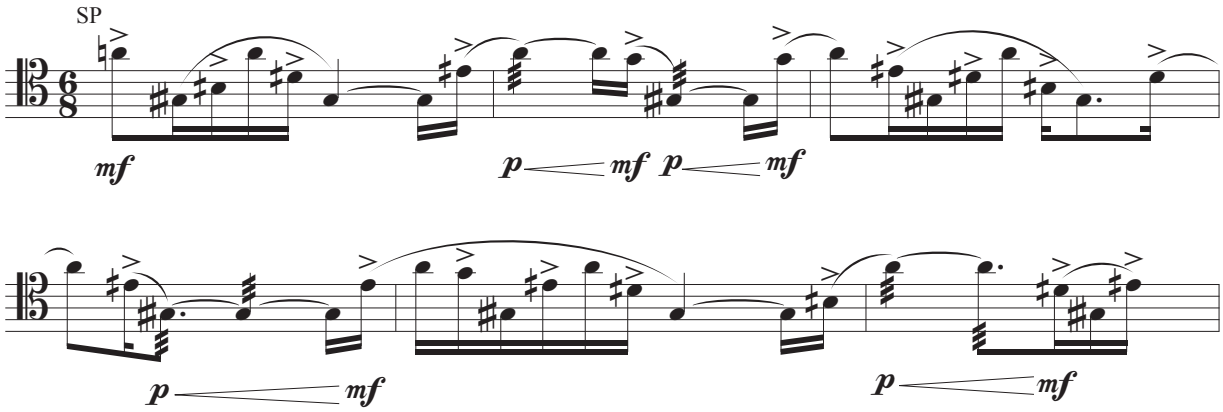
listeners in their qualitative understanding of the section's development; this textural expansion occurs in the domains of instrumentation and register.

Example 2.12a presents the pitch content of each event-type layer in Section 2, including above each measure the cells for which each collection of pitches applies. Noteheads with stems represent pitches which are held invariant and where two or more invariant pitches are present in an event, they have been beamed together for visual clarity. Noteheads without stems represent pitches which fluctuate – notice that because every pitch in the 13-layer is subject to fluctuation, I have chosen to reproduce only the first three pitches of each event rather than trace their development throughout. For the purposes of showing continuous textural expansion, I have arranged the events in this example by duration rather than chronology (remembering that the discontinuous-dynamic growth of this section occasionally manifests in the rearranging of events – see Example 2.9). Textural growth can be seen to occur in a number of ways in this example: in latter events of the 2- and 3-layers, additional voices are sounded simultaneously to increase textural density; in the 3-, 5-, 8-, and 13-layers there is an increase in pitch content; in all layers, there is registral expansion. The increased density of pitch content and the expansion of register are easily perceptible as this section progresses, propelling the music toward a climax in the final events. Meanwhile, instrumentation becomes quite variable (see Appendix 1 for Baillet's graph tracing the *nombre de voix* in Section 2), growing to a dense concentration of voices in most of the section's latter events, but interspersed with sudden drops to two or three instruments for brief interludes (following reh. 46, 52, 58, 62, and 65). These interludes provide contrast to the overall progression of growth and thus heighten the sense of discontinuous-dynamic accumulation.



Example 2.12a. *Pitch content of Section 2's constituent events.*

Example 2.12b is a reproduction of the cello solo that follows reh. 46 – a striking moment in the piece and an excellent example of how the pitch content of Example 2.12a practically manifests in the score. This excerpt represents the 3-layer event of 36 eighth-notes which, as can



Example 2.12b. Vortex Temporum I*, reh. 46-47 (cello part).*

be seen in 2.12a, uses six unique pitches, the two outermost of which remain fixed while the inner voice arpeggiates through B3-quarter-sharp, D4-quarter-sharp, E4-quarter-sharp, and G4. Also interesting to note from this example is how the 3-layer has begun to imitate the longer event-types by incorporating sustained notes – a process which further obscures the alternation between event-type layers as the piece progresses.

The aggregate effect of the primary processes in Section 2 is arguably a temporal acceleration, though one that is quite different from that experienced in the first section. Due to the increased number of event types, the negating perceptual effect of rhythmic fragmentation, and the model of accumulation which, if anything, is working in opposition to temporal acceleration, Section 2 is presented to listeners in a much more ambiguous light. While textural and registral expansion certainly propel the music forward, it is doubtful whether a single perceptually positive process could overcome the opaque development of every other musical domain. Therefore, Section 2 is best viewed within the global structure of the movement as a continuation of the fragmentation that began in Section 1. This process will come to its fullest

expression in the third section, where fragmentation becomes the paradigm and prediction becomes all but impossible.

Section 3:

The formal structure of Section 3, although as tightly controlled as those preceding, represents a huge step towards fragmentation: the absence of any perceptually positive processes, combined with the dramatic increase of information presented to the listener, makes the formal structure of this section effectively imperceptible. A combination of natural, dilated, and compressed spectral reservoirs, a process of durational diminution, a statistical model of progression, and a complete dearth of continuity in event-type presentation threaten to whelm listeners under a veil of incoherence and prolixity, yet the section never reaches such a state of fragmentation that an atrophied mode of perception is unavoidable. The means by which perceptual orientation is maintained by listeners throughout a passage characterized by textural dissolution is heavily dependent on a Husserlian conception of temporal consciousness, for despite the unpredictability with which events are presented one-by-one in the "tonal now," Grisey uses pre-established processes from Section 1 and 2 to allow for the perception of microstructure within whichever event is currently "activated" in each listener's flux of consciousness. Such microstructure is only perceptible insofar as listeners' recollections of past musical experiences are able to be brought into relation with each member of the tripartite structure of consciousness, so it is the nature of this intersection which will inform the discussion of temporal consciousness in Section 3.

Fundamentally, recollections are just retentions that have passed from the present flux of consciousness into the memory where, lying dormant, they can be conjured by external sources (such as the return of a motivic element in a piece of music) or by intentionality (the volition of a subject to represent the contents of a past event to the present consciousness). The former case involves the creation of a contingent relationship between a recollection and a present event, and in so doing to form a structural connection across a potentially large span of time. The latter case involves shifting attention away from the external events of the present and instead focusing internally on an event of the past. Because this results in a decreased external awareness, it is difficult for this type of recollection to take place during a musical performance without a significant loss of perceptual coherence; therefore, recollection by external re-presentation provides the most cogent possibilities for interpreting the role of memory in Section 3.

The relationship between a recollection and a present event is essentially a semiotic one, where an event of the present signifies one of the past and thus partakes, to some degree, of the structure and expectations inherent to the recollection. When a motivic event with certain identifiable properties is introduced in a musical work, all subsequent iterations serve to confirm those properties which are inherent to the event-type's identity and to strengthen the expectation that the event-type will be presented in a certain way. Thus, the aforementioned "microstructure" of an event-type is formed and discrete instances adopt the function of signifiers for the complex array of properties which have come to be inherent to the type. These properties can consist of anything from specific qualities of melodic contour, intervallic content, harmonic progression, rhythmic identity, and instrumentation, to semiotic referents (e.g. the "sine wave" which the primary event of Section 1 represents), and developmental processes. Although these properties

can be entirely localized within the structure of an event, it is important to note that event-types can also have properties of global scope, such as the formal location inherent to a sonata's primary theme or the process of diminution which becomes a vital part of the primary event of Movement I. From the idea of a recognizable event-type with coherence across its various instances comes an intrinsic quality of predictability, where each discrete event is expected to "perform" in a way that is consistent with other events of the same type. Therefore, because many of the event-types in Section 3 of Movement I are designed to act as semiotic referents to the event-types of Sections 1 and 2, a degree of predictability is incorporated by proxy into an otherwise unpredictable formal structure.

Example 2.13 presents the formal graph of Section 3, pared back slightly from Baillet's chart in *Fondements d'une écriture* to show just that information which is pertinent to the present discussion.[49] As in the other graphs, spectral fundamentals are represented below the rows of events and the multiplier for the duration of each event-type is shown to the right of the chart. Note that two of the event-types, B and E, are invariant in duration, making their multiple 1. Unlike the previous sections, which drew respectively from dilated and contracted spectra, Section 3 includes both altered forms (at the same factors of either 1.046 or 0.954) and adds to these the natural spectrum. Each event-type uses a specific form of the spectrum, which is represented next to its letter designation with – for contracted spectra, + for dilated spectra, or 0 for natural spectra; note that the two event-types with invariant durations are also the only ones to use natural forms of the harmonic spectra. Beneath the chart, lines have been added to connect the fundamental pitches of event-type A; notice that these fundamental pitches outline two and a

[49] Baillet, *Fondements d'une écriture*, 220.

Reh.:	68	69		70	71	72		73	74		75		76	77		78	79			80			81				82		83					84			85							Mtpl.
H+																																										11		11
G+																									16								12							6			6
F+																			32							24					16						8				8
E0														13										13								13					13					1
D–												50			40					30										20							10					10
C–				96				84								70							56				42						28			14						14
B0		18				18			18		18							18			18								18						18							1
A+	143		130		117		104			91			78				65					52						39							26							12	13
Spec.:	A				C		D#	F#	D#	F#		A#		D	G	D#	C#	A	E		C	E	B	D	C#		G#	G	D#	C#	A#	D	E	F	B	F#	D	A	D	G	G#	A#	D	

Example 2.13. *Chart of duration in sixteenth notes and spectral content from* Vortex Temporum I, *Section 3.*

half vii^{o7} chords, each a half-step apart: A–C–D#–F#, A#–C#–E–G, and B–D. Tracing the spectral fundamentals of each event-type reveals that a similar process of outlining vii^{o7} chords occurs in each layer, with the only anomaly occurring in the G-layer, where the fundamental pitches are C#, E, and G#, rather than G-natural.[50]

Although Section 3 is structured much like the previous sections, the increase to eight event-types and the absence of any sequential events of the same type make it exceedingly difficult to form reliable expectations about how the music will progress. This distinct lack of perceptually apparent structure is representative of the statistical model of progression described by Grisey, wherein continuity is obscured by a "complete redivision" of event-type layers, resulting in "unpredictability of durations."[51] Balancing this statistical model, six of the eight event-types are composed of musical material that either directly quotes or clearly evokes material from Sections 1 and 2 (Example 2.14). Thus, by functioning as signifiers for musical processes previously established, events impose perceptual structure by way of their re-presentation of past musical experiences on the flux of consciousness. Remembering Husserl's previously-cited statement that "every retention is already a continuum," this re-presentation can be said to act like an artificially-imposed recollection, presenting past events to the present consciousness with the same fullness of experience that was originally inherent to them.[52] This phenomenon is distinct from ordinary thematic repetition due to the sporadic and unpredictable context in which these artificial recollections occur: the complete absence of developmental

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[50] This slight modification may have resulted from a desire to avoid two sequential events with the same spectral fundamental: the preceding event, the last iteration of the F-layer, uses G as its fundamental and thus precludes its use in the following event of the G-layer (reh. 85).

[51] Grisey, "Tempus ex Machina," 244.

[52] Husserl, *The Phenomenology of Internal Time-Consciousness*, 51.

A: Saw-tooth wave
D^{+} spectrum
12 sixteenth-notes
(altered from 13)

B: Sine-wave (upper voice)
Square-wave (lower)
A^{0} spectrum
18 sixteenth-notes

C: Square-wave
D^{-} spectrum
14 sixteenth-notes

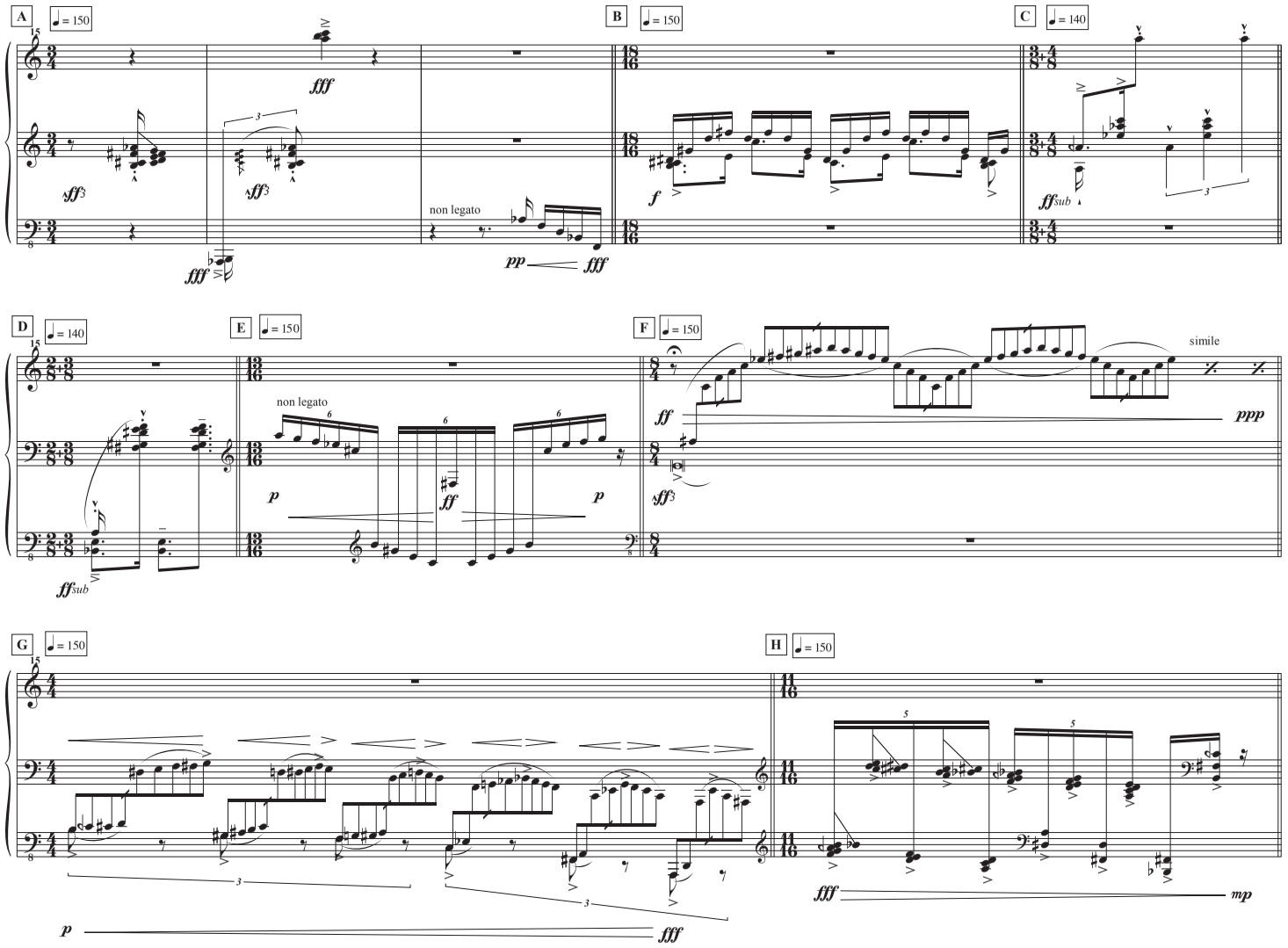
D: Square-wave
A^{-} spectrum
10 sixteenth-notes

E: Sine-wave
E^{0} spectrum
13 sixteenth-notes

F: Sine-wave
E^{+} spectrum
32 sixteenth-notes

G: Sine-wave
$C\#^{+}$ spectrum
16 sixteenth-notes

H: Saw-tooth wave
$G\#^{+}$ spectrum
11 sixteenth-notes



Example 2.14. E*vent-types A-H in* Vortex Temporum I, *Section 3.*

continuity divorces each event from the surrounding material and presents it as an isolated fragment. Whether Grisey intended this section to be analogous to the way in which human consciousness seems to flutter about – attending closely to the present moment, absently recalling an earlier experience, synthesizing the just-past with the long-past, forming expectations by way of this synthesis, etc. – is uncertain, but the similarities provide useful insight into how the section is able to perceptually cohere despite its great structural mobility.

The primary way that event-types evoke earlier music is through contour: B (upper voice), E, F, and G are similar to the sine-wave contour of Section 1; B (lower voice), C, and D are reminiscent of the more jagged, square-wave contour of Section 2; A and H are unique to this section and intended to resemble a saw-tooth wave.[53] The perceptually disorienting presentation of these different event-types to the listener in collage-like juxtaposition is thus counterbalanced by the usage of familiar thematic content. Like a postmodern pastiche, Section 3 wanders with apparent aimlessness through a fog of disparate musical fragments into which memories of past experiences cut, gleaming, through the obscurity – thus providing momentary points of clarity to orient the consciousness and ward off complete perceptual disengagement.

Temporally, the process of diminution in Section 3 results in a gradual acceleration of musical and perceptual pacing, although the manner in which this occurs is quite distinct from the corresponding process in Section 1. Here, the gradual durational diminution which is effected in six of the eight event-types is made nearly imperceptible, except in a vague, qualitative way,

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[53] Baillet, *Fondements d'une écriture*, 222-23.
Although Grisey explicitly references the function of these three wave-forms as the archetypes for each section of the first movement, the distinctive musical qualities which are incorporated into the event-types associated with each wave-form are such that most listeners would recognize three different categories of thematic material, even without prior knowledge of Grisey's conceptual designations.

by the rapid alternation of layers. Where the single event-type of Section 1 provided a stable reference point for the perception of durational diminution, the use of eight event-types and the complete avoidance of event-type repetition in Section 3 obscures the process altogether. Because of this, the process of diminution in Section 3 is rightly labeled as being perceptually negative – the global effect is one of sporadic fragmentation, not gradual diminution.[54]

To return to the question of temporal archetypes, introduced at the beginning of this analysis, a conception of how this movement is supposed to represent a human's temporal experience begins to coalesce in the aggregate effect of each section. Moving gradually away from the simple and clearly perceivable material shown in Example 2.5 to an agitated state of fragmentation in Section 3, Movement I is illustrative of the disparate ways in which humans experience time. Each section accelerates to its conclusion with irresistible momentum, drawing the listener further away from their internal consciousness of time and into that of the music, but this momentum never seems to reach a satisfactory culmination: the frantic, ascending flourish of Section 1 dissolves into jagged, aimless wandering (reh. 38); the strings, clarinet, and flute in Section 2 issue forth violent, guttural wailings, only to vanish entirely with no preparation or warning (reh. 68); the piano's final, irascible attack in its lowest octave brings Section 3 to a resolute close, but the notes are sustained until they fade, unnoticed, into the Interlude between movements (reh. 85). Surely this is evocative of human time, propelled as it is hopelessly forward into an unfamiliar and unpredictable future, compressing and dilating in choreographed

[54] An exception might be made for the music following reh. 84 to the end because it clearly traces a linear movement through the eight layers (Example 2.13). However, because the preceding music moved too freely between layers for listeners to perceive the ordered layering seen in Example 2.13, this acceleration, though structurally directed, will likely be perceived as furthering the process of fragmentation.

step with the fluctuating density of events but ultimately, in this life, never attaining a satisfactory resolution of the accumulated tension of the past. In the final analysis, though, Movement I never reaches to the extremes of temporal experience – each section is ultimately bounded by the limits of perceptibility, manifesting in the immanent, musical present as the product of a closely determined structure. Movement II, on the other hand, will show what happens when these boundaries are exceeded and the human experience of the temporal dimension is stretched to accommodate the limits of dilation and predictability.

The dilation of time in *Vortex Temporum II*

In the program notes for *Vortex Temporum*, Grisey describes the intended temporal aspect of the second movement as being "that of whales (spectral time of sleep rhythms)," a quality which is evoked by magnifying the spectral material of the first movement so that "the initial Gestalt is heard [in the second movement] only once, spread over the entire duration."[55] As shall be seen, the projection of the primary event of Movement I (Example 2.5) onto the form and processes of the second movement creates an experience of extreme dilation, as if the single eight-second event were perceived as occupying eight full minutes. Although the limits of human consciousness will mitigate this perceptual effect, disallowing the type of extreme "slow-motion" which Grisey describes as the conceptual basis for the movement, a certain degree of temporal deceleration will ultimately prove unavoidable. Grisey effects this perceptual manipulation by continually subsuming immanent musical events beneath new waves of material in a hypnotic process of displacement:

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[55] Grisey, "Vortex Temporum I, II, and III," Program Notes.

> I tried to create in the slowness a feeling of spherical and vertiginous movement. The ascending movements of the spectra, the interlocking fundamentals in chromatic descent and the continuous filtering of the piano generate a kind of double rotation, a helical and continuous movement which rolls up on itself.[56]

Process:	Manipulation of register and pitch density	Pos.	Implementation of common tones	Pos.	Incorporation of accentuations	Pos.
Model:	Discontinuous-Dynamic		Periodic		Continuous-Dynamic	

Example 2.15. *Chart of structural processes in* Vortex Temporum II.

Structural Processes:

My approach to this movement will consist of an exploration of the structural processes that control its global pacing, followed by an evaluation of those processes that govern the immanent, foreground material which most directly effects the perception of temporal dilation. As relates to structural content, there are three primary processes at work, presented in Example 2.15. Note that because the structure of this movement follows an arch form, these three processes are used to facilitate both accumulation and fragmentation, to differing degrees. Consequently, their model of progression for the first half of the movement may be one of periodic accumulation, while in the second half it is one of continuous-dynamic fragmentation.

Nine spectral pitch collections are used in this movement (the tenth collection presented in Example 2.16 is used as transitional material leading into Movement III), each of which corresponds to a discrete formal section and stands in complex relation to the surrounding

[56] Ibid. (Translation is my own) «J'ai cherché à créer dans la lenteur une sensation de mouvement sphérique et vertigineux. Les mouvements ascendants des spectres, l'emboitement des fondamentaux en descentes chromatiques et les filtrages continus du piano génèrent une sorte de double rotation, un mouvement hélicoïdal et continu qui s'enroule sur lui-même.»

collections. Baillet notes that each section is characterized by the presence of four distinct elements:[57]

1. An "ostinato note subset" of the spectral collection that the piano repeats on each quarter note pulse of the section (indicated with note stems in Example 2.16).
2. A descending line that fills the space between the two outermost ostinato notes.
3. A series of accented pitches within the descending line – differentiated by dynamics and articulation – which describes an independent line of slower duration (indicated with circles in Example 2.16)
4. Pitches sustained by the other instruments that vary in register and textural density depending on the formal location.

Additionally, Example 2.16 presents the generative fundamental and its quality (natural, dilated, or compressed) to the left of each spectral collection, and, on the other end of the staff, the number of pitches that constitute each collection and the number of times the piano descends through this gamut of pitches. Parallel spectral collections are brought into relation by way of similar formal location, register, and pitch constitution, and are indicated by curved lines to the right of the staves. Because each collection has a unique fundamental pitch, these pitches will serve as the mnemonic designations for each respective formal section; in other words, the first three sections will be referred to as the B, B♭, and A sections, respectively.

Baillet notes that the formal structure of the nine spectral collections is patterned on the primary event of the first movement (illustrated by his formal graph of Movement II, reproduced in Appendix 2). The sine-wave contour of this primary event is structurally projected onto

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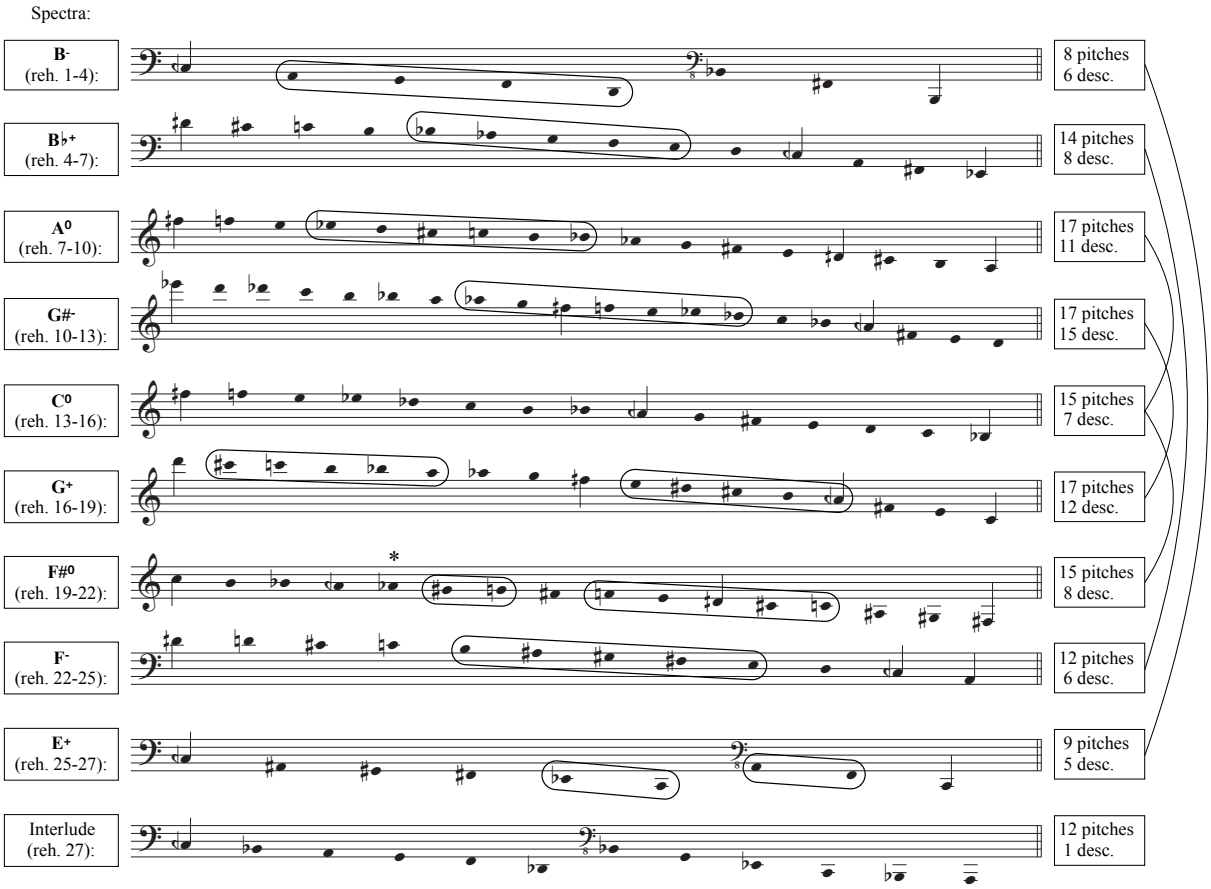
[57] Baillet, *Fondements d'une écriture*, 225-226.



Example 2.16. *Spectral pitch collections in the piano part of* Vortex Temporum II.[58]

Movement II by manipulating the density and register of each spectral collection: the first four collections reflect an increase in both density and register while the last four reflect a decrease. The manipulation of pitch density is facilitated additively, through the addition or subtraction of an average of three pitches per transformation (one notable exception being the increase from eight pitches in the first section to fourteen in the second). Due to the varying increment by which this parameter is altered, this process can be said to follow a discontinuous-dynamic model of progression, though one that is certainly perceptually positive: the ascending and descending registral limits and the gradual increase and decrease of pitch content in each

[58] Many of the notational devices that I use in this example find their inspiration in an essay by Robert Hasegawa: "Gérard Grisey and the 'Nature' of Harmony," *Music Analysis* 28/3 (October 2009), 349-371.

collection are two primary contributors to the listener's perception of an arch form in this movement.[59]

Perceptual continuity is also maintained in this movement through the implementation of common tones between adjacent ostinato note subsets and the pitch contents of parallel collections. As the number of ostinato notes increases from two in Section B to four in Section G, every transition maintains at least one common note (there is one notable exception, between Sections G and F#, though it could be argued that C is a common tone despite an octave change). Smooth "voice leading" is maintained in the changing ostinato note subsets by moving an outer note of one subset into the middle of the following subset, effectively subsuming the pitch by shifting register. For example, the uppermost note of Section B♭, D4-quarter-sharp, continues to be articulated throughout the following section, A, but is covered by a new ostinato note, F5-quarter-sharp. This process works in reverse for the second half of the movement. Baillet points out that a similar process of common tone retention governs the instrumental parts: "the last tones held to the end of a section are overlapped to the beginning of the next because they belong to the spectra of the two sections."[60]

If the ostinato note subsets serve to create local continuity, parallel spectral collections create continuity at a global level. I have identified these collections as being related for a variety of reasons, not least of which is that, with the exception of Section F#, all parallel collections

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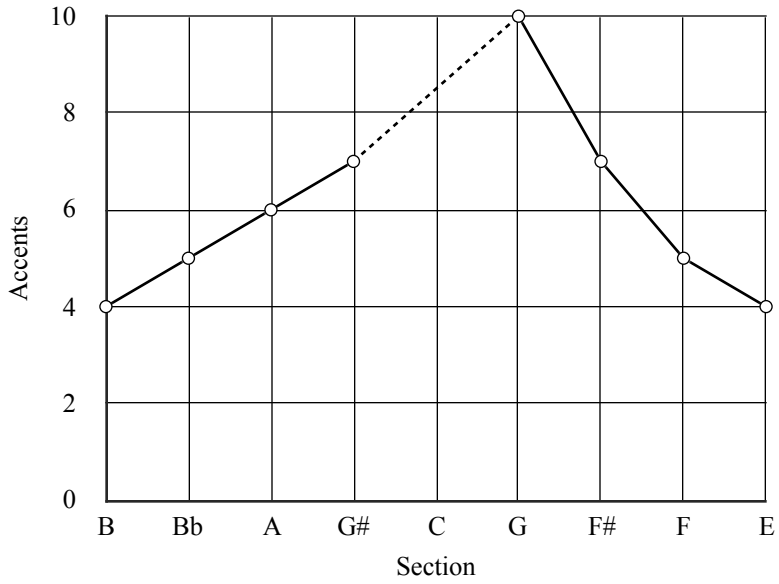
[59] An interesting problem arises in counting the pitches of reh. 19-22 because both G#4 and A♭4 appear in the piano part (marked by the asterisk in Example 2.16). Due to their enharmonic equivalence, I have chosen to count the two orthographically distinct pitches as representative of a single pitch in the spectral collection, despite the fact that they seem to function in contextually distinct roles: G# is used when chromatically descending from B♭ through A-quarter-flat, while A♭ is used only when descending a whole step from B♭.

[60] Baillet, *Fondements d'une écriture*, 226. (Translation is my own) «les derniers sons tenus à la fin d'une section sont tuilés au début de la suivant car ils appartiennent aux spectres des deux sections.»

share the same uppermost note and occupy similar registral space.[61] Collections are also associated by the number of ostinato notes present in each section: there are 2, 3, 3, and 3 or 4 (Section C and G, respectively) ostinato notes in the four groups, working inward in Example 2.16. The pitch contents of parallel collections bear further similarities: Sections B♭ and F have ten pitches in common, two of which are ostinato notes; Sections G# and G have fifteen pitches in common and two ostinato notes; Sections B and E share an uppermost note, but the latter collection has been transformed by raising the remaining pitches by a half step; the final group shares eleven notes between Sections A and C, ten between A and F#, and nine between C and F#. Finally, parallel collections have similar spectral constitutions: all two-collection groups comprise one compressed and one dilated form of the spectrum while the three-collection group consists only of natural spectra. The retention of a proportionally fixed number of common tones between ostinato subsets and parallel collections throughout the entire movement is representative of a periodic model of progression, which does not follow an arithmetic or geometric pattern of growth but remains constant through the progression of events. These common tones function as the axis about which the modulatory spectral collections can revolve in ever-changing register, density, and spectrum, "rolling up on themselves" to create a perception of continual subsuming beneath the undulating waves of material.

The third process controls the pattern of accentuations and is in many ways a microcosm of the transformations that govern the larger pitch collections. Like the spectral collections, the accented notes increase in number and register until their culmination in Section G, decreasing

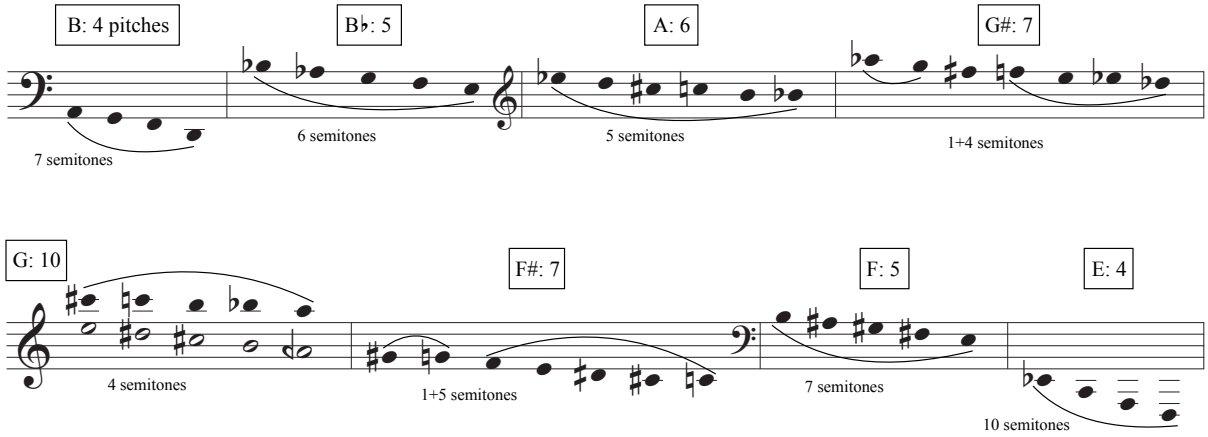
[61] Although Section F# does occupy a different register than its parallel collections, it nevertheless retains a high degree of similarity in pitch content and is deviant only to facilitate a faster descent from the climactic middle section.



Example 2.17. *Progression of accents in* Vortex Temporum II

thereafter to the end of the movement. Unlike the spectral collections, the subset of accented pitches follows a simple continuous-dynamic progression, facilitated primarily through the addition of one accent per section as the piece accelerates to Section G# (4, 5, 6, and 7), and a deceleration from ten accents in Section G by three, two, and then one accents in each of the following sections (10, 7, 5, and 4). This continuous-dynamic progression, illustrated in Example 2.17, is representative of Grisey's theory of dynamic progression, which holds that the listener will tolerate a long acceleration but not an equally long deceleration. Baillet notes that these accents are presented in descending order to create "a slower descending line in the interior of each section," thus enforcing the steady, quarter-note descent that occurs on the surface of the music with a structurally deeper and temporally expanded version of the same.[62] However, in contrast to the steady quarter-note descending line, the frequency with which these accents enter is surprisingly opaque in its surface-level patterning. The 43 quarter note beats comprised by

[62] Baillet, *Fondements d'une écriture*, 225.



Example 2.18. *Sequence of accented pitches in* Vortex Temporum II.[63]

each section (with the exception of Section E which contains 44 quarter-notes) are divided by these accents with stunning irregularity, ranging from three beats between accents to thirteen. One exception, quite striking in performance, occurs shortly after reh. 16 when two accents are played on immediately adjacent beats. Notably, this represents the point of greatest tension in the movement due to the density of instrumentation and accents, the height of register, and the acceleration of tempo which all reach their zenith in Section G.

From the start, this piece assumes a character of submersion, exemplified by a descending cello glissando that facilitates the transition from the first movement and gives way to the ubiquitous cascading inner voice of the piano. This inner voice, though progressing through the fluctuating registers of each spectral collection, continues its descending pattern with such persistence that it becomes, arguably, the archetype of the piece – one of the fundamental processes that impose their internal dynamism upon the movement as a whole. The accented note subsets embody this process as they form a descending line not only within their respective pitch

[63] This figure is based upon a similar example found in Baillet's *Fondements d'une écriture* (reproduced in Appendix 2), but contains one notable difference: Baillet misidentifies the first accented pitch in Section B♭ as B3, which causes him to overlook the process which governs interval compression and expansion in the accented note subsets.

collections, but on a larger scale as well: played in order (and ignoring changes of octave), the accents describe a consecutive collection of pitches that proceed in an ever falling spiral (Example 2.18); note that there are 43 pitches, a total which corresponds directly with the duration of each section in quarter note beats.[64] The interval that each subset of accented notes spans is gradually compressed during the piece's acceleration and expanded throughout its deceleration. That is, in Section B the accentuations span an interval of seven semitones, followed by six semitones in Section B♭, five semitones in A, and seven semitones in G# (the point of maximum density for the piano, as all accented notes are immediately adjacent on the keyboard). In this last case, if the ostinato note, F5-quarter-sharp, acts as a point of division, the accentuations can be divided into an interval of four semitones below (D♭5 to F5) and a single semitone above (G5 to A♭5). It can be noted that this slightly interpreted sequence of intervals, [7,6,5,4], is the retrograde of the number of accents in each of the first four sections, [4,5,6,7]. To carry this speculation into the second half of the movement, the accentuations which occur in Section G are separated into two groups of five notes, the top group of which is given precedence as it is the continuation of the descending line of accents; this collection spans the interval of four semitones. The next section is similar to Section G# in that it can also be divided into two intervals that straddle an F# pitch, although in this example the bifurcation is made explicit by unaccented insertion of said pitch (see Example 2.16 to confirm the presence of F#4 in the F# spectral collection). With this procedure, the intervals described by accents in Section F# are a span of five semitones below F#4 (C4 to F4), and one semitone above (G4 to G#4). Sections F and E are simpler, their accents filling intervals of seven and ten semitones, respectively. This

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[64] Baillet, *Fondements d'une écriture*, 225.

Process:	Number of descents in the piano part	Pos.	Textural density	Pos.	Tempo	Pos.
Model:	Continuous-Dynamic		Discontinuous-Dynamic		Continuous-Dynamic	

Example 2.19. *Chart of immanent processes in* Vortex Temporum II

sequence of intervals, [4,5,7,10] is, again, the retrograde of the number of accents that occupy the last four sections of the movement. All of this is done in order to facilitate the process of compression and dilation: as the piece accelerates, the intervals become more constricted and the accents denser; deceleration is the reverse of this process, but it traverses more intervallic space as the additive sequence is gradually compounded (one, two, and three semitones being added to each successive interval).

Immanent Processes:

These processes of structural pacing and pitch determination are functionally in the background, or skeleton, of *Vortex Temporum II* – providing a framework for the presentation of the more "fleshy" immanent material that will directly influence the listener's temporal perception. Achieving an effect of temporal dilation, of "slowing down" time, requires the coordination of numerous musical elements, but three parameters are relied upon more heavily than the rest, shown in Example 2.19.

As regards the piano's linear descending pattern, the process which will most affect listeners' perceptions of time is the number of descents – statements of the spectral collection from the top ostinato note to the bottom – which occur within each respective section. Baillet records this number in his formal outline of the second movement, showing that there are 6, 8, 11, 15, 7, 12, 8, 6, and 5 descents in the nine respective sections (shown to the right of each

system in Example 2.16). The first half of the movement (Sections B–G#) follows a process of additive continuous-dynamic growth similar to that which governs the accumulation and reduction of accents in its spectral collections. This is manifested as the addition of two, three, and then four descents per section as the movement accelerates to its climax (6, 8, 11, and 15 descents), a progression which is interrupted by the middle section, C, which contains only seven descents. The second half of the movement (Sections G–E) facilitates a faster deceleration by reducing the number of descents in each successive section by half; that is, by four, two, and then one (12, 8, 6, and 5 descents). Grisey's model of long acceleration and short deceleration is employed yet again in the development of this parameter, but within the context of temporal manipulation his motives behind its application finally begin to come to the surface.

When the model of long acceleration (typified in this movement by simple additive growth) and short deceleration (typified by multiplicative or compounded reduction) is engaged within the parameters of this movement, the perceptual phenomenon contrasts sharply with its employment in the rapid outer movements. The primary cause of this contrast is that the archetype of this movement, the slow, steady pulse of the piano's descending line, is incredibly static; its rhythm and direction are fixed and predictable in the listener's ear. Thus, when the long acceleration begins, the effect is like trying to push a heavy object: there is an inertia that resists accumulating momentum as time is brought, somewhat uncomfortably, from a point of suspension to one of motion. "Through acceleration," Grisey says, "the present is made more dense," but in the case of this movement, density and propulsion are resisted furiously, eager to return to stasis like the Sisyphean stone. Therefore, when the familiar model is here employed, it is to better accentuate the movement's static quality. The perceptual results of this stasis, and, I

would argue, the *Gestalt* of this movement, are related in "Tempus ex Machina": "a series of extremely predictable sound events gives us ample allowance for perception. The slightest event acquires an importance. Here, *time has expanded.*"[65]

The second parameter that Grisey manipulates to effect temporal dilation is texture. After the remnants of the Interlude have faded away, only the piano and solo bass clarinet are left, the latter sustaining its lowest available pitch, B♭1. As the first half of the movement progresses, the texture around the piano is gradually thickened by the addition of instruments on a single pitch doubling and by the addition of entirely new pitches. Section C, predictably, interrupts this process of accumulation by excluding all instruments except the piano. The process by which texture is altered in the second half of the movement is much less linear, with close examination revealing a discontinuous-dynamic model of progression. In this context, harmonic density (the number of unique pitches sounding in addition to the piano's descents) has a greater perceptual effect than simple textural density (the total number of instruments sounding at any given time), the latter resulting primarily in a simple change of timbre and volume. Setting the piano part momentarily aside, Example 2.20 is therefore formatted to illustrate the gradual progression of harmonic density by recording the average number of unique pitches sounding between each rehearsal marking. The contrast between the progressions governing each half of the movement becomes quite obvious as the hyperbolic growth of the first half is compared with the dual hyperbolic decay of the second half (represented by dotted lines in Example 2.20). In other words, rather than simply allowing the movement to decay in a symmetrical hyperbolic regression from section C, the process of decay is obscured by the use of two distinct

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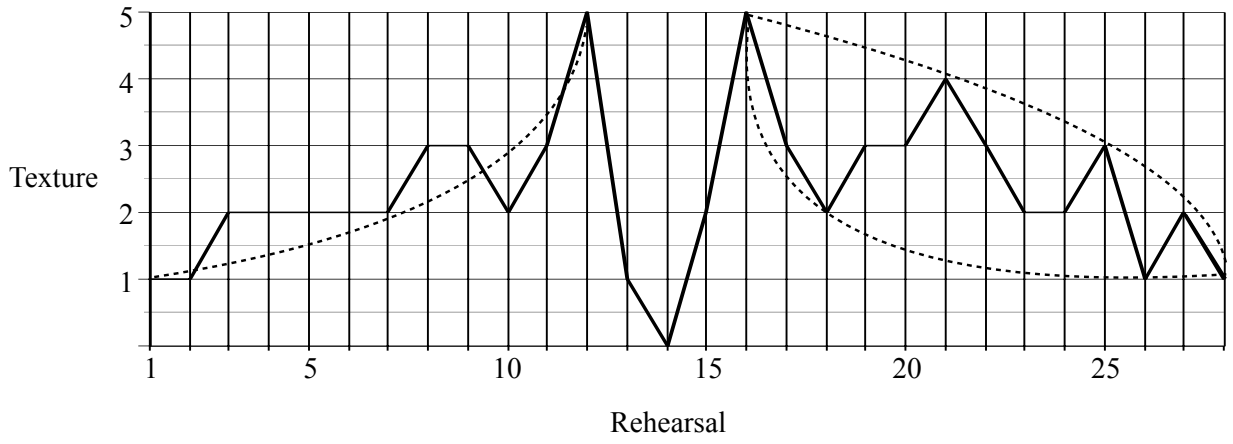
[65] Grisey, "Tempus ex Machina," 259.



Example 2.20. *Graph of textural progression in* Vortex Temporum II[66]

progressions beneath the surface-level fluctuations: the first is a gradual decay (5, 4, 3, 2, and 1 voices at reh. 16, 21, 25, 27, and 28, indicated by the top dotted line) and the second is a sudden decay (5, 2, and 1 in reh. 16, 18, and 26, indicated by the bottom line). The alternation between these two progressions is a clear example of the discontinuous-dynamic model, wherein two continuous-dynamic processes are juxtaposed in order to obscure any perception of continuity. Despite the complexity of the second half of the movement, the peaks at reh. 12 and 16 are symmetrically embedded in the textural structure, their approach being described by the pattern: -2, -1, +1, 0 alterations per rehearsal mark, working outward. This contrasts with the surface-level variance between the outer parts of the movement (reh. 1-8 and reh. 20-28) and isolates the climactic middle as a discernible unity.

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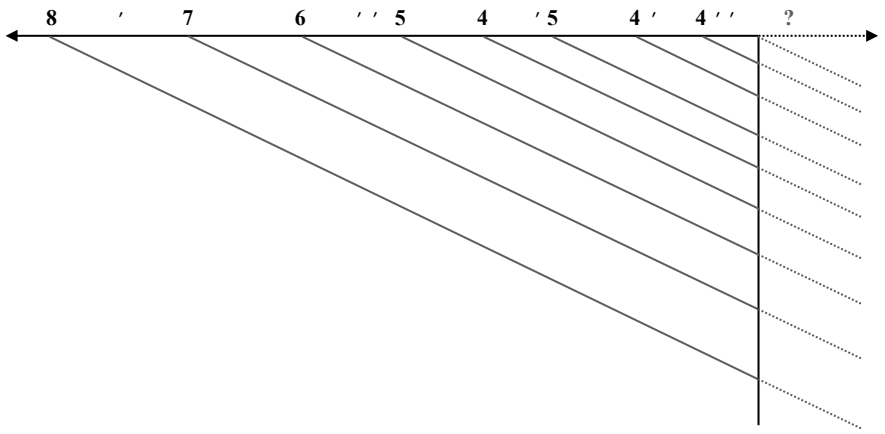
[66] In compiling the data for this graph it was necessary to interpret one textural data point per rehearsal number, resulting in a generalization of the minor fluctuations that occur between two rehearsal numbers and determining an average textural density for that span. The graph can also be somewhat misleading in that it seems to imply that textural alterations coincide with each rehearsal number, which is not necessarily the case in the score. Nevertheless, these generalizations are not so severe as to compromise the graph as an accurate representation of textural progression. Three textural changes are excluded as they occur very briefly within the context of a span that is otherwise texturally homogenous: an increase to four voices at reh. 10, an increase to four voices shortly after reh. 19, and an increase to three voices shortly after reh. 25. Also, as this graph is intended to portray the growth and decay of harmonic texture, not that of timbre or volume, instruments that double the same pitch are interpreted as comprising only one textural layer.

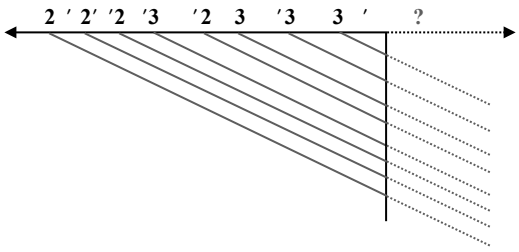
While the piano's descents facilitate temporal dilation by bringing the global process of acceleration into tension with its slow, highly predictable line, the perceptual effect of the harmonic texture is somewhat more direct. The textural thickening in the first half of the movement works in congruence with the process of acceleration by proportionally increasing as the climax draws nearer; this conforms with listeners' expectations regarding standard musical progression and consequently has little ramification on their temporal perception. By contrast, the textural thinning in the second half is brought into tension with the long acceleration/short deceleration model by juxtaposing a process of gradual decay against the expected process of sudden decay. This has the perceptual effect of prolonging the textural dissipation of the movement, thereby frustrating the listener's expectations and creating what Grisey described as "a sort of expectancy in the void of the present."[67] According to the familiar model, the process of deceleration should be short in order to sustain the listener's attention, but Grisey's subterfuge induces a state of temporal dilation as the listener is made to attend to a gradual decay of sound wherein their anticipations are no longer acknowledged as useful or even pertinent.

It should be noted at this point that while many other parameters, such as the growth and decay of ostinati subsets, spectral collection size, and accent interval density, all align with the long acceleration/short deceleration model, most of these parameters have little direct influence on temporal perception. They operate within the model to better facilitate a proportional structure, but the temporal experience of listeners will not be greatly influenced by the size of spectral collections or by the addition or subtraction of a couple of ostinato notes. One exception might obtain for the number of accents within sections, since the contraction of time between

[67] Ibid., 249.



Example 2.21a. *A model of consciousness for the piano descent entrances in Section B♭.*



Example 2.21b. *A model of consciousness for eight piano descent entrances in Section G.*

discrete events certainly has temporal ramifications (per Example 2.2), but an examination of the score shows that the accents occur with such irregularity that any significant effect on temporal perception is doubtful. Even as regards the linear descents of the piano, their temporal influence extends primarily to the relative proximity of entrances; new iterations of the linear descent take precedence and the remaining active lines are submerged and relegated to textural inner voices. Because the entrances of these linear descents and the relative density of harmonic texture are very clearly perceptually positive, they are significantly more capable of having an influence on temporal experience than the other pitch-related parameters. Example 2.21a presents the eight points of initiation for the piano's linear descents in Section B♭, with the numbers on the temporal continuum representing the number of quarter note beats between each entrance. Tick

marks have been included to approximate points of attack for all of the other instruments. Although the irregular interval between descent entrances makes for tenuous predictability regarding future entrances, the density of events on this flux of consciousness is such that the musical texture is quite comprehensible. By contrast, the first eight descent entrances of Section G are presented in Example 2.21b, on a model of consciousness that is to scale with that of Section B♭. The greatly accelerated pace with which the piano descents enter make for a much denser temporal continuum and a less readily perceived musical texture. The large amount of information that is presented to listeners at this point of climax is intended to disrupt the experience of extreme regularity that has previously characterized the movement and create, through the listeners' disorientation, a more malleable temporal awareness – one which is exploited to great effect by the process that governs tempo in the second half of the movement.

The fluctuations in tempo that dominate the second half of the movement arguably play a greater role in the manipulation of temporal consciousness than any process discussed thus far. Here, finally is an explanation for the abrupt cessation in Section C of all the musical processes that had been accelerating toward the climax: this section acts as a point of formal division between the grinding acceleration of the first half of the movement and the dynamic, prolonged deceleration of the second half. Although many of the same processes are at work in reh. 13-27 as in reh. 1-13, the prevailing characteristic in the second half of the movement, the quality which is unavoidably faced by the listener, is the fluctuation of tempo. The process by which tempo fluctuations are incorporated is fairly simple: shortly after reh. 13, a pattern of tempo acceleration begins, starting with a baseline of of ♩= 50 and accelerating to ♩= 90 before

returning to ♩= 50.[68] This pattern repeats two more times, increasing the peak tempo by 20bpm until ♩= 130. From this point, occurring at reh. 15, the pattern repeats seven more times with the peak tempo decreasing by 10bpm until the movement's conclusion at a stable ♩= 50. It is important to note at this point in the analysis that Grisey has well-defined ideas about the role of tempo in his compositional language: "The tempi in my music seldom have a structural value. More often, they serve to compress or expand a musical sequence, and it is therefore the total duration of this sequence which is structurally important, and not the unit of measurement."[69] Therefore, an understanding of the global effect of tempo fluctuations in this movement should be the analytic goal, the most salient feature of which is their influence on the expansion of the musical sequence, in time.

The disorienting effect of an irregular pulse on listeners' perceptions is described by Grisey:

> If, therefore, the pulse is not expressed, we will remember that only a few simple rhythms make the perception of a virtual pulse possible, whereas others disguise it for the sake of ambiguity and the mesmeric feeling of pure duration, without a reference point. *In the latter case, in the absence of any standard, each duration can only be compared with that/those preceding it,* and our apprehension of the durations is thus more global and more relative.[70]

Therefore, the fluctuations of tempo function to suspend the regular quarter-note pulse of the first half of the movement and relativize the listener's experience of duration; the consequence of which is that reh. 16-27 seem to expand in time when compared to reh. 1-13, although they

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[68] While in the score it appears that this acceleration is to half-note = 90, in his notes Grisey explains that "the tempo is always indicated for the quarter-note." This is a rather curious feature of the score for the second movement, for there are several tempo markings for half-note and dotted half-note tempi, but they are consistently treated as being for the quarter-note, due to Grisey's explanatory note.

[69] Grisey, "Tempus ex Machina," 242.

[70] Ibid., 242.

occupy similar temporal spans (roughly 4 minutes, depending on the performance). The expansion of time is further accentuated across the movement by the fact that the tempo baseline is always 50bpm, which approximates the average heart rate of a sleeping person but is slightly below the average heart rate of one at rest. Although this may be coincidental, the effect is that the piece moves at a pace that is very slightly uncomfortable and out of time with the physiological rhythm of the listener – slowing time by an increment so slight that it will probably be noticed only subconsciously. Then, with the introduction of the tempo fluctuations, the experience is altered to that of rushing forward before immediately beginning a protracted return to a state of complete rest; with the exception of two (at reh. 13 and 19), every tempo fluctuation follows this pattern of a short acceleration and a long deceleration.

Grisey once wrote about the way in which music shapes the world of the listener, both as a reflection of the listener's physiological experience of *being* in the world and as an invitation into the *other*worldly space that the music occupies:

> If and when it takes place, music - and with it the artificial time that gives it life - envelops us like a kind of amniotic liquid. With nothing to muffle our ears, we remain open and receptive. Violent once more, it induces ecstasy or repulsion, or in the worst case indifference.
>
> What will be inscribed on our memory will be precisely these corridors, these transmissions, these coincidences which sometimes establish themselves between our sense of time and that of the composition.
>
> These transfigured moments of time fulfill us to the point of ecstasy since they are, at a given moment, exactly the fulfillment that our "emptiness" requires, or the vertiginous vacuum to which our body, saturated with physiological rhythms, would aspire…
>
> Real musical time is only a place of exchange and coincidence between an infinite number of different times.[71]

[71] Gérard Grisey, "Tempus ex Machina: A composer's reflections on musical time," *Contemporary Music Review* 2/1 (1987), 273-274.

From background conception to immanent realization, *Vortex Temporum II* explores the extreme limits of dilation in an effort to manipulate listeners' sense of duration and pacing. Although the extent to which time can be stretched in a human's perception has definite limits, Grisey attempts to create a slow-motion musical environment in which the languorous, protracted motion of whales is experienced, to some degree, by listeners. Through the careful combination of structural and immanent processes, the concept of dilation is projected into every layer of this movement's construction; the result is a high degree of short-term predictability and an extended process of deceleration, thus allowing listeners to closely attend to the progression of events but delaying the final point of closure. To make a simple analogy, it is like taking a long plane ride but being made to wait as the plane endlessly circles the destination, waiting for a cleared runway: the tangible proximity of completion makes the process of deceleration unaccountably prolonged in the temporal experience of the passengers (or, listeners). Just so, *Vortex Temporum II* seems to cascade in never-ending spirals, the music of the present being submerged continually beneath overlapping layers of piano sequences and swelling, instrumental tones. Conclusion is delayed and the process of deceleration is brought, magnified, to the forefront of listeners' perceptions, coercing them into setting aside their own physiological rhythm and putting on instead the dilated time of the music. When the movement finally reaches its end, the experience is anything but conclusive, leaving listeners with a suspicion that the protracted journey of the movement was but an illusion and that, in the words of T.S. Eliot, "In my end is my beginning."[72] Set between the fragmented and active outer movements, Movement II seems to be a point of extended repose, the axis about which the macrocosm of *Vortex Temporum*

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[72] T.S. Eliot, *Four Quartets* (New York: HBJ Publishers, 1943), 32.

rotates: to quote again from the *Four Quartets*, this movement is "At the still point of the turning world," where "Time past and time future / Allow but a little consciousness," for "To be conscious is not to be in time."[73]

[73] Ibid., 15-16.

III

Triadic Memories: a closer look at retention and memory

Morton Feldman on time

Referencing his compositional approach to *Triadic Memories* (1981), Morton Feldman once wrote:

> There is a section of different types of chords where each chord is slowly repeated. One chord might be repeated three times, another, seven or eight – depending on how long I felt it should go on. Quite soon into a new chord I would forget the reiterated chord before it. I then reconstructed the entire section: rearranging its earlier progression and changing the number of times a particular chord was repeated. This way of working was a conscious attempt at "formalizing" a disorientation of memory. Chords are heard repeated without any discernible pattern. In this regularity (though there are slight gradations of tempo) there is a *suggestion* that what we hear is functional and directional, but we soon realize that this is an illusion; a bit like walking the streets of Berlin – where all the buildings look alike, *even if they're not*.[1]

I will return to this passage for guidance in my analysis of *Triadic Memories*, but I put it here, at the beginning of the chapter, to illustrate Feldman's profoundly idiosyncratic approach to the process of composition. As someone who, throughout his life, allowed an extraordinary number of interviewers to record his thoughts and opinions on music composition – a bulk of literature

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[1] Morton Feldman, "Crippled Symmetry," in *Give My Regards to Eighth Street*, ed. B.H. Friedman (Cambridge, MA: Exact Change, 2000), 137-38.

which was supplemented by a prodigious quantity of his own, original writing – Feldman presents scholars with a vexing array of disparate, and occasionally contradictory, statements about his musical philosophy. Nevertheless, a systematic purview of Feldman's ideas on the confluence of time and memory in his music reveals a conception that is satisfactorily consistent.

Inspired by his close acquaintance with the school of abstract expressionist painters who flourished in New York from about 1940 to the late 1960s, Feldman liked to refer to his works not as compositions, but as "time canvases in which I more or less prime the canvas with an overall hue of music"; the implication of this terminology is that Feldman considered the musical contents of a composition to be coextensive with the temporal framework within which a piece operated.[2] In other words, there are two operative components in his compositions: one is the objective, measured span of time that each piece should occupy – just like the fixed dimensions of a painter's canvas – and the second is the compositional material itself. One of Feldman's many paradoxes is the way in which he handled this former component. On one hand, Feldman spoke of music which, like the paintings of Cézanne and those of the abstract expressionists, "has surface" – a quality which he described as the disappearance of representation and organizational principles in deference to "something more immediate in its insistence on the picture plane."[3] Translated to the aural plane, "music that has a surface *constructs* with time. A music that doesn't have a surface *submits* to time and becomes a rhythmic progression."[4] What is this time-object with which the composer constructs?: musical material that exists not "by way

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[2] Morton Feldman, "Between Categories," in *Give My Regards to Eighth Street*, 88.

[3] Ibid., 84.

[4] Ibid.

of Time, *in* Time or *about* Time, but…*as* Time."[5] In the previously-cited passage regarding *Triadic Memories*, these time-objects are the chords which occupy each successive sliver of time in the composition's total duration.

So Feldman was, maybe more than any other composer of his generation, concerned with the construction of musical time. On the other hand – and here the paradox is introduced – Feldman also spoke of his distaste for composers who subdivided time so that they could "handle and even parcel [it] out."[6] He viewed this as an artificial construction, a passing off of t*iming* as a substitute for unstructured time – the painterly equivalent might be the illusion of perspective and depth achieved in the Renaissance with chiaroscuro. While the use of rhythmic units facilitates the presentation of a subject (such as Beethoven's *Eroica* theme), it reduces time to bundled, measurable increments and, in so doing, confines it within the bounds of the chronometric; Feldman quipped, in his characteristic, off-hand way, that "this approach to Time bores me. I am not a clockmaker."[7]

Returning to the two components that constitute a musical work for Feldman, the time-canvas and the musical material, it becomes increasingly difficult to discern at which point these two things diverge. It seems that musical material *is* time-object – with all the idiosyncratic, indefinable qualities that Feldman ascribes to it – and that the time-canvas is simply the unobstructed outgrowth of said time-object. In fact, many of Feldman's compositions take on such an aspect, in which a granular piece of material is organically proliferated into a vast and undifferentiated field of sound. His closest equivalent in the visual arts, in my estimation, would

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[5] Ibid., 86. (Emphasis original to the text)

[6] Ibid., 87.

[7] Ibid.

be Rothko, who "discovered that the surface [of a painting] did not have to be activated by the rhythmic vitality of a Pollock to be kept alive – that it could exist as a strange, vast, monolithic sundial, so to speak, with the exterior world reflecting upon it still another meaning – another breathing."[8]

It may not be apparent what the precise difference is between musical material as conceived traditionally (by a composer like Beethoven) and Feldman's rather more esoteric conception, so a closer look at what constitutes a "time-object" is likely in order. Feldman was careful, while writing, never to leave the domain of sound for the domain of "composition"; this attitude manifested quite literally in his refusal to abandon the piano for the writing bench, which he considered a philosophical shift from interacting immediately with the sounds "in themselves" to adopting the precompositional planning that typified much of European music during his life. Like the abstract expressionists, Feldman tried to remove representation from his music and allow sounds simply "to be," which resulted in the realization that "any desire for differentiation must be abandoned…all the elements of differentiation were preexistent within the sound itself."[9] Thus, in contrast to a horizontal series of events such as a tone-row, a melodic theme, or the complex network of events which constitute linear development or form – all of which rely on the possibility of differentiation for the establishment of identity and sequence – Feldman proposed that sounds, once invoked, simply be left alone. This is, of course, an overly simple way of prescribing a complex aesthetic ideology in which the composer takes on an auxiliary

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[8] Ibid., 84.

[9] Morton Feldman, "Vertical Thoughts," in *Give My Regards to Eighth Street*, 12.

role with regard to his material and, by way of subtle manipulation, draws out the nuance of each time-object.

In Feldman's *œuvre* these time-objects tend to be fragmentary collections of intervals or sonorities with no clear rhythmic identity and no one definitive iteration that represents their primary form. As such, each presentation (or re-presentation) of the object seems to be constantly referring to prior instantiations (which themselves refer to even earlier instantiations, for there is no primary event from which they can all conclusively be said to derive) and at the same time to represent, as present, the *idealized* form of the time-object – the result of a long process of "becoming." The existence of an ideal time-object is an illusion, however, "because even when remaining completely unchanged in notation, the sound object changes over time in perception."[10] Neither is Feldman's music fundamentally concerned with the backward-referring nature of the time-object – this is made clear by the fact that Feldman himself "forgot" the past event even while composing the present – but rather with its present content and its status as an object of perpetual change and duration: an entity with a pattern of existence not unlike the life-cycle of a living organism. In this, Feldman aligns himself with the phenomenological prioritization of the object-as-perceived over the object-in-itself and encourages listeners to remain in a fixed posture of attention with regard to the present moment. When maintained, this mode of listening to the never-ending stream of identical or near-identical time-objects will effect a "potentially infinite receding of the temporal horizon," a succession of retentions which

[10] Herman Sabbe, "The Feldman Paradoxes: A Deconstructionist View of Musical Aesthetics," in *The Music of Morton Feldman*, ed. Thomas Delio (Westport, CT: Greenwood Press, 1996), 12.

"proceeds against and at the same time posits – another of its paradoxes – the limits of the reactivation of the past."[11]

Practically, this compositional approach results in musical works that are extraordinarily long and, in Feldman's terms, allowed to "die of old age."[12] In this extremity of duration the previously cited paradox is activated via the dual confirmation and denial of accurate recollections of global scope: because of the uniformity afforded by the presence of a single time-object throughout the piece's duration, listeners' retentions and memories are constantly being refreshed (or replaced) with each new iteration of the time-object; but, due to the lack of a primary event – a single object to which each iteration would refer – recollection seems devoid of content and utterly incapable of locating discrete events within the work. The effect is not unlike the bizarre experience of *déjà vu*, during which the individual has a vague impression that "I have done this before," but has no actual referent in their past that would allow for the location and justification of the phenomenon. Similarly, in some of Feldman's longest pieces, listeners are being continuously provided with the phenomenological data for recalling events that occurred even hours before the present moment, but are ultimately impotent with regard to the actual act of recollection.

Feldman spoke in the opening passage of "'formalizing' a disorientation of memory," a process which, it is hoped, has been elucidated somewhat by the preceding discussion.[13] What remains to be articulated, however, is the means by which Feldman allows time-objects "to be"

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[11] Ibid.

[12] Morton Feldman, "Darmstadt Lecture: 26 July 1984," in *Morton Feldman Says: Selected Interviews and Lectures 1964-1987*, ed. Chris Villars (London: Hyphen Press, 2006), 205.

[13] Feldman, "Crippled Symmetry," 137.

for such extended periods of time and how exactly the "formalization of disorientation" takes place. Feldman considered the traditional usage of "musical forms and related processes" to be "only methods of arranging material" that "serve no other function than to aid one's memory."[14] Indeed, all precompositional strategies are sworn off as banal, uninspired, and limited in scope to relatively short pieces; rather, Feldman relies on artistic intuition and, fundamentally, his power of concentration:

> …to get through a big piece, you don't come with any kind of prearranged schema; you just find ways to survive in this big piece. And the most important survival kit is concentration…I'm involved in keeping the thing going, but not necessarily via its implications. So, if you're not going to be involved with the implication of your material, how do you keep it going?…I feel that the moment, the *rightness* of the moment, even though it might not make sense in terms of its cause and effect, is very important…I'm not interested in the aspect of completing, or satisfying a need to make what we think is that terrific, integrated piece of music…there's no need for me to finish the piece in terms of anyone's expectations, which include my own.
>
> …in writing a long piece, I would make curious moves but only for the *moment*… So what happens in a long piece is that sooner or later you go through the whole parameter [*sic*] of possibilities, and everybody's going to get something out of it, I'm sure. The form of a long piece is more like a novel – there's plenty of time for everything.[15]

Divested of the logic that a "cause and effect" progression affords, Feldman locates two primary means by which the "rightness of the moment" can create its own organic logic within a piece: change and reiteration.[16] Reiteration has already been discussed obliquely, by way of the "succession of retentions" which provide cohesion to large sections of the piece through time-object uniformity. The process of introducing change is where concentration becomes a truly

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[14] Feldman, "Crippled Symmetry," 137.

[15] Tracy Caras and Cole Gagne, "Morton Feldman *Soundpieces* Interview: 17 August 1980," in *Morton Feldman Says*, 92-93.

[16] Michael Whiticker, "Morton Feldman: Conversation without Cage: 25 July 1984," in *Morton Feldman Says*, 186.

vital function for the composer, whose primary role is to determine "which pattern should be reiterated and for how long, and on the character of its inevitable change into something else."[17] Change, therefore, is the gradual transformation of one time-object into another by way of minute variation – a subtle manipulation over time which works closely with reiteration to enforce global continuity, promote "deep" listening (the ability to listen closely to the quality of the sounds in themselves rather than their relation to each other in thematic/formal settings), and ultimately, to effect a disorientation of memory.[18] In a discussion about *String Quartet II*, Feldman claims, somewhat paradoxically, that both reiteration *and* change can, simply by themselves, be responsible for the disorientation of memory:

> Actually now [1975] I just try to repeat the same chord. I'm reiterating the same chord in inversion. I enjoy that very much, to keep the inversions alive in a sense where everything changes and nothing changes. Actually before I wanted my chords in a sense to be very different from the next, as if almost to erase in one's memory what happened before. That's the way I would keep the time suspended…by erasing the references and where they came from. You were very fresh into the moment, and you didn't relate it. And now I'm doing the same thing with this relation. And I find it also very mysterious…[19]

It seems that both the act of reiteration (of a single chord with only changes of inversion) and the act of change (of successive chords in so radical a manner that they are unrecognizable, one from

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[17] Feldman, "Crippled Symmetry," 140.

[18] Feldman also refers regularly to his intuition-based method of introducing completely new material, the precedent for which he locates in Beethoven: "He wasn't interested in compositional ideas; he was listening to this damn thing and something enabled him to come up with the idea, 'Let's throw in another one!,' even though it was unprecedented. 'Let's put another tune in here.' That's the way I work." (Morton Feldman, quoted by Paula Kopstick Ames, "Piano (1977)" in *The Music of Morton Feldman*, 101.) It should be noted that this procedure is distinct from the aforementioned process of change, which operates by gradually manipulating a single, ubiquitous time-object.

[19] Walter Zimmerman, "Conversation Between Morton Feldman and Walter Zimmerman: November 1975," in *Morton Feldman Says*, 52.

another) can effect the erasure of one's memory; too much relation or too little relation results in temporal suspension.

Reiteration and change operate slowly upon the fragment of musical material that constitutes a time-object, progressing largely at the composer's whim; however, two processes, in a very conventional sense, can be found to operate over sections of long duration in Feldman's music. The first has been mentioned already: the process of allowing sounds to "die of old age." This metaphor translates practically into a gradual reduction of pitch or interval content over the course of a work. In the upcoming analysis of *Triadic Memories* this process will be shown to manifest as the reduction, one pitch at a time, of the set [012367] to [0123], by the piece's end. The second process has only been alluded to: the tendency of each form of a time-object to be reiterated with subtle changes until its gamut of possibilities has been exhausted.[20] Obviously, it would be impractical to use every conceivable iteration of a pitch set, even in works of such extreme duration as Feldman's. Therefore, to limit the scope of variation, time-objects are given pitch-class and rhythmic identities that remain consistent for large sections of a piece; change occurs by way of the subtle manipulation of pitch-order, rhythmic fluctuation, register, and layering (the gradual transformation of harmonies into melodies, and vice versa). Thus, pattern completion, though not always operative in an exhaustive way, plays a role in the construction of a piece.

Before embarking on an analysis of *Triadic Memories*, one more passage from Feldman merits being quoted at length – if not for the insight it affords to his compositional process, then

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[20] Gagne and Caras, "Morton Feldman *Soundpieces* Interview," 93.

because of its poetic merit and its reference, through analogy, to the nature of the interaction between time and music:

> Christian Wolff once remarked that eventually everything becomes melody. This is true. Time does untangle complexity. We are eventually left with the one-dimensional – with the face of the clock rather than the workings of its inner parts. Time in relation to sound is not unlike a sundial whose enigmatic hand travels imperceptibly throughout its journey. But if sound has as its nature almost being nature, let us then observe our sundial in those moments when there is no longer sun, yet abundant light. Paradoxically, it is at this moment that time is less elusive. All shadows have left, leaving us a weathered object. In these moments time itself becomes less perceptible as movement, more conceivable as an image. In the former case our time-sound is in full scrutiny of measured light, soon to become the fixed stare of melody. In the latter, time has transfixed itself within the sound. There is still movement – but it has become nothing more than the breathing of the sound itself.[21]

In other words, by precluding the measurement of passing time through reference to an external object – such as the directional "fixed stare of melody," a functional harmonic progression, or a form – time itself becomes exposed as the object of observation: rather than presenting musical objects within the framework of time, sound in itself becomes the object from which time emanates. The time-object, as a musical idea with inherent temporal qualities but no capacity for marking time in the way afforded by traditional thematic material, determines more than just the notational practicalities of the musical surface; it becomes the primary means of temporal expression for the entire work.

Analyzing Feldman

Feldman's music poses a few challenges to the theorist who hopes to accomplish anything resembling a systematic analysis. For one thing, Feldman himself seemed resistant to

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[21] Feldman, "Vertical Thoughts," 12-13.

the rationalizing effect of analysis, where the vitality and unpredictability of musical material is scrutinized until it becomes sedate and predictable. Speaking rhetorically to his interviewer, Feldman once mused on the analyst's conception of uncertainty:

> I would like to know…whether [musical analysts] themselves can hear it – or whether they feel it [detracts from] the piece or adds a kind of mystery to the piece – keeps it alive, so to speak. I want to know to what degree predictability is a virtue.[22]

For Feldman, a lack of predictability was one of the most vital features of his music – a quality which he believed could be achieved by formalizing a disorientation of memory. In the opening quotation of this chapter Feldman detailed how, after writing a section of *Triadic Memories* characterized by the seemingly arbitrary reiteration of chords, he proceeded to repeat the entire section, avoiding too high a degree of predictability by "rearranging its earlier progression and changing the number of times a particular chord was repeated."[23] Elsewhere, in reference to *Why Patterns?* (1978), Feldman explained that:

> Repetitive chordal patterns might not progress from one to another, but might occur at irregular time intervals in order to diminish the close-knit aspect of patterning; while the more evident rhythmic patterns might be mottled at certain junctures to obscure their periodicity.[24]

Yet, again, Feldman is attempting to obscure the manner in which his music is constructed so that periodicity might be reduced in the listeners' perception. Clearly, the conventional role of the analyst is fundamentally antagonistic to Feldman's aesthetic goal: in uncovering the logical – and therefore predictable – progression of his music, the analyst must rationalize (normalize,

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[22] Feldman, quoted by Ames, "Piano (1977)," in *The Music of Morton Feldman*, 101. (Brackets are original to the text)

[23] Feldman, "Crippled Symmetry," 137.

[24] Ibid., 141.

formalize, quantize, etc.) what is intentionally crafted to be irrational (abnormal, informal, indefinable, etc.).

However, the phenomenological project, by emphasizing the perceiver before the percept, furnishes a "back door" into Feldman's music. In setting its analytical sights on the perceptual experience of listeners and, by consequence, subjugating the conventional, intra-musical aims of music analysis to the elucidation of this final, extra-musical goal, the phenomenological approach provides a systematic way into the music while still operating within Feldman's aesthetic paradigm. The analysis to follow will proceed according to this objective, using the tripartite model of time-consciousness, as expounded by Husserl, to describe the perceptual effect of *Triadic Memories* upon listeners' temporal awareness. Although ostensibly similar to my earlier analysis of *Vortex Temporum* – at least in respect to their shared teleology – the compositional language of *Triadic Memories* represents so radical a shift from Grisey's spectral idiom that many of the analytical mechanisms used the former analysis must be significantly altered for the present purposes. To be retained are the concepts of event-type, layering, and perceptual positivity/negativity; no longer applicable are the models of progression, or, obviously, any of the operations that are native to the spectral idiom.

Because of the immediacy of Feldman's music – where no single moment or event can be said to have primacy over any other – it seems obligatory to give due diligence to every moment-to-moment repetition and transformation that contributes to the global perception of the temporal-continuum. However, in a piece the length of *Triadic Memories* (49 pages in the printed score), this can prove daunting and, quite frankly, tedious. The theoretical part of this analysis will therefore attend most closely to the passages where transformation or progression

are perceptible and give only summary descriptions of the vast swaths of material that constitute the more stable, repetitious sections of the music. These latter passages will, however, feature prominently in the phenomenological part of the analysis, which is primarily concerned with the global effect of the work on listeners' temporal perceptions.

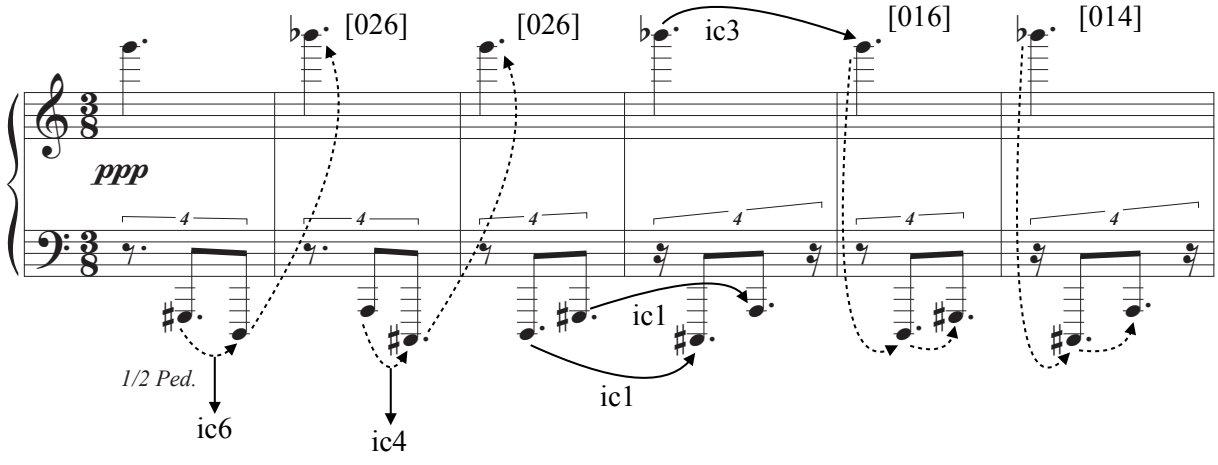
On the quality of timelessness in *Triadic Memories*

Feldman's predilection for using very limited intervallic material is particularly evident in the late piano works; the nearly ubiquitous use of sparse texture and extreme duration in this part of his catalog is intended to magnify and extend intervals through time, thereby lending a quality of autonomy to his musical material. A single hexachordal set class supplies the interval content for *Triadic Memories*, with each successive section highlighting a unique subset or interval class from the generative set. The theoretical aim of this analysis is to demonstrate how the [012367] hexachord is prolonged by its transformation and redistribution into unique subsets, and ultimately, how its possibilities are gradually exhausted until it "dies of old age." The phenomenological aim of this analysis is to describe how these two processes contribute to a disorientation of memory and, subsequently, an experience of timelessness in the perception of listeners.

Section 1:

The first section of the piece begins by alternating between two motivic cells that are identical in terms of their interval content, contour, and general rhythmic identity (event-type A). As a direct result of their similarity, which is omnipresent for the first four pages of the printed

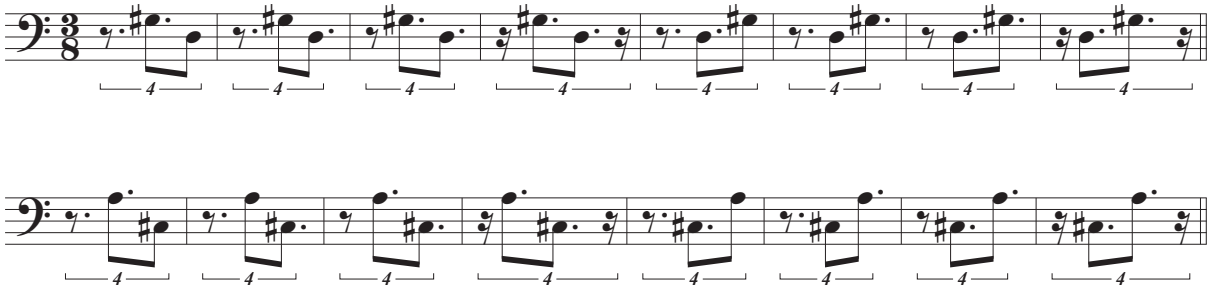
score, the subtle distinctions between the two cells and the processes to which they are subjected are the most perceptually relevant components of the first section. Example 3.1 reproduces the first six measures of the piece, illustrating three ways of parsing the interval content by using dotted arrows to indicate trichordal pitch set groupings and solid arrows to indicate dyadic interval-class (ic) groupings. The most obvious approach is probably to group by discrete measures (shown in mm. 5-6 of the example): combining G in the treble clef with G# and D in the bass clef for the set class [016] and B♭ with A and C# for the set class [014] – note that both cells feature ic1, an interval which is also emphasized in the pitch order of the first two measures through the adjacency of G–G# and B♭–A. Although these sets will become momentarily significant much later in piece, their influence is not of immediate consequence here. Another viable option, grouping by register (mm. 3-5), produces ic3 between G and B♭ in the upper layer and ic1 between G#–A and C#–D in the lower; again, these intervals will acquire significance in later sections of the work. The final grouping, not necessarily intuitive from the score's layout, becomes quite evident when listening to a performance of the work: by hearing each pair of



Example 3.1. Triadic Memories*, mm. 1-6.*

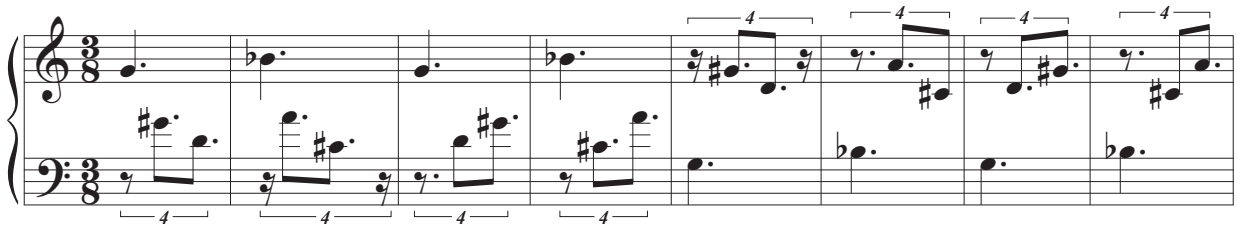
pitches in the bass clef as preparing the subsequent pitch in the treble clef, – thus ascribing to the the loose triple meter an anapestic rather than dactylic patterning – the grouping of G#–D–B♭ and A–C#–G produces two members of set class [026] (mm. 1-3). Not only does this interpretation garner favor solely in light of its perceptual prominence but, as will be seen, the entirety of the first section is characterized by the prominent use of interval classes 2, 4 and 6. The first event-type (A) of *Triadic Memories* are the two [026] sets and their aggregate, the [012367] hexachord, is the piece's "time-object."

There are two main processes at work in the first section of *Triadic Memories*: 1) in Section 1.1[25] (mm. 1-100) the rhythmic possibilities of event-type A are twice exhausted and 2) in Sections 1.2 and 1.3 (mm. 101-117 and 118-140), [012367] is redistributed into a different collection of subsets. The variables of pattern completion in Section 1 are the two orderings of the dyadic layer of the [026] sets, [G#–D]/[D–G#] and [A–C#]/[C#–A], and four distinct rhythmic profiles (presented successively in the first four measures of the piece), making for a total of sixteen possible permutations (Example 3.2). There is no discernible pattern for the way



Example 3.2. *Eight possible permutations of event-type A.*

[25] I will use this nomenclature for designating discrete subsections in the larger sections of the work. While large sections are defined primarily by the ubiquity of a single hexachord, subsections are identified through their repetitive use of unique and recognizable motivic cells. In some cases, the motivic cells are so pervasive that they merit being labeled as event-types – this occurs primarily in the stable first subsections of each larger section.

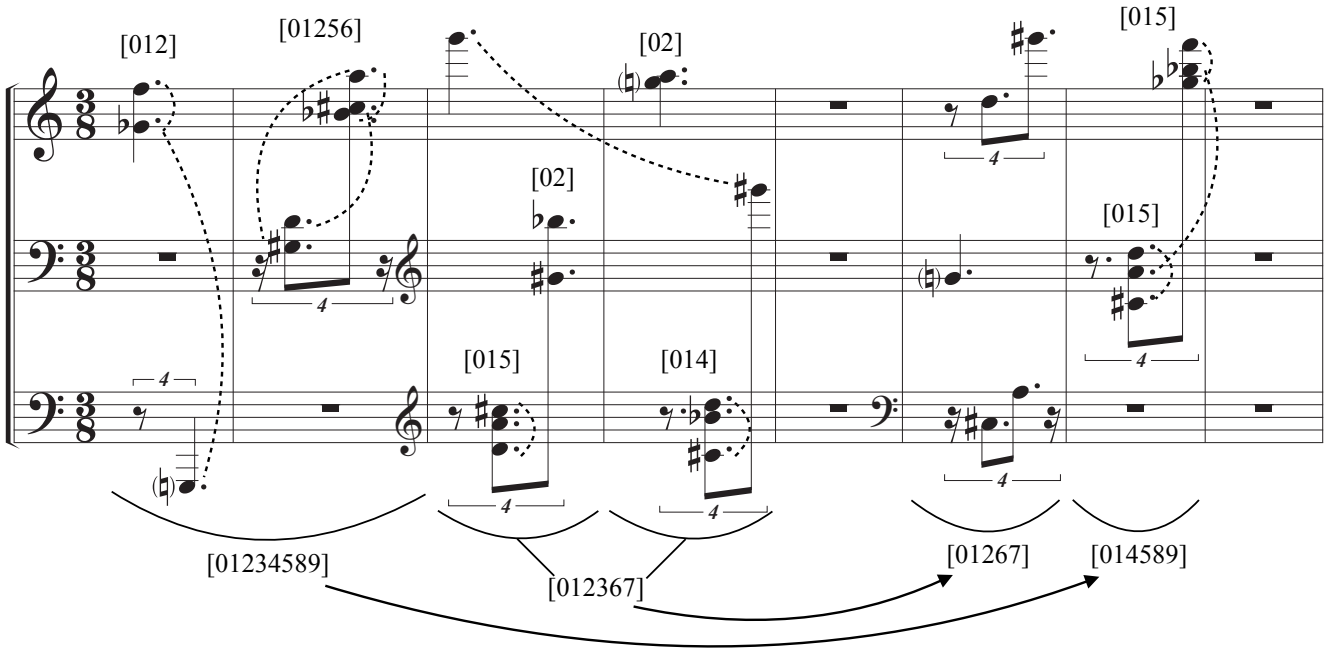


Example 3.3. Triadic Memories, mm. 47-54.

in which these possibilities are instantiated in the measure-to-measure progression of the music, but the incorporation of new permutations happens slowly, taking place over fifty measures. Concurrent with the exhaustion of these rhythmic possibilities, the register of each layer begins to move inward, one octave at a time. The point where the layers are closest is also the point at which all of the possible permutations have been exhausted (mm. 49-50), thus bringing the first round of pattern completion to an end (Example 3.3). The layers cross in the following measure (m. 51) and in so doing restart the process of pattern completion, this time with each part moving gradually outward to the opposite registral extreme. This second process is lacking only one permutation when, in mm. 81-82, two new pitch-classes interrupt its progression with the ascending ic1: G♭– F. This interruption, foreshadowing the redistribution of [012367], reverts the voices to their original placement with the G–B♭ layer in the upper register and and the C#–A/G#–D layer below, while also momentarily upsetting the strict dyadic alternation: C#–A and G#–D repeat for four bars each while G–B♭ continues to alternate above. The final rhythmic permutation is introduced in m. 92, which is notable for being the first time that dyads C#–A and G#–D are presented in the same measure and for being the first time that the pitches of the G–B♭ dyad are not sounded in the same octave. The process of rhythmic pattern completion is a fairly simple way in which Feldman can bring unpredictability to a section which is dominated by a

single set class, [026], and a completely uniform pitch contour. In limiting the number of possible permutations of each cell, an inherent logic is brought to the music's progression, but in a way that is perceptually opaque and, therefore, disorienting.

The process of transformation picks up more or less where the process of pattern completion leaves off: as mentioned, the first explicit instance of ic1 occurs in mm. 81-82 with the dyad G♭– F. By initiating the process of intervallic transformation with two previously unheard pitch classes, Feldman perceptibly marks the onset of the transformation and thus ascribes to this dyad the function of a signifier for the gradual impingement of ic1. The next time it appears is in m. 93, where it marks the first time that two pitches are sounded simultaneously as a vertical sonority (Example 3.4). This initiates a complete revoicing of the [026] material into vertically arranged collections that are presented in constantly changing inversion. In addition to pitch-class set labels, Example 3.4 also draws attention to the prevalent uses of ic1 with dotted



Example 3.4. Triadic Memories, *mm. 93-100*.

lines. The effect of presenting subsets of the hexachord in vertical groupings is that, by manipulating the inversion of the chord, different intervals can be emphasized. For example, the first sonority from the hexachordal material is encountered in m. 94, where it is voiced as two interlocking ic1 dyads, A–B♭ and C#–D, situated within the ic1 dyad, G#–A; the aggregate of these pitches is the set [01256].[26] The emphasis on ic1 results in the natural division of this set into two components: a [012] trichord (G#–A–B♭) and an isolated [56] dyad (C#–D). The preceding measure also contains a [012] trichord (G–G♭–F) which is inversionally symmetrical with the [012] of m. 94 about the isolated C#–D dyad (meaning that the collection G–G♭–F–D–C# is also described as the set [01256]). Due to their inversional symmetry about C#–D, these two measures seem to adhere as a single unity, an interpretation which is strengthened by the fact that the chordal organization of m. 94 is heard as a direct result of the impingement of G♭–F in m. 93. Effectively, the set class of these two measures is just the sum of every pitch class that has been encountered thus far in the piece: [01234589]. This complete saturation of material makes the subsequent redivision of the aggregate more effective as new interval classes are systematically isolated and emphasized.

The next two measures, mm. 95-96, represent a return to the primary hexachordal material. Their structure refers back to the ic2 of event-type A by presenting this interval as a simultaneity, but also suggests a gradual transformation of interval content through the statement of a [015] trichord and the thoroughgoing emphasis of ic1 (C#–D, A–B♭, and G–G#). The initial dyadic subdivision of C#–A and D–G# returns in m. 98, where the absence of B♭ reduces the

[26] Notice that this set is simply a truncation of the [012367] hexachord, where the one pitch that is unable to function as part of an [015] set, pc0, has been removed. This foreshadows the material of Section 2, but is never fully exploited.

pitch set to [01267]. Although it will require numerous iterations for this subset to be firmly established, this measure represents the first step in the process of reducing [012367] to what will be its final form: [0123].[27] Except in passages which are intended to allude to the opening material, the inclusion of all six pitches of the [012367] hexachord becomes much less frequent after this point, making this the first alteration of the time-object of *Triadic Memories*. The following measure, m. 99, similarly reduces earlier material. The symmetrical set [014589] is produced by removing one of the ic1 dyads from the set of m. 93-94, thereby permitting the use of [015] subsets to exhaust the pitch content of the hexachord. Although the process is far from complete, this measure marks the first concrete step toward complete intervallic transformation and is a decisive departure from the repetition of event-type A.

The transition from Section 1 to 2 (mm. 101-140) is devoted to redistributing [012367] by removing emphasis from the [026] set which isolated ic2, 4, and 6, and instead focusing on ic1 and 5. Example 3.5 presents all of the dyadic and trichordal possibilities of [012367] (note that two trichords, [024] and [048], cannot be formed with the contents of this hexachord). The first column under each heading contains the normalized form of the set, the second column contains the unnormalized instance of each subset as it occurs in the generative hexachord, and the third column contains those pitch classes which cannot be included as a member of any of the subset instantiations. From this table it is clear that ic1 and ic5 make the most thorough use of the contents of [012367], with ic5 excluding only pc3 (pitch class 3). Among the trichords, [026] uses every member of the hexachord, [015] uses all but pc0, and [016] uses all but pc3.

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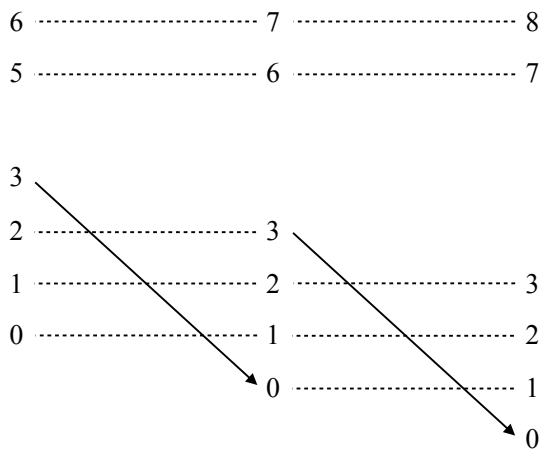
[27] It should be noted that the process by which the time-object is reduced over the course of the piece is not one which can be expressed succinctly in standard operational terms. The transformation occurs, in short, by first removing two pitches from the hexachord and then gradually condensing the intervallic content of the remaining pitches until the tetrachord [0123] has been formed.

[012367] / <4,2,2,2,3,2>					
Dyads:			Trichords:		
[01]:	[01], [12], [23], [67]		*[012]:*	[012], [123]	6, 7
[02]:	[02], [13]	6, 7	*[013]:*	[013], [023]	6, 7
[03]:	[03], [36]	1, 2, 7	*[014]:*	[236], [367]	0, 1
[04]:	[26], [37]	0, 1	*[015]:*	[126], [237]	0
[05]:	[07], [16], [27]	3	*[016]:*	[016], [127], [167]	3
[06]:	[06], [17]	2, 3	*[025]:*	[136]	0, 2, 7
			[026]:	[026], [137]	
			[027]:	[027]	1, 3, 6
			[036]:	[036]	1, 2, 7
			[037]:	[037]	1, 2, 6

Example 3.5. *Interval contents of [012367].*

The hexachords [012356] and [012378] act as the transformational goals of Sections 1.2 and 1.3. These hexachords bear strong similarity to [012367] in that they both comprise four instances of ic1, one of which is isolated from the others. In Section 1.1, two ic1 related [026] subsets functioned as the primary motivic cells; this relationship is reversed in Section 2.1, where the motivic cell consists of three ic1 dyads, separated by ic2 and ic5 – making the dyadic relation either [025] or [027], depending on the configuration. In other words, setting 0 as pitch class C, the the motivic cells of Section 2.1 would comprise three ic1 dyads at either C–C#, D–D#, and F–F# (or the inversion: C–B, A#–A, and G–F#) or C–C#, D–D#, and G–G# (or the inversion: C–B, A#–A, F–E) depending on whether the dyads are related by [025] or [027], respectively. In Feldman's approach, which seems to be concerned primarily with interval classes, the pitch sets [025] and [027] are very intimately related due to their common emphasis of ic2 and ic5. Therefore, the idea that he would consider the hexachords [012356] and [012378] to be



Example 3.6. *Transformation of hexachordal material.*

variations of the same intervallic material is within the realm of possibility. Example 3.6 shows how all three hexachords can be transformationally related through the simple transposition of one member of the lower chromatic group (this could also be interpreted as a transposition of the entire [0123] chromatic).

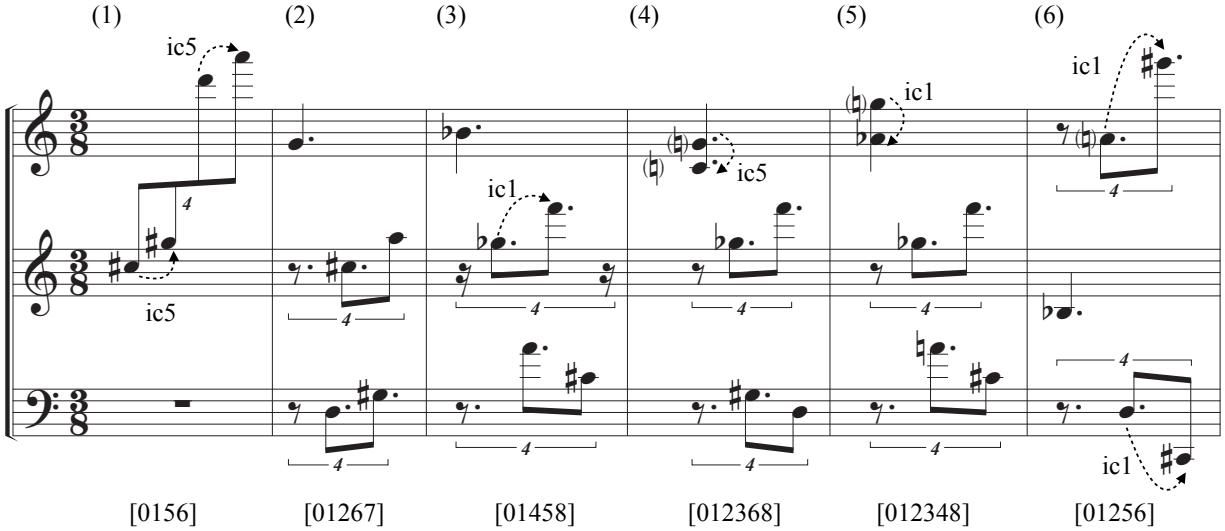
Feldman's transitions tend to be rather abstract in their construction, fulfilling their role primarily by the straightforward interpolation of new material or, more subtly, by the reinterpretation of old material. They rely heavily on the literal and near-literal repetition of events, but lack any of the organizational logic contributed by the process of pattern completion. As a direct result of their logical paucity, these transitions are usually the most perceptually obscure passages of the work and are consequently very strongly evocative of Feldman's formalized "disorientation of memory." The transition from Section 1 to Section 2 happens in two steps, the first characterized by the redistribution of the original [012367] material (Section 1.2, mm. 101-117) and the second by the incorporation of altered forms of the hexachord (Section 1.3, mm. 118-140). Using set classes to determine the unique interval content of motivic

cells, six groupings emerge in the first part of the transition – each of which represents a unique step in the transformational process (Example 3.7):

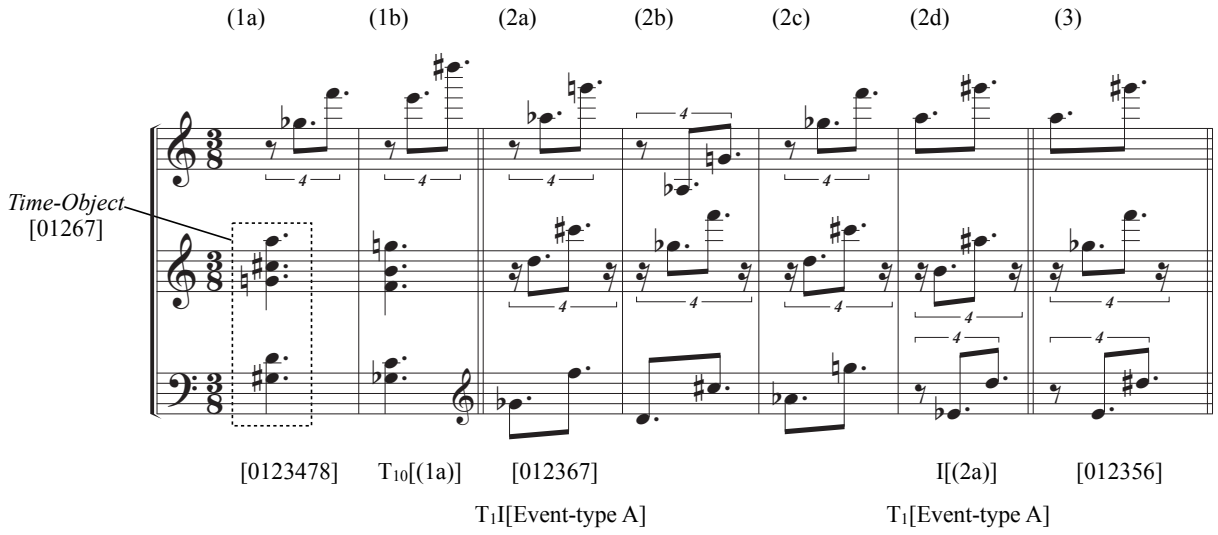
1. The ic5 possibilities within [012367] are isolated and presented in explicit, ascending pairs.
2. The new time-object set is reiterated.
3. The D–G# dyad from event-type A is replaced by the ic1 dyad, G♭–F.
4. G generates a new pitch-class, C, to create another ic5 possibility.
5. Event-type A is redistributed by pairing G with A♭ to form ic1.
6. Event-type A is redistributed by pairing A with G# and D with C# to form ic1.

This process effects a permanent deposition of ic4 and ic6 from the melodic fore and installs ic1 and ic5 in their place (ic2, also a structural interval in event-type A, will return prominently in the third and final section). These six motivic cells repeat irregularly throughout Section 1.2 but, except as embedded in the [01267] pentachord that now represents the time-object of the piece, the dyadic groupings of event-type A will be completely obsolete upon the commencement of Section 1.3.

Two significant processes dominate Section 1.3: the switch from trichordal to dyadic subdivision of the hexachord and the introduction of the remaining pitches of the chromatic

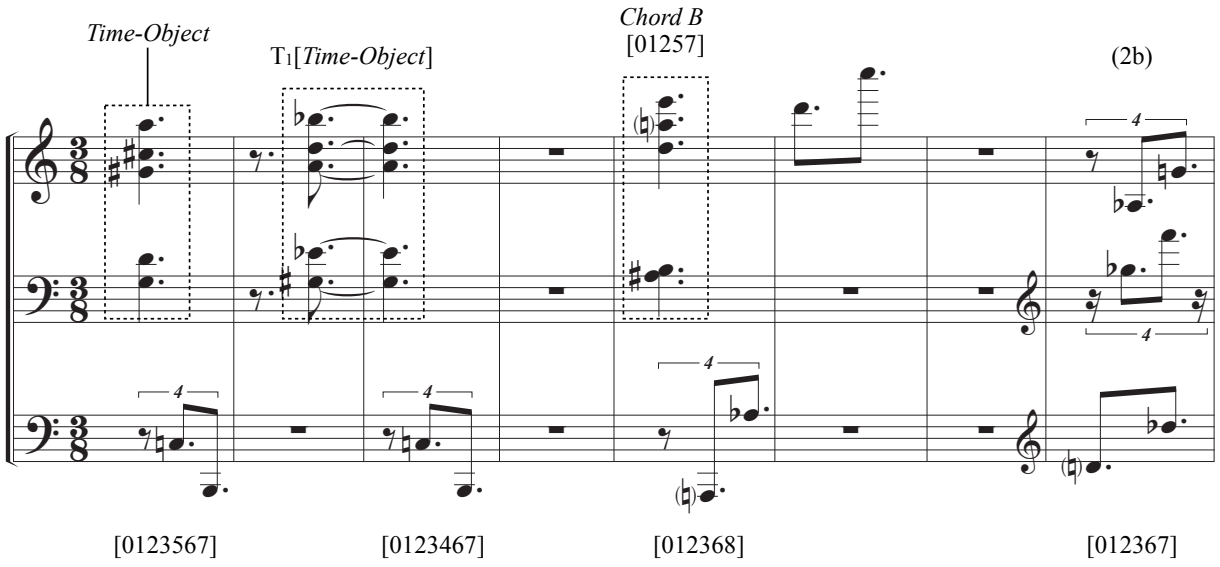


Example 3.7. *Six motivic cells in Section 1.2, mm. 101-117.*



Example 3.8. *Three motivic cells in Section 1.3, mm. 118-140.*

scale. Using only three distinct motivic cells, this passage makes heavy use of the transposition operation and the inexact repetition of measures. Example 3.8 reproduces all three motivic cells, including also the variations on cells (1) and (2) that occur by way transposition, rhythmic alteration, and/or registral shift. Cell (1) contains a juxtaposition of the new time-object, arranged vertically – the form in which it will recur throughout most of the piece – and the dyad G♭–F that initiated the transition to Section 2. Cell (2) represents the completed process of arranging [012367] as pairs of ic1 dyads. In its first iteration, this cell is related to the pitch material of event-type A by the T_1I operation. Cell (3) is the first occurrence of the complete [012356] hexachord, an instantiation which is emphasized by the introduction of two new pitch classes: D# and E. The last pitch of the chromatic still to be introduced is presented in m. 126 in the (2d) cell, which includes B as part of an ic1 dyad with A#. These motivic cells repeat seemingly at random until m. 133, at which point the time-object returns in a new inversion, accompanied by the ic1 dyad, C–B; the resulting set class, [0123567], is the aggregate of [012367] and [012356] (Example 3.9). This prepares the introduction of an altered form of the time-object in

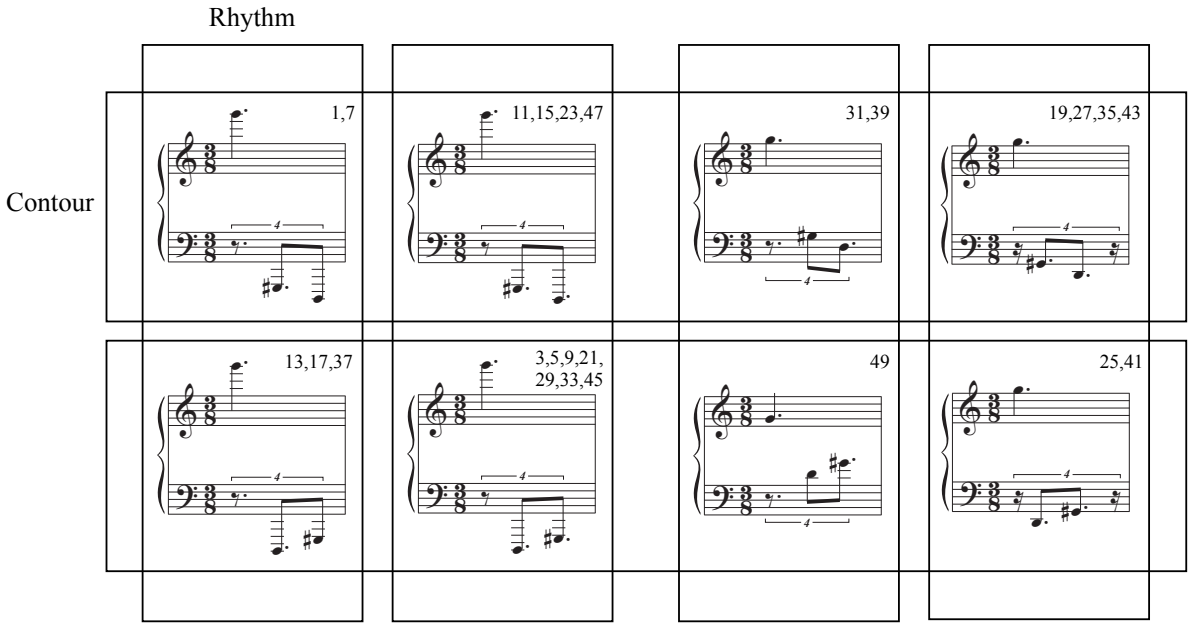


Example 3.9. Triadic Memories*, mm. 133-140.*

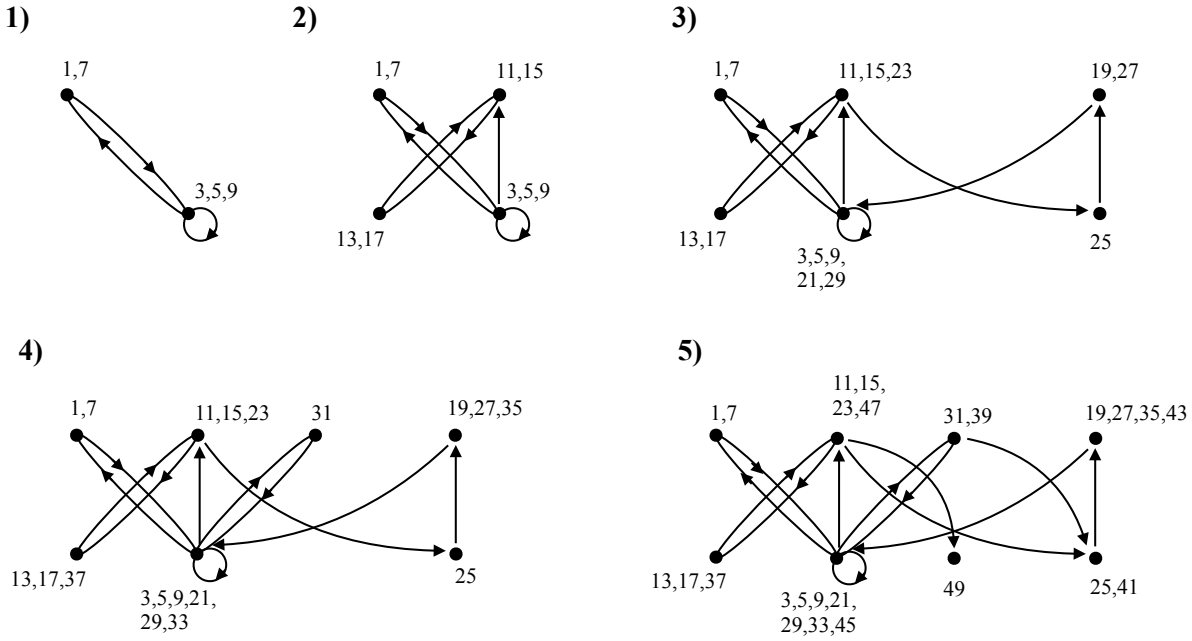
m. 137, which will be labeled Chord B for its shared emphasis of ic1 and ic5 with the upcoming event-type B.[28]

Having identified the progression of events in Section 1, it will now be possible to survey the passage's effect on temporal perception. Beyond the general statements already made about the disorienting effect of extended, monothematic sections of music and their preclusion of accurate protentions from listeners' awareness, it remains to be seen how the gradual evolution of an event-type will impact listeners' perceptions of the moment-to-moment progression of the piece. In *A Theory of Music Analysis*, Dora Hanninen provides a useful technology for illustrating this process of transformation, implemented in Example 3.10a and 3.10b; arrows are used to represent the way in which present consciousness is constantly referring to past events, a

[28] Chord B returns numerous times in the subsequent music; providing it with a label not only emphasizes its semiotic import but also draws attention to its similarity with the time-object, which originated in event-type A.



Example 3.10a. *Eight configurations of the G#–G–D measures from event-type A, mm. 1-50.*



Example 3.10b. *Map of progression for G#–G–D measures in mm. 1-50.*

process that ultimately results in a complex and interconnected network of signifiers.[29] Example 3.10a groups all eight unique iterations of the G#–G–D measures in the first process of pattern completion (mm. 1-50) by rhythmic profile and contour, including with each instance the measure numbers in which it occurs; Example 3.10b functions as a map for the experience of these measures.[30] The first five iterations are represented in step 1) of 3.10b, where the first cell quickly yields to the second, the second repeats, and the process begins again. However, before the second cell can repeat a second time the progression is interrupted by the introduction of a new iteration in m. 11, shown in step 2). The map should be read in this way, with each step representing a passage which, due to its relatively short duration and distinguishable pattern of movement between cells, constitutes a single comprehensible unit.

Because the rhythmic variation between each of these cells is so minute, it is fair to assume that most listeners would not be aware of the eight unique rhythmic possibilities which are at play in this passage. However, the map of 3.10b is very useful in depicting the way that each new moment of the piece represents not an idealized musical object, formed through directed developmental procedures (a conception which might be mapped as a single arrow), but a deeply self-referential object with no single, definitive iteration. Looking at the final step of 3.10b, the progression of the cell is seen to be ordered, in that its recursiveness is highly

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[29] Dora A. Hanninen, *A Theory of Music Analysis: On Segmentation and Associative Organization* (Rochester NY: University of Rochester Press, 2012).

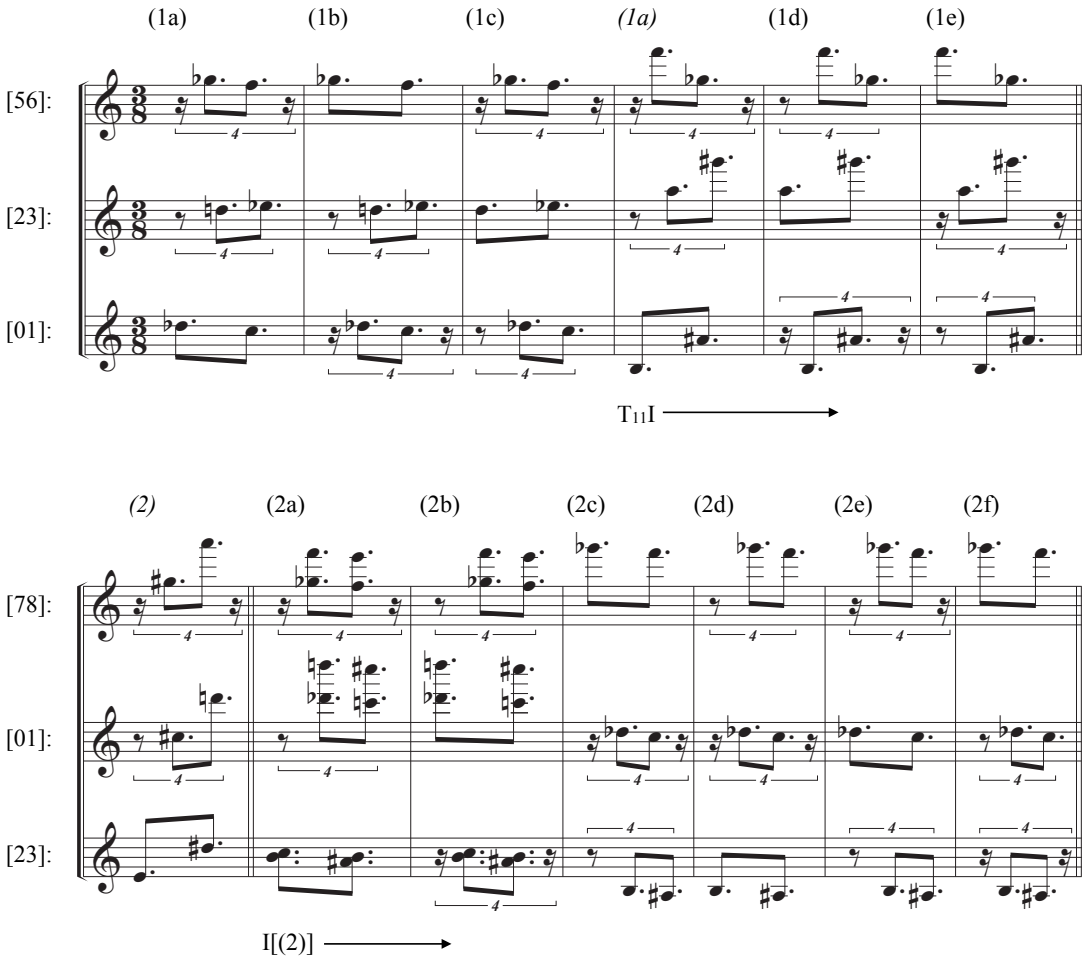
[30] Note that, due to the way that each [026] set of event-type A is completed by the dotted quarter note in the following measure, the cells represented in 3.10a are not strictly representative of [026] sets, but of discrete measures. Because the intent of this example is to provide a visual representation of the recursive quality of the opening passage, this configuration is sufficient and avoids the unwieldy use of two-measure cells. Also note that many of the cells are presented in multiple registers; this parameter is left out of consideration for the present purposes because it would generate too many unique cells and make impractical and unwieldy a map like that seen in 3.10b.

patterned, but it is not teleological – there is no end or "final form" toward which the progression is propelled.[31] The process of varied repetition cannot be classified as perceptually positive, for the way in which each successive cell is presented is completely unpredictable; but neither can it be classified as perceptually negative, for each iteration is recognizable and, consequently, stabilizing. Rather, passages like this one create the impression of an unbroken, undifferentiated horizon. Time certainly continues to progress at a steady pace, punctuated clearly by events at regular intervals, but there is a nagging sense that this motion is illusory: like how the undulation of waves gives the appearance of propulsion to a boat passenger, but upon lifting their gaze to the shoreless horizon the passenger feels the same boat to be completely motionless. The lack of an external point of reference – such as a form or a discernible, directed process – creates the impression of timelessness. Doubtlessly, the music occurs *in* time, but the perception is not of *directed* time but of time as a fixed *object* in a manner precisely akin to Feldman's aforementioned sundial analogy (pg. 93).

Section 2:

The advent of a new section with unique and stable interval content initiates a return of the process of pattern completion – though its operation is slightly modified in Section 2.1 (mm. 141-169). The variables for this process are the three discrete dyadic subsets of the [012356]/ [012378] hexachords and three unique rhythmic patterns, making for a total of six possible iterations with each hexachord. Example 3.11 reproduces each of these iterations in the order in

[31] The drive to complete the gamut of rhythmic possibilities certainly cannot provide a teleology to the progression, for it is undirected and random – there is no defined process of manipulation which occurs to the cell, it simply repeats until all possibilities have been exhausted.



Example 3.11. *Motivic cells from Section 2.1, mm. 141-169.*

which they appear in the score and represents a comprehensive list of each instance of event-type B in the opening passage. [012356] is introduced first, quickly presenting three unique possibilities in mm. 141-143. However, this process is interrupted by the intrusion of cell (2) before it can complete the remaining three iterations (m. 144). In contrast to the other motivic cells, which are repeated numerous times throughout this opening passage, (2) is unique in that it is never placed within repeat signs and is found only twice; these two locations mark significant structural moments in the process of pattern completion – the first of which is its intrusion upon hexachord [012356].

Hexachord [012378] takes over in m. 151 (2a), where each pitch of its three ic1 dyads is itself embellished above with the addition of a vertical instance of ic1: D♭–C is embellished at a pitch interval of 13 semitones, G♭–F at 11 semitones, and B–A# at 1 semitone. The process of pattern completion occurs very rapidly: if not for the repeat signs that enclose (2a)-(2b) and (2c)-(2f), all six possibilities would be presented in an unbroken sequence. Upon the conclusion of this series, (2) finds its second and final iteration (m. 157) – this terminates the use of [012378] and allows for the reinstatement of [012356]. The placement of (2) in immediate adjacency with the other [012378] material proves to be functionally important for reasons beyond its ability to signify the transition back to [012356]. Although [012378] is inversionally equivalent after a transposition of three semitones, its orientation in this passage can be identified with reasonable confidence through its relation to (2). The simplest way to transform (2) into the subsequent (2a), (2b), (2c),… cells is the inversion operation, where C#/D♭ is 0. Therefore, the juxtaposition of (2) with the other [012378] material means that cells (2a)-(2f) can be reasonably assumed to have D♭ as their fundamental pitch and should be heard as inversionally related to (2).

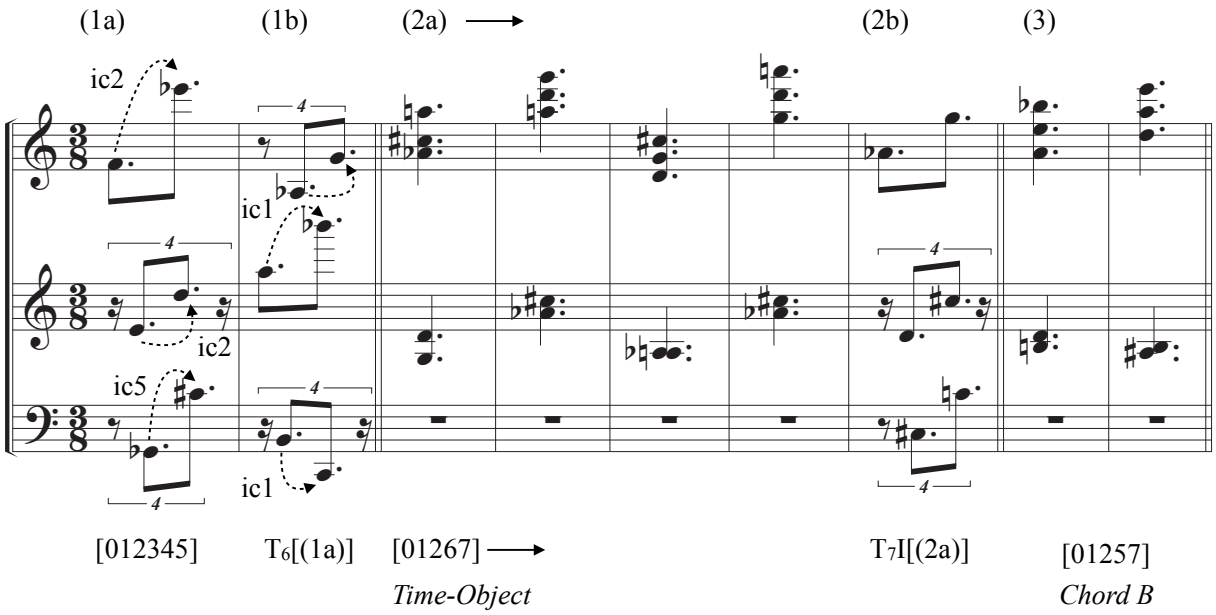
The final bars of Section 2.1 (mm. 158-160) begin with a reproduction of cells (1a)-(1c) before inverting [012356] about its isolated G♭–F dyad ($T_{11}I$ in operational terms). The dyadic rhythmic identity of (1a) is then replicated with the new pitch collection; this results in the formation of cell *(1a)* and provides a link between the two hexachords. After two new rhythmic iterations are presented as cells (1d) and (1e), the process of pattern completion seems to be nearly drawn to a close when, in mm. 164-167, hexachord [012367] (inverted from its original pitch-level in event-type A and grouped as three ic1 dyads to imitate the texture of event-type B) suddenly impinges upon the musical progression. Its statement is brief and isolated, but

constitutes a sufficient enough disturbance to prematurely terminate the pattern completion of [012356] and effect a structural shift to the transition.

In contrast to the proportions of Section 1, Section 2's transition occupies a significantly longer span of music than its stable introduction. The transition can be divided into three parts, determined by their localized motivic cells: mm. 170-200 (Section 2.2), 201-252 (2.3), and 253-324 (2.4). The first part begins the process of shifting intervallic focus from ic1 onto ic2, the second part is a collage of previously-encountered motivic cells, and the third part reduces the time-object by another pc to [0126], thus preparing the move to set [0123] in Section 3. Rather than analyzing each part of the transition in its measure-by-measure progression, the function of each part will be illustrated by highlighting its integral processes and motivic cells.

Section 2.2 consists of three elements: 1) the chromatic set [012345], 2) the time-object [01267], and 3) Chord B [01257] (Example 3.12). The chromatic set is alternately presented as two ic2 intervals and one ic5 interval (1a) and as three ic1 intervals (1b), thus serving to maintain continuity with event-type B while also shifting the intervallic focus to ic2. Except for three intrusions of the time-object (presented in veiled form as three linear ic1 dyads rather than in its usual vertical arrangement: see Example 3.12, (2b)) in mm. 176, 187, and 195, and a short section of repeating chords, the chromatic set dominates the entire passage with only slight modifications and embellishments. The chordal passage begins with four iterations of the time-object cells (2a), presented exactly as shown in Example 3.12 but for a two-measure interruption between the third and fourth inversions.[32] This gives way to two inversions of Chord B (3) which are separated by repeated iterations of the (2b) and (1a) cells. This part of the transition is

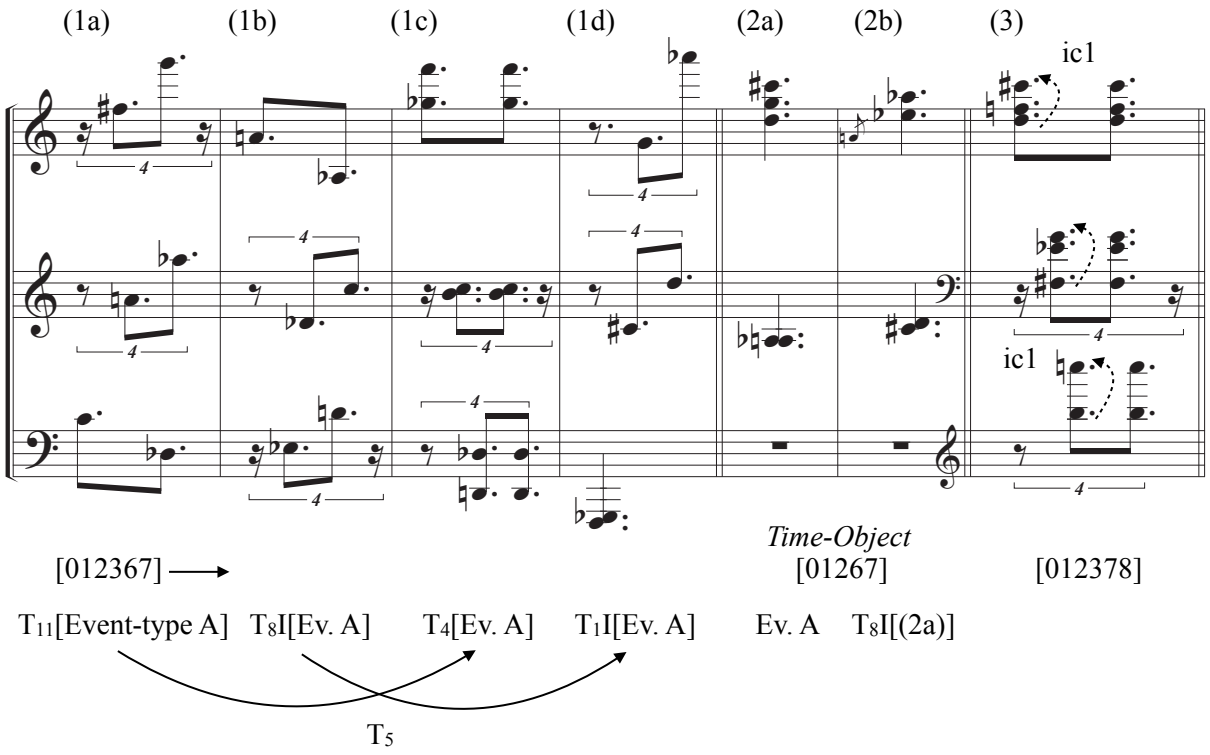
[32] This interruption consists only of a measure of rests and an isolated ic1 dyad, A♭2–A3; its main import is to attenuate the predictability of the repeating chords.



Example 3.12. *Motivic cells from Section 2.2, mm. 170-200.*

integral to the structure of the entire work because it marks the first time that a motivic cell from an earlier part of the piece returns as a sort of "fabricated memory." Contrasting the intrusion, in mm. 164-167, of hexachordal material from Section 1, where the event-type A origin of [012367] was obscured by being presented as ic1 dyads, the incorporation of the time-object and Chord B in this part of Section 2 is an explicit and recognizable reference to the same objects as they occurred in Section 1.3 (Examples 3.8 and 3.9). This technique will prove to be an important feature in the construction of Section 3, where recognizable material from earlier passages of the work are interpolated within the staggeringly long repetition of the final form of the time-object, [0123].

Section 2.3 is rather more convoluted in its construction than 2.2. Functioning rather like a motivic collage of previously encountered material, the passage alternates in an apparently random sequence between three basic set classes. As seen in Example 3.13, the first motivic cells



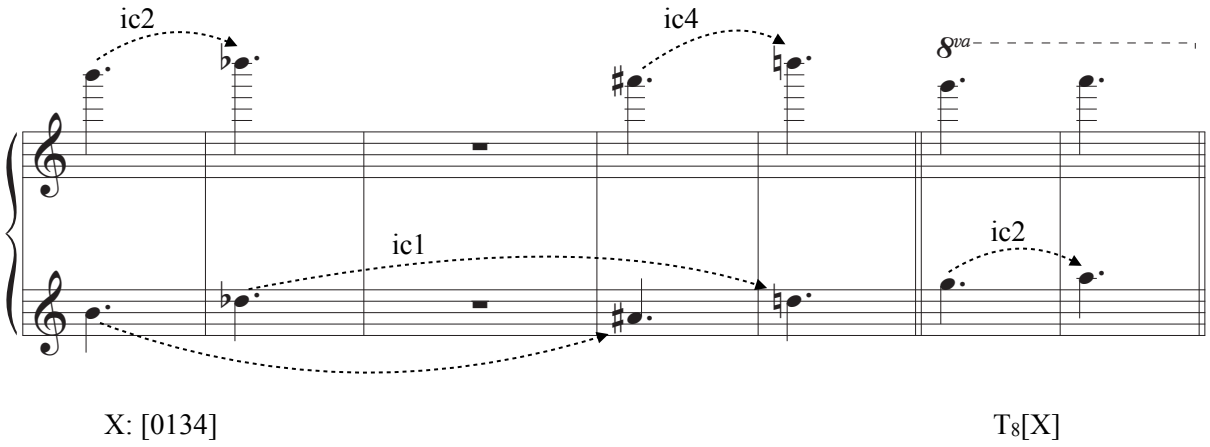
Example 3.13. *Motivic cells from Section 2.3, mm. 201-252.*

encountered are transformations of the opening hexachord, [012367]. The grouping of pitch material as ic1 dyads is specifically reminiscent of two previous instantiations of this hexachord in Section 1.3 and 2.1, which themselves obscurely refer to the opening pitch material. The first two iterations of the hexachord (mm. 201-207) are T_{11} and T_8I transformations of event-type A material; these two forms forms of the hexachord are themselves transformed by the T_5 operation and presented as such in many of the set class's subsequent iterations (mm. 221-22, 238-42). The time-object, arranged in familiar vertical orientation, regularly intrudes upon the predominantly dyadic texture of this section. Example 3.13 shows the two forms in which it appears: at the familiar pitch level, where it retains the event-type A pc content (excluding only B♭), and under the T_8I transformation. The use of this specific transformation in both the hexachordal and pentachordal material of this section is significant, for it is from this T_8I instance that the final

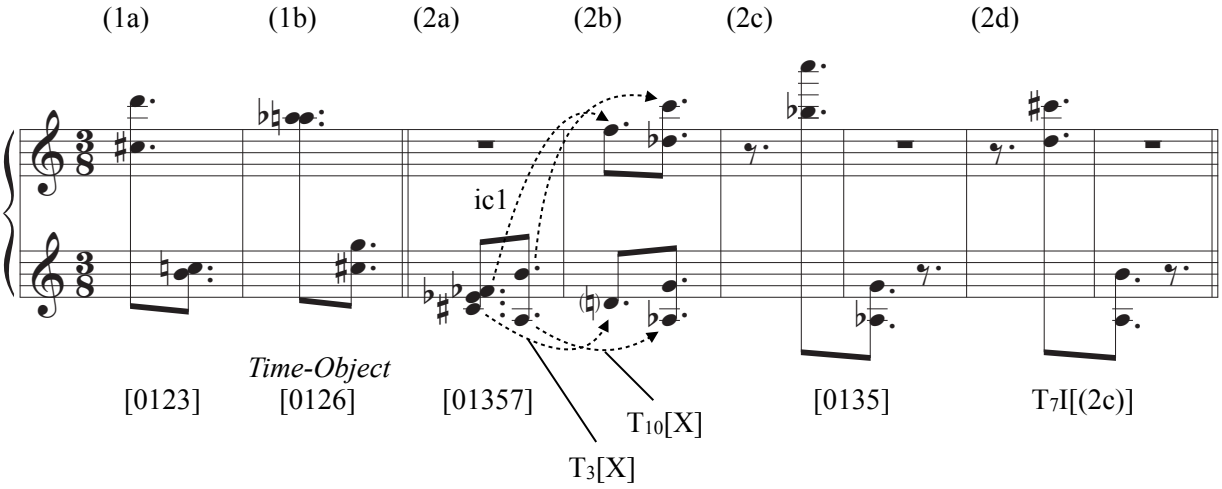
form of the time-object will reify and simultaneously provide the pitch material for much of Section 3. Despite the fact that the final motivic cell, (3), is only presented a single time in Section 2.3 (m. 226), it marks the last time that event-type B material will be used in the work and is consequently of great importance. Embellished by the inclusion of inner voices F and E♭ between two of its ic1 dyads, hexachord [012378] is clearly discernible in this measure and reminiscent of the embellished motivic cells (2a) and (2b) in Section 2.1 (Example 3.11).

Section 2.4 (mm. 253-324) is devoted to two distinct processes: 1) a compression of pitch and interval content, ultimately terminating in the [0123] chromatic tetrachord, and 2) shifting intervallic focus from ic1 to ic2. The first process is initiated by reducing the cardinality of the time-object, resulting in the [0126] tetrachord (Example 3.14b, (1b)). This new form of the time-object is juxtaposed with motivic cell (1a), a chromatic collection with such a strong aural presence in this passage that by the onset of Section 3.1 it has attained complete control of the musical surface. Although the present form of the time-object remains intact well into Section 3.1, the chromatic tetrachord will dominate the remainder of the work, gradually subsuming [0126] and displacing it as signifier for the time-object.

The second process, that of shifting focus from ic1 to ic2, is interwoven with the aforementioned alternations of (1a) and (1b). Example 3.14a reproduces the first five bars of Section 2.4, a passage which is notable for being the first time that entire measures are occupied by solitary pitch classes. Ic2 and ic4 are separated by rests to give them unequivocal prominence, though the nesting of ic2 within ic4 also results in obscured ic1 dyads (indicated in the lower staff of Example 3.14a). The aggregate of these four pcs is the tetrachord [0134] (labeled "X" for ease of reference), a set class which will function as the structural framework for numerous

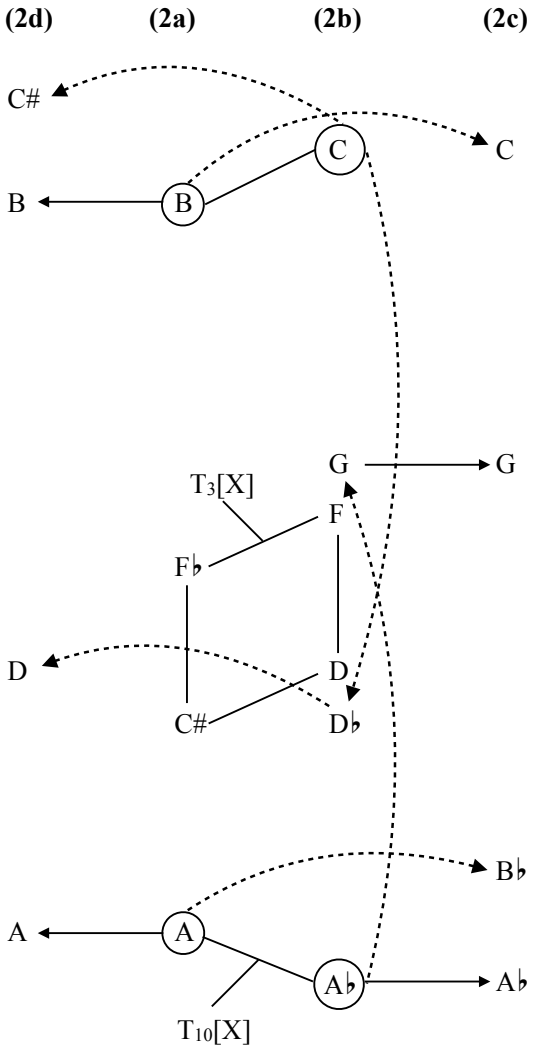


Example 3.14a. Triadic Memories*, mm. 253-57 and 323-24.*



Example 3.14b. *Motivic cells from Section 2.4, mm. 253-324.*

subsequent motivic cells, shown in Example 3.14b as (2a)-(2d). Due to similarities in rhythm and contour, these four motivic cells are grouped in pairs, with (2a) and (2b) representing the use of X as a process of transformation and (2c) and (2d) being generated from the interaction of (2a) and (2b). Example 3.15 illustrates how (2a) is transformed into (2b) by isolating its dyadic simultaneities (leaving out the E♭ in (2a) due to its status as an inner voice) and generating from them the tetrachord [0134] (this can also be seen by tracing the ic1 dotted arrows in Example



Example 3.15. *Transformation of motivic cells in Section 2.4.*[33]

3.14b). In other words, the dyads C#– F♭ and A–B are isolated in (2a) and used to generate two more dyads, D–F and C– A♭, in (2b) to create two T_7 related [0134] sets: C#–D– F♭–F, and A♭–A–B–C. In (2b), both members of the new C– A♭ dyad generate an instance of ic1, indicated in Example 3.15 by the dotted arrows from C–D♭ and A♭–G. (2c) is created by retaining the A♭–G dyad from (2b) and combining it with the semitone transposition of dyad A–B from (2a); (2d) is

[33] Note that due to octave equivalence in pitch-class space, the note placements in this example were chosen for convenience and clarity and are not necessarily representative of absolute pitch space.

generated in a similar manner. Although a rather complex network of transformations at first glance, this process of deconstructing the intervallic content of a single set class and using the results to generate, in gradual, evolutionary stages, numerous pitch set collections finds ample precedent in event-type A. At this point, nearly every interval class embedded in [012367] has been isolated and embellished for an extended passage of the work (excepting ic3, which is yet to come), and it is consistent with this compositional approach for Feldman to use the germinal [0134] tetrachord to generate four unique and interconnected motivic cells in this transitional section. Section 2.4 concludes by recapitulating the ic2 dyad from X (Example 3.14a), but it has been transposed eight semitones to G–A – reminiscent of the T_8I operation in Section 2.3. This brings the last transitional section to a close and prepares the introduction of event-type C, which will emphasize ic2 for the remainder of the piece.

Having already discussed the perceptual effect of monothematic pattern completion in conjunction with Section 1, it will perhaps be most interesting to investigate the way that motivic "re-presentation" influences temporal perception. It will be remembered that a similar concept was introduced in the third section of *Vortex Temporum I*, where the re-presentation of past events afforded a degree of perceptual orientation that would have been impossible otherwise. In *Triadic Memories*, however, what seems to be a comparable technique produces an effect that is diametrically opposed to that of *Vortex Temporum*. Focusing specifically on the collage-like structure of Section 2.3, Example 3.16 functions as a legend for the perceptual experience of this passage by tracing the origins of each measure's motivic content. In this 51-measure section, only two events can be heard as consisting of new material with no explicit reference to earlier events. The first of these, in m. 216, is a foreshadowing of the upcoming event-type C; the

Measure:	Set Class:	Original Location (Mm. or Section: Motivic Cell)	Transformation (of Original Location)	Texture
201	[012367]	1.3: (2a)	$T_{10}I$	Linear Dyad
202-207			T_7	
208	[01245]	m. 200		Linear Dyad
210	[01267]	Time-Object		Chord
212			T_8I	
214.1				
214.2			T_8I	
215	[013457]	combination		Linear Dyad
216	[0123]	none		Linear Dyad
217	[01267]	Time-Object	T_8I	Chord
219.1			T_8I	
219.2				
221-22	[012367]	1.3: (2a) (new texture)	T_3I	Vertical Dyad
223	[01267]	Time-Object		Chord
224.1	[01249]	none		Chord
224.2-25	[01267]	Time-Object	T_1I	Chord
226	[0123(46)78]	2.1: (2a)	T_1	Embellished Vertical Dyad
227-28	[01267]	Time-Object	T_8I	Chord
229.1	[01249]	224.1		Chord
229.2-30	[01267]	Time-Object	T_1I	Chord
231	[012345]	2.2: (1a)	T_{10}	Lin. and Vert. Dyad
232-36	[012367]	1:3 (2a)	T_7	Linear Dyad
238-42				Lin. and Vert. Dyad
243	[012347]	combination		Linear Dyad
244	[01236]	1:3 (2a) (missing 1 pc)		Lin. and Vert. Dyad
245-49	[012367]	1:3 (2a)	T_7	Linear Dyad
251	[01267]	Time-Object		Chord

Example 3.16. *Table of referents for each measure of Section 2.3.*

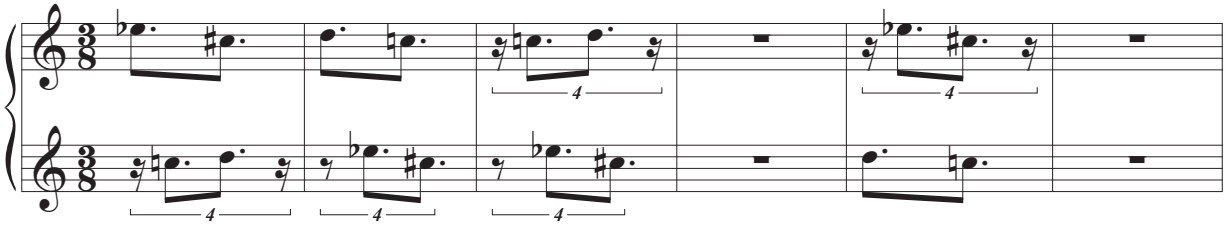
second, in m. 224.1, is repeated in m. 229.1 – making its second iteration a signifier limited in scope to Section 2.3, but a signifier nonetheless. However, due to a number of factors, the recursiveness of this section will likely result in perceptual disorientation rather than provide listeners with a sense of predictability. The main culprit for this disorientation is the textural similarity of many pre-established motivic cells. Because it is extremely unlikely that listeners will be able, in a performance, to catalog the unique set class for each motivic cell, all linear dyadic groupings (like that of cells (1d) and (1e) from Section 2.1 and cells (1a) and (1b) from Section 2.3) will likely sound derivative of a single event-type – similarly with vertical dyadic groupings, chordal sonorities, and all other easily distinguishable textures. Therefore, although Section 2.3 is continually referencing specific motivic cells from the preceding music, listeners are unable to identify exactly which cells these are, much less where they find their origin in earlier sections. Compounding this perceptual opacity is the regular interjection of full-measure rests, the indeterminate number of times a performer will take each repeat sign, and the unpredictable alteration between different types of texture. Thus, the usual problem resurfaces: the absence of a primary event or directed process of development empties all potential signifiers of content and makes even such a highly recursive passage as that of Section 2.3 seem arbitrary in its perpetual repetition and re-presentation of motivic cells. In the face of such unpredictability, listeners will likely become disoriented and unable to maintain a sense of chronometric time. The indefatigable linearity of listeners' physiological time will find itself in conflict with the seemingly endless circularity of the music; as Feldman said, the effect of this

conflict is like walking the streets of Berlin, where no matter how far you go, the house facades are so similar that all progression seems illusory.[34]

Section 3:

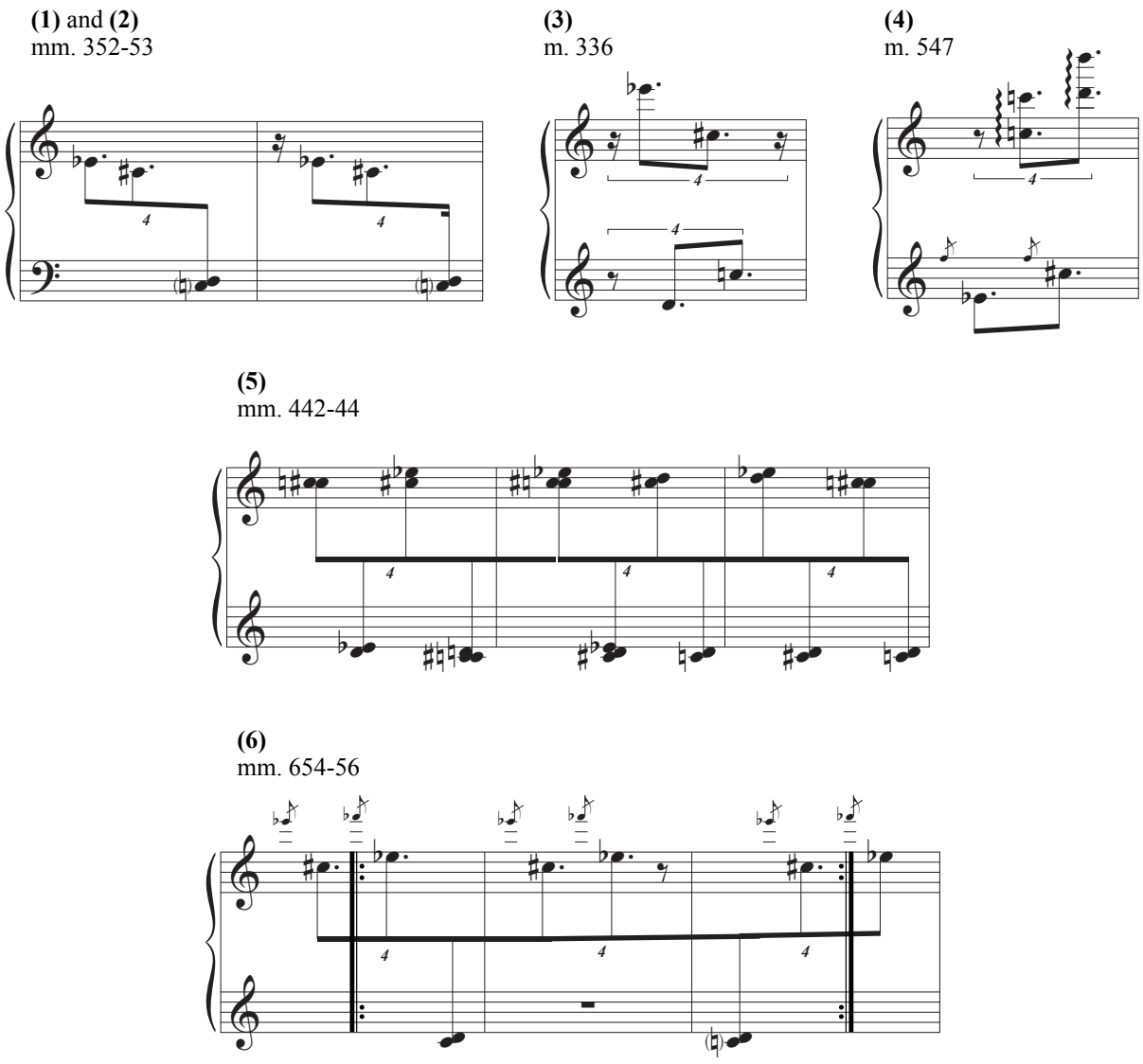
Although the third and final section of *Triadic Memories* occupies more than half of the work's total duration, its uniform motivic surface means that the overall construction of this extensive passage can be surveyed fairly succinctly. Section 3 breaks roughly into two halves, the first of which juxtaposes the pitch-class set [0123] (C–C#–D–E♭) in various rhythmic and textural profiles with assorted forms of the time-object and re-presentations of motivic cells from earlier in the piece. The second half is characterized by its extremely stable pitch content and regular changes of meter – it is into this vast and undifferentiated landscape that Feldman's "disorientation passage" is interposed.

The opening bars of Section 3.1 (Example 3.17) closely resemble those of Section 2.1 in their linear dyadic grouping and constantly fluctuating rhythmic profiles but, in addition to the shifted emphasis to ic2, they quickly diverge from the conservative "closed voicing" of the prior passage and introduce increasingly complex and divergent textures. Also in contrast to Section 2.1, the interval grouping of the prevailing pitch set is occasionally altered to prioritize the other



Example 3.17. *Event-type C in* Triadic Memories*, mm. 325-30.*

[34] Feldman, "Crippled Symmetry," 138.

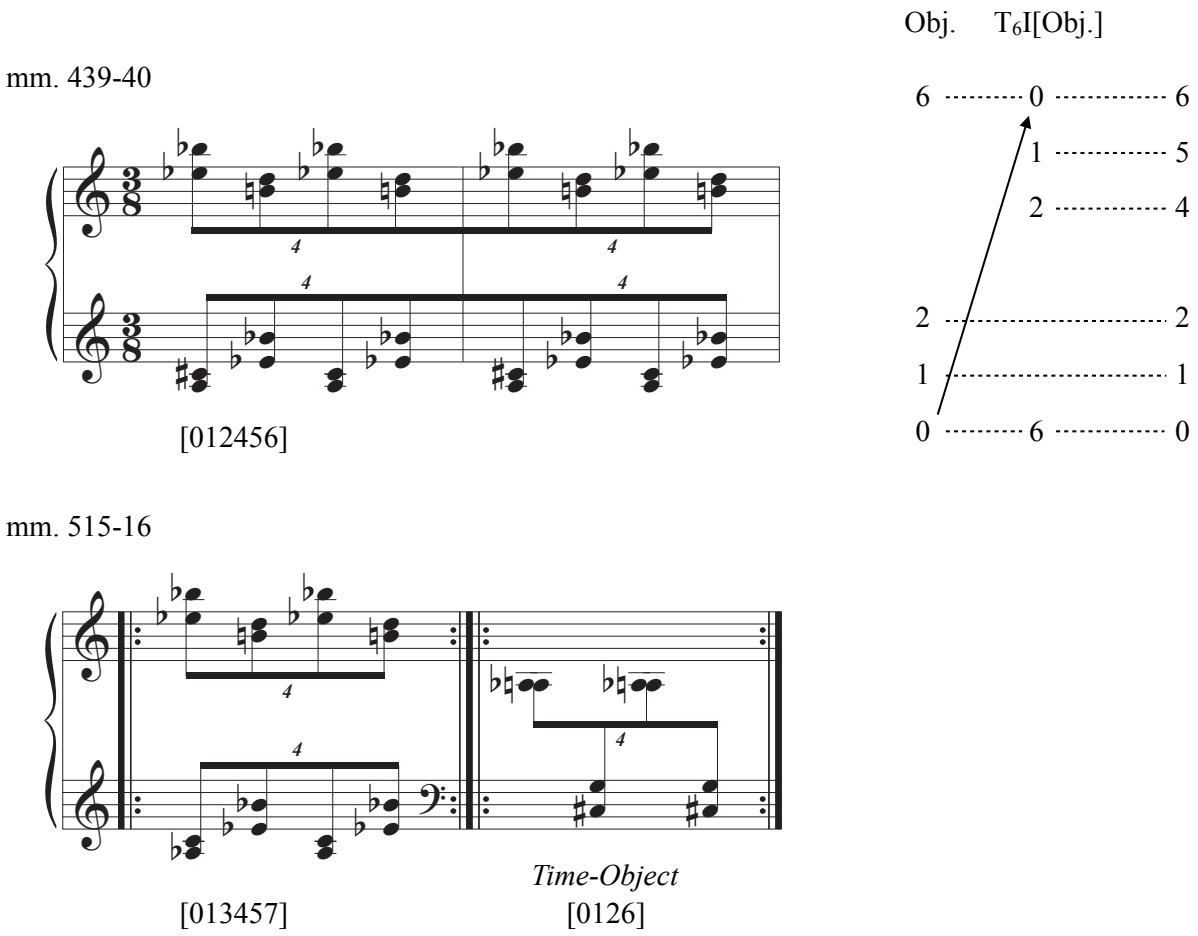


Example 3.18. *Various presentations of [0123] in Section 3.1.*

intervallic possibilities of [0123], ic1 and ic3 (although this reconfiguration is typically sustained for only a single, isolated, measure at a time). New textural and rhythmic possibilities are also explored throughout the section (Example 3.18): (1) the presentation, in single measures, of both linear and vertical instances of ic2, (2) the first pitches of eighth- and sixteenth-note duration, (3) the use of compound intervals, (4) pitch embellishment through arpeggiation or grace notes, (5) long passages of rapidly alternating pitch-clusters, and (6) mid-measure repeat signs, among

other things. In fact, the various guises in which [0123] is presented in this section are so distinctive that it is nearly impossible to establish a normative profile for the pitch set – making this an excellent example of Feldman's late-style practice of reiteration by way of subtle variation.

Between these constantly transforming presentations of [0123] are interpolated fragments of earlier material that, in their explicit reference to the past, function like the aforementioned "fabricated memories." Again, the various ways in which this compositional technique manifests are too numerous for it to be practical to discuss them all here, but it should be sufficient to indicate a few notable instances. These interpolated fragments can be characterized according to two basic types: 1) iterations of the time-object and 2) rather lengthier passages that are direct quotes of earlier material. The first interpolation (m. 350) is an exact replication of the time-object as it occurs in motivic cell (2b) of Section 2.3, simply transposed an octave higher (Example 3.13). The time-object returns frequently, often in altered forms that have not been previously encountered, but the transformations are never so significant as to make the instances lose their signifying function. Perhaps the most attenuated instance is reproduced in Example 3.19 (mm. 439-40), where the [0126] set class of the time-object is combined with its T_6I transform and performed in a texture similar to that of the pitch-clusters in Example 3.18. Although this excerpt's aural connection to previous forms of the time-object is significantly weakened by its prioritization of ic3, 4, and 5 rather than ic1 and ic6, a subsequent passage in Section 3.1 (mm. 515-16) presents the same textural content in immediate juxtaposition with an

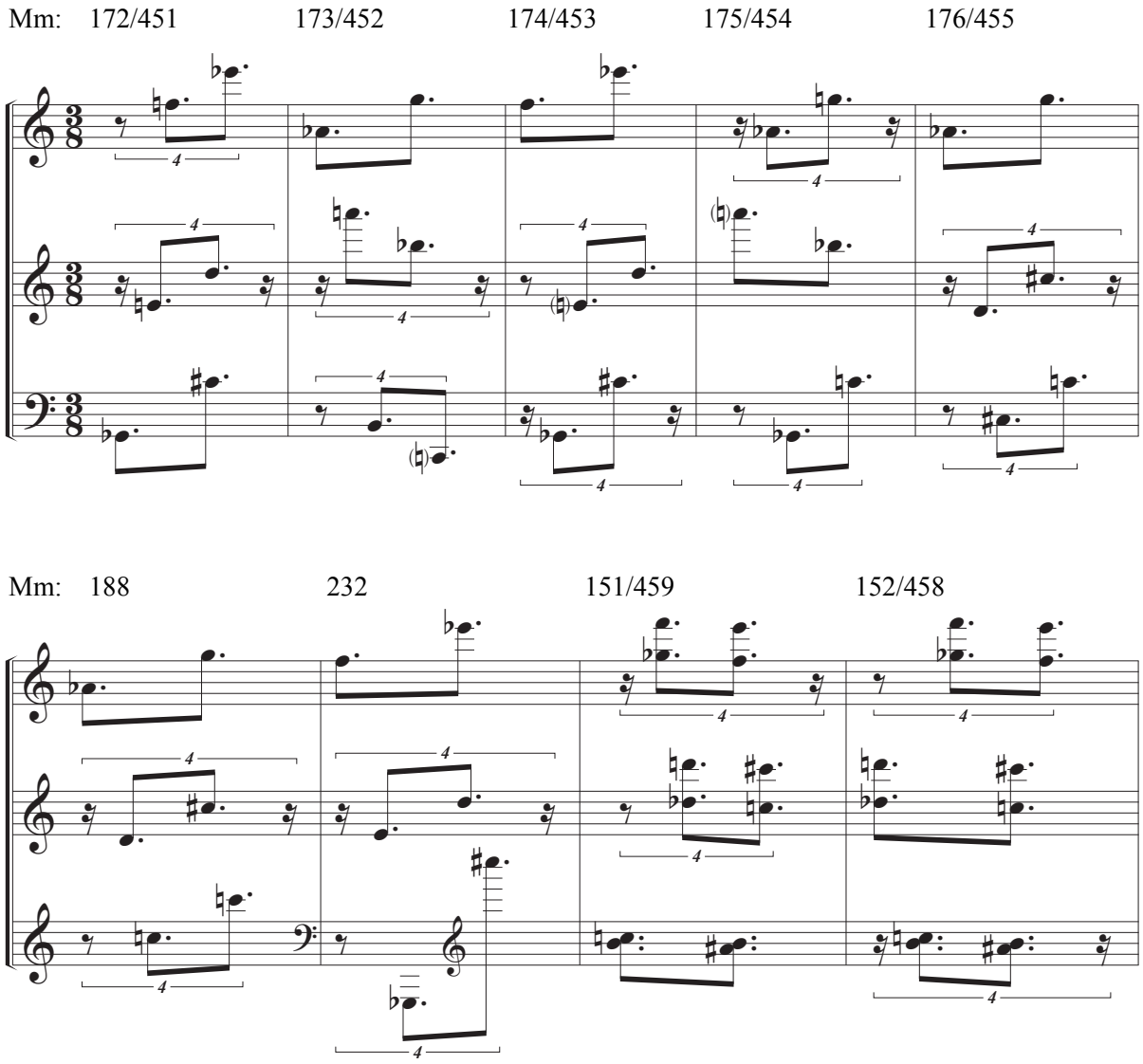


Example 3.19. *Excerpts from Section 3.1 and the transformation of [0126] into [012456].*

explicit form of the time-object and thus makes their affinities more noticeable.[35] Even though many of the numerous interjections of the time-object in Section 3.1 are subjected to some form of variation, most are more immediately recognizable than Example 3.19; but even the most obscured instances work to maintain the aural presence of the time-object throughout the first half of Section 3.

[35] Despite this second iteration's variance in set class content from the [012456] hexachord of mm. 439-40, the texture and interval grouping are so similar that it is more than capable of establishing a semiotic link between this unique motivic gesture and the time-object.

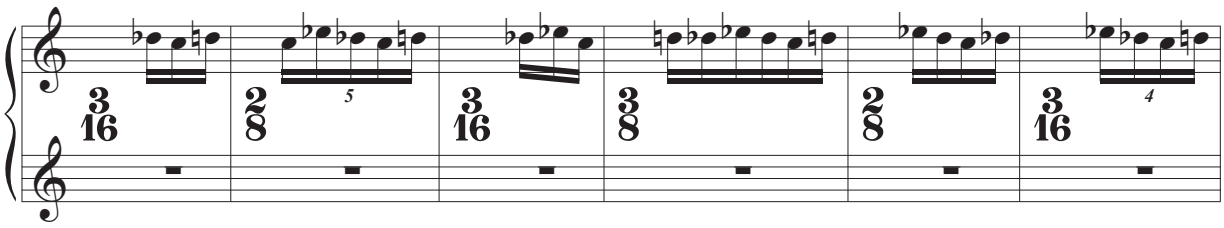
There are three longer interpolations of foreign material, occurring in mm. 415-24, 451-59, and 631-39; each passage draws primarily from Section 2.2 (Example 3.12), though only the latter two passages quote it directly at length. The first passage is initiated by a complete reproduction of m. 236 (set class [01245]), which is then repeated with rhythmic variations and gradually expanded to the chromatic hexachord, [012345]. Although it is not an explicit reproduction of earlier material, the linear-dyadic texture of this passage is immediately



Example 3.20. Triadic Memories*, mm. 631-39.*

recognizable as being from Section 2 and contrasts sharply with the surrounding material which consists only of single, repeated pitches. The two remaining interpolations consist entirely of quoted material: mm. 451-59 is a repetition of mm. 172-76, 179-80, 152, and 151 (for a total of nine measures), and mm. 631-39 is a repetition of mm. 172-76, 188, 232, and 151-52 (nine measures). Example 3.20 reproduces this last passage in its entirety with the measure numbers for the source material provided above the score; note that some measures, because they were quoted in the second passage, have two referents.

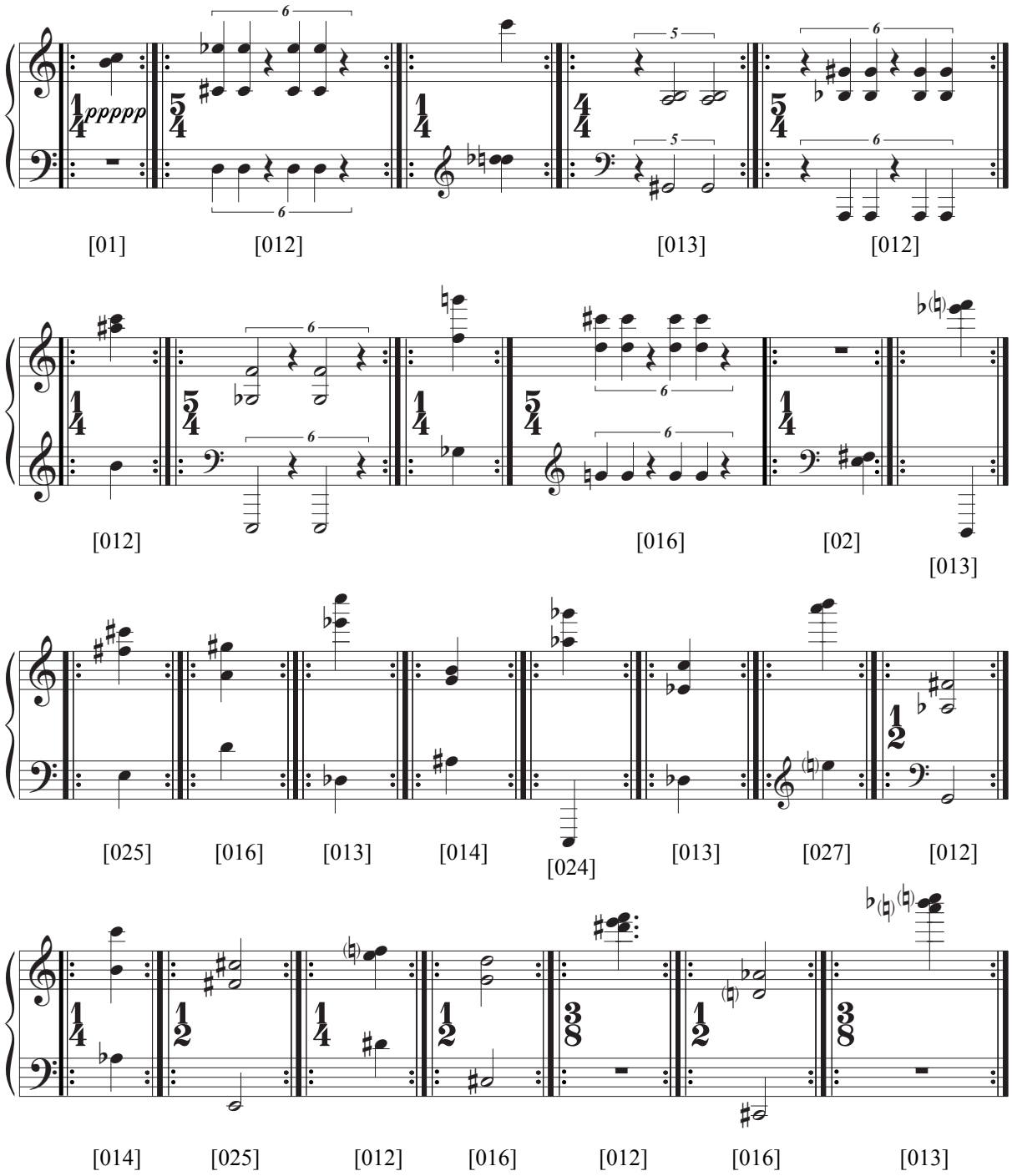
Section 3.2 significantly pares back the musical material of the first part by dwelling almost exclusively on the [0123] pitch set. Despite its extremely predictable pitch content, the C–D♭–D–E♭ tetrachord is outlined in a randomized sequence that seems designed to prevent listeners from anticipating the exact pitch order of each successive measure. Further lessening the predictability of this monothematic section are the constantly changing meters in which [0123] is performed (Example 3.21). The motivic content of Example 3.21 is nearly ubiquitous throughout the remainder of the piece, only yielding for two brief passages to a time-object derived interval sequence and the aforementioned disorientation passage. Due to the persistent and unmistakable aural presence of [0123] throughout the entirety of Section 3, this tetrachord is justifiably identified as the final form of the time-object of *Triadic Memories*. Though the result of an extended process of diminution, it is important, by Feldman's conception, not to view this tetrachord as an idealized, rarified end, but simply the last step in the life-cycle of a sound. To impose a teleologic directionality on the process would be to ignore Feldman's frequent statements that motion in his music is illusory. To the contrary, the way that Feldman speaks of musical material seems to necessitate a metaphysical (and rather



Example 3.21. Triadic Memories*, mm. 775-80.*

unconventional) understanding of the nature of time-objects; perhaps the closest analogy can be made with how humans commonly understand their own existence. That is, individuals do not consider their identities to become any more fundamentally real over time; rather, their *essence* remains fixed and it is only the guise in which they are presented to the world which changes. Similarly, in Feldman's conception, musical material has an essential identity that remains constant throughout the regular changes on the music's surface. The [0123] tetrachord, therefore, is simply the remnant of what began as [012367] – the final stage in a series of transformations that traces the life a sound. However, just as the identity of a person is epistemically inaccessible to all but him/herself, the time-object's constantly morphing rhythmic and textural presentations are intended to preclude the possibility of locating an objective statement of the work's musical content in a conventional theme or melody.

To mitigate the high degree of predictability that would be unavoidable if the repetitive motivic content of Example 3.21 continued to the piece's conclusion, Feldman, in mm. 910-35, interrupts the musical progression with the series of chords that constitutes the "disorientation passage." With one exception (m. 918), each chord is presented within its own repeat signs and can be reiterated as many times as the pianist choses, meaning that the performative realization of this passage will be extremely unpredictable. Example 3.22 reproduces the complete passage

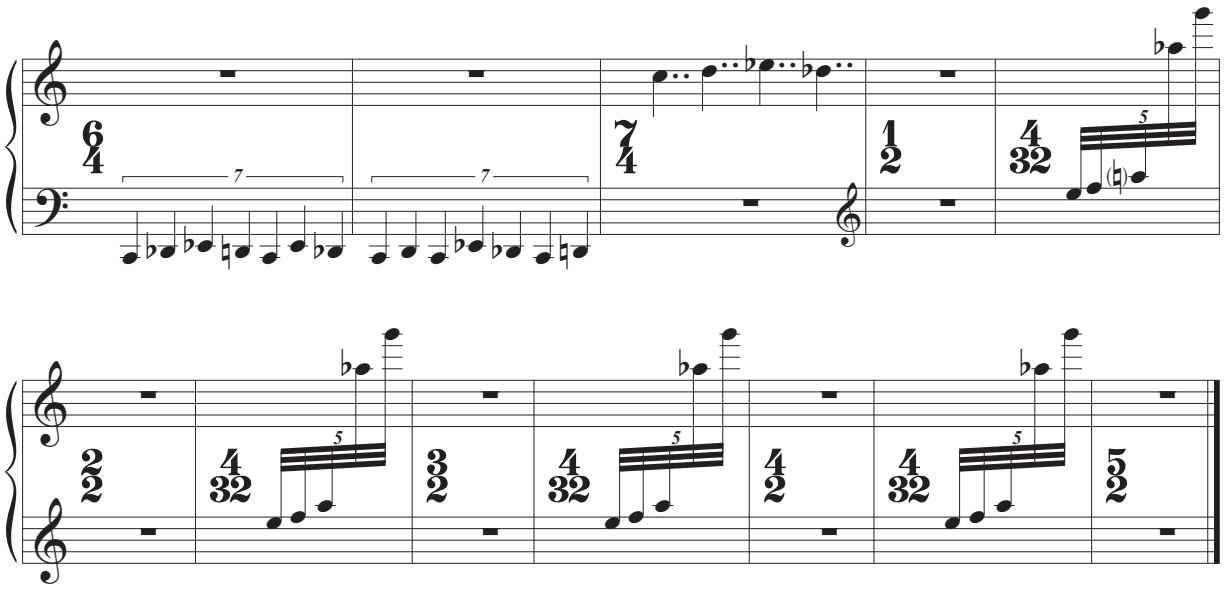


Example 3.22. Triadic Memories*, mm. 910-35.*

and presents the set class for each trichord below the staff. Although some familiar sets make an appearance – such as the [0123] subsets, [012] and [013], and the event-type A measure-discrete

trichords, [014] and [016] – the less-anticipated sets [024], [025], and [027] are also used briefly. The gradual incorporation of these three sonorities is initiated in m. 919 by the [02] set – one of only two dyads used in the passage and a subset of all three trichords. It will be remembered that [025] and [027] were present in Section 2.1 (albeit implicitly, as the structural relation between ic1 dyads), but [024] finds little precedent at all in the preceding music. This is an important phenomenon because, rather than functioning as a recapitulation of all the set classes introduced thus far in the work, this passage is intended to disorient listeners by precluding accurate protentions; these three trichords, through their common use of ic2 in a context dominated by ic1, represent an even deeper level of the formalized disorientation of memory.

The final pages of *Triadic Memories* consist of a fragmentary collection of motivic cells, all familiar from before the disorientation passage, but presented in an unexpected sequence to make prediction nearly impossible. The work seems prepared to end with the [0123] time-object, augmented in duration to bring the piece to a gradual conclusion; however, reluctant to leave listeners with the comfortable sense of closure that would follow such a gradual cessation of the music, Feldman adds four rapid, ascending flourishes – as if to reiterate that listeners should give up all efforts of anticipation and rather allow themselves to be passively subsumed by the music's spontaneity (Example 3.23). Because of its deep referentiality and the rigorous demands that it makes of listeners' faculty of recollection, it is challenging to engage with *Triadic Memories* in a way that is consistent with the composer's intentions. Speaking of these elevated requirements in conjunction with his *String Quartet II*, Feldman said that "there's the possibility for infinite variation…I have to work harder in constructing pieces these days because I don't



Example 3.23. Triadic Memories*, mm. 1078-89.*

want 'baby food' memory: I want real good, sophisticated memory."[36] *Triadic Memories*, composed six years later, continues in this vein by demanding that listeners attend to the seemingly countless variations of a time-object and work tirelessly to relate each present moment to its numerous past referents.

Before concluding, brief mention should be made about the role of the Husserlian model of time-consciousness in the present analysis. It may have been noticed that no models of consciousness were used for mapping the events of *Triadic Memories*, despite the recurrent use of Husserlian concepts in the discussion of temporal experience. The reason for this lies in the nature of the events themselves. Due to the lack of a primary event and the constant (but directionless) variation to which each event-type was subjected, the model of consciousness would provide an overly simple description of the progression of events as they appear to listeners. Therefore, to present the content of *Triadic Memories* on a linear, measured continuum

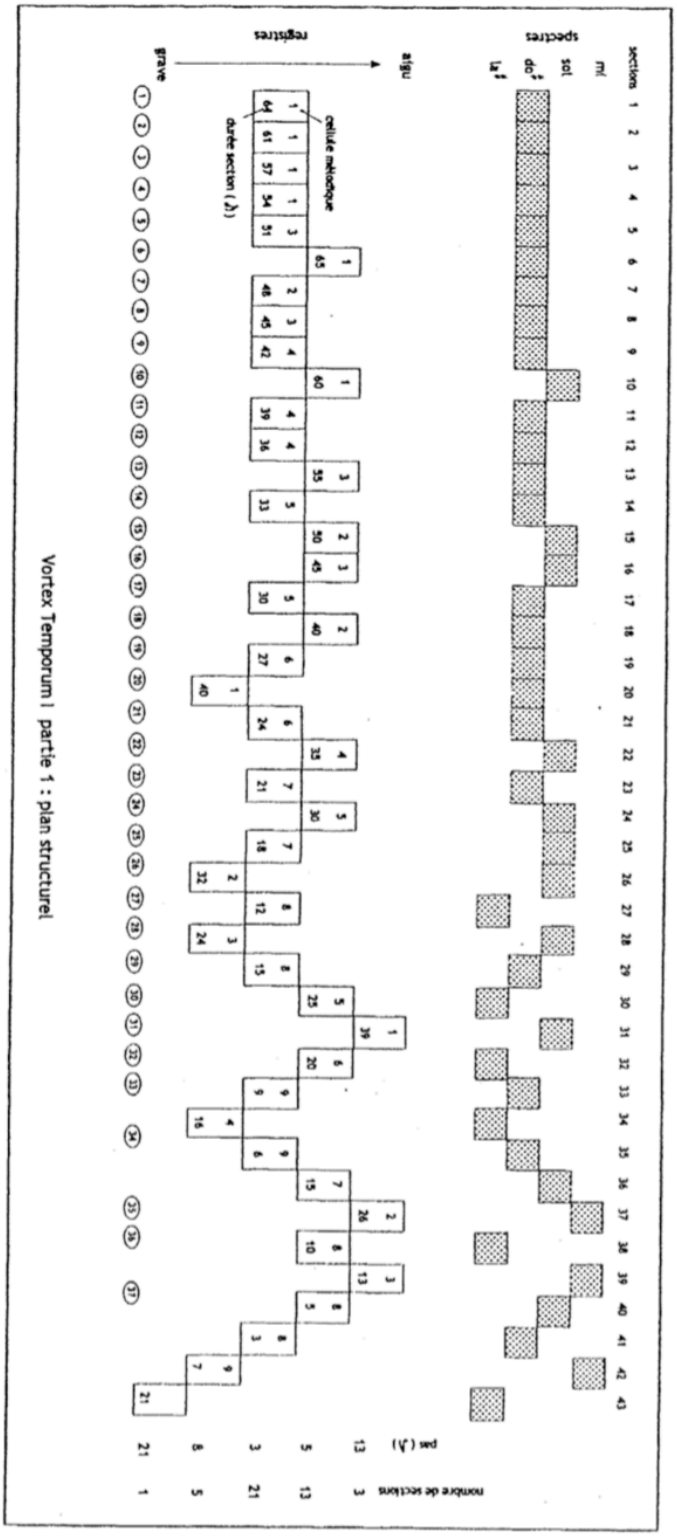
[36] Whiticker, "Morton Feldman: Conversation without Cage," 186.

would be to counter Feldman's primary aim in the construction of this piece: the preclusion of all recourse to idealized, objectified referents and the minimization of the appearance of directionality. In his conception, "events" are not discrete objects that can be pointed at and described through their variance with the surrounding material. To the contrary, if events may be spoken of at all, it is only as the incidental manifestation of what really concerns him: the time-object. The result of this conception is a highly repetitive motivic construction that would be not only impractical but misleading to represent as discrete events on a line. Once listeners have become immersed in the piece, the ability to quantifiably locate, by recollection, the complex network of referents which coalesce in each successive moment is nearly extirpated, leaving only the impression of compounding repetition. Therefore, the map of progression in 3.10b, with its undirected accretion of perceptions, is a much more accurate representation of the recursive nature of the music. This is not to say that the Husserlian conception of time-consciousness is "checked at the door" when listeners sit down for a performance of *Triadic Memories*, but that their innately linear perception of time, as described in the Husserlian conception, will be constantly at odds with the recursiveness of the music.

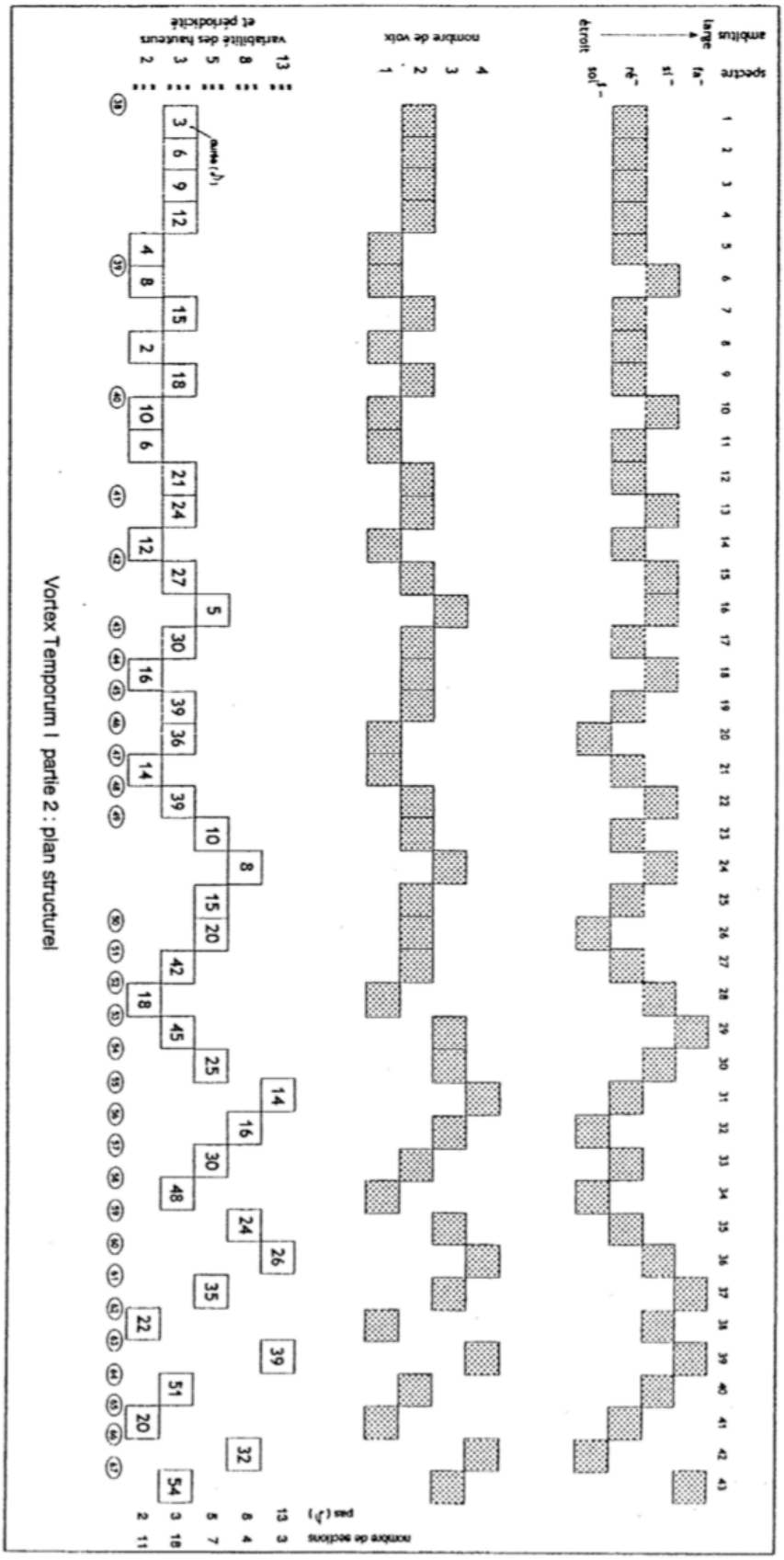
The tension between physiological, linear time and compositional, recursive time is the perceptual *tour de force* of *Triadic Memories*. By alternating between vast, monothematic sections – hypnotic almost in their repetitiveness – and unpredictable, collage-like sections, Feldman compels listeners to attend closely to the music or risk falling into a passive, soporific cognitive state. The consequence of engaging with the piece on these stringent terms, however, is that listeners' inherent temporal linearity will be shed, to the extent possible, in deference to the recursive, undirected progression of the music. Admittedly, there is a self-contradiction in this

manner of speaking, for words like "progression" and "repetition" imply linearity, if only in a temporal and not a structural sense: "progression," even devoid of its developmental connotations, requires a sequence of events to "progress through"; repetition, obviously, requires prior instances to be the source-objects for subsequent repetitions. But linguistic and cognitive limitations aside, it is not outlandish to say that Feldman's late works represent a concerted effort to *transcend* the normal experience of time entirely. This is not to imply that Feldman is unconcerned with time as a concept – his voluminous writings on the subject suggest strongly the contrary – but that time as direction is discarded in favor of time as object: the sun-less sundial, the streets that lead nowhere – these are the chosen metaphors for a time-object which has been extracted from its integument of the temporal continuum and presented as a stationary percept. Perhaps even more extreme in its temporal dilation than *Vortex Temporum II*, *Triadic Memories* functions like a vast, monolithic color field: representation, perspective, and linearity are discarded and, like standing before a Rothko painting, the audience is invited to view the artwork in its totality – to be examiners of time, outside of time.

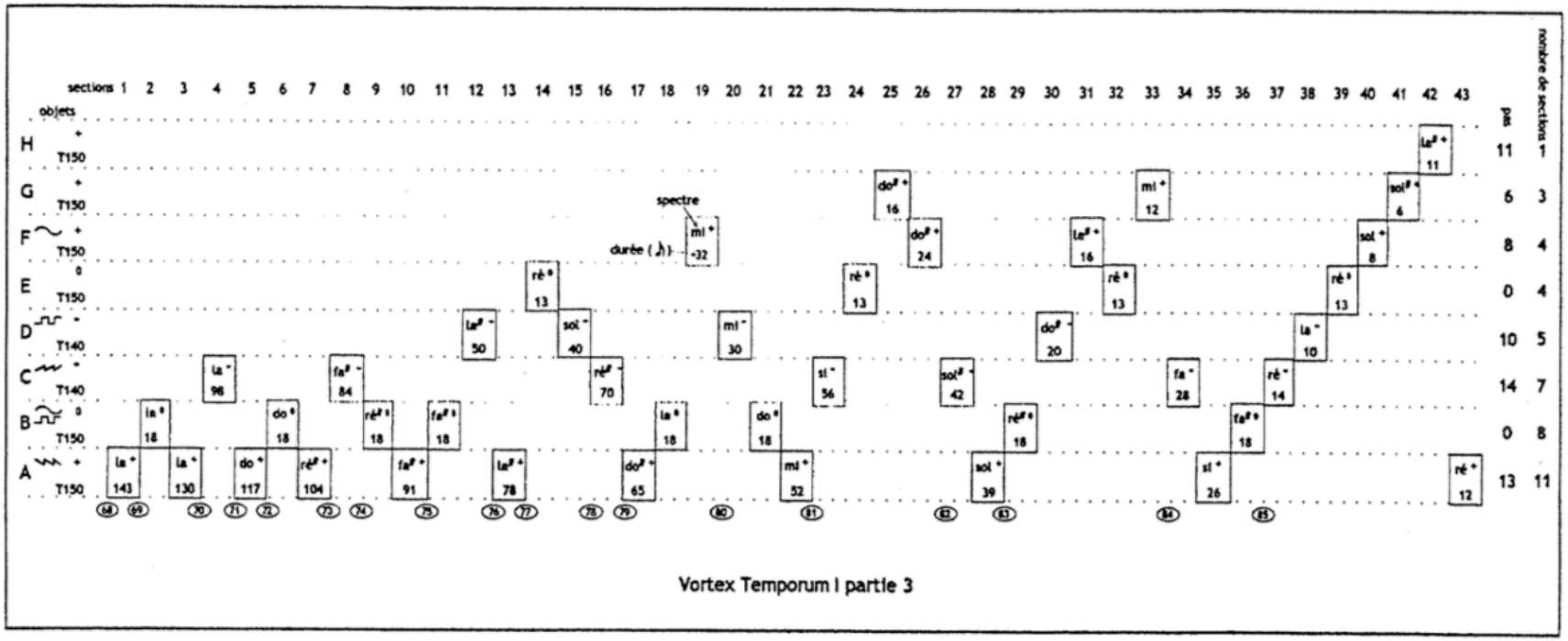
Appendix 1. *Jérôme Baillet's charts of duration and spectral content in* Vortex Temporum I*, Sections 1-3.*[37]



[37] Baillet, *Fondements d'une écriture*, 214, 218, and 220.

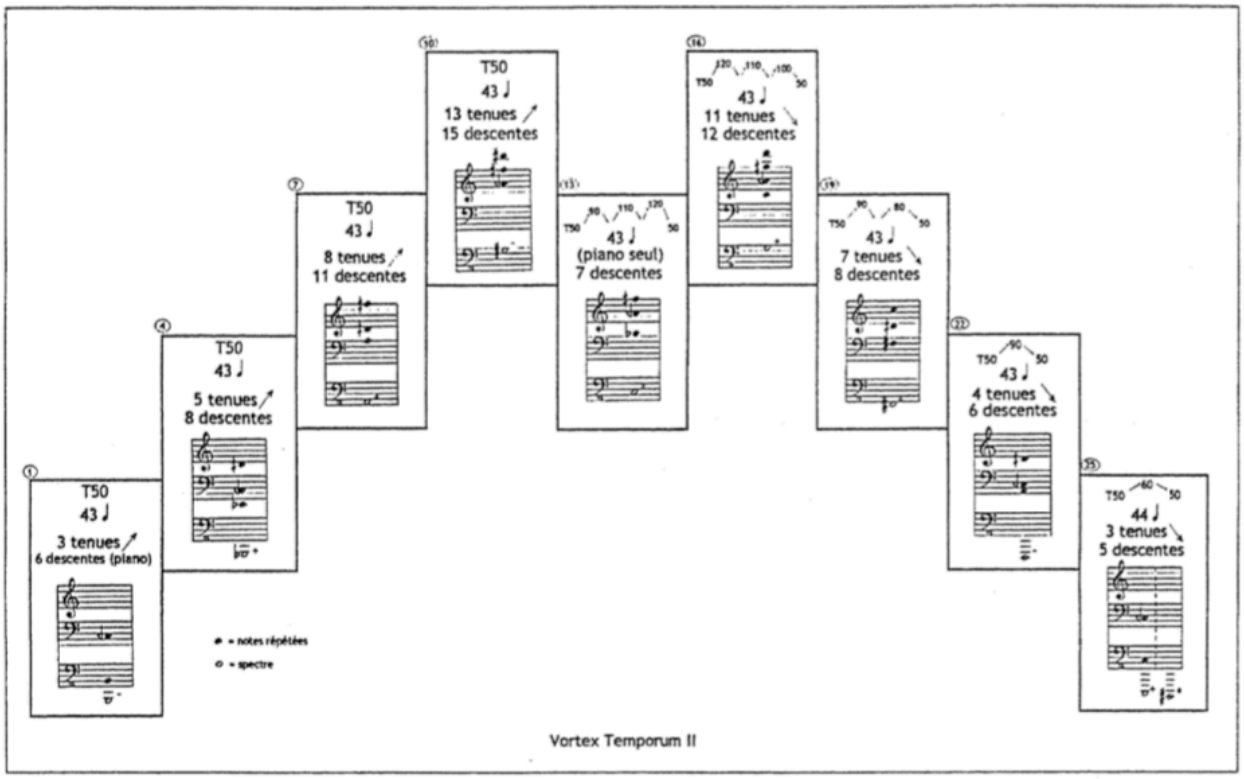


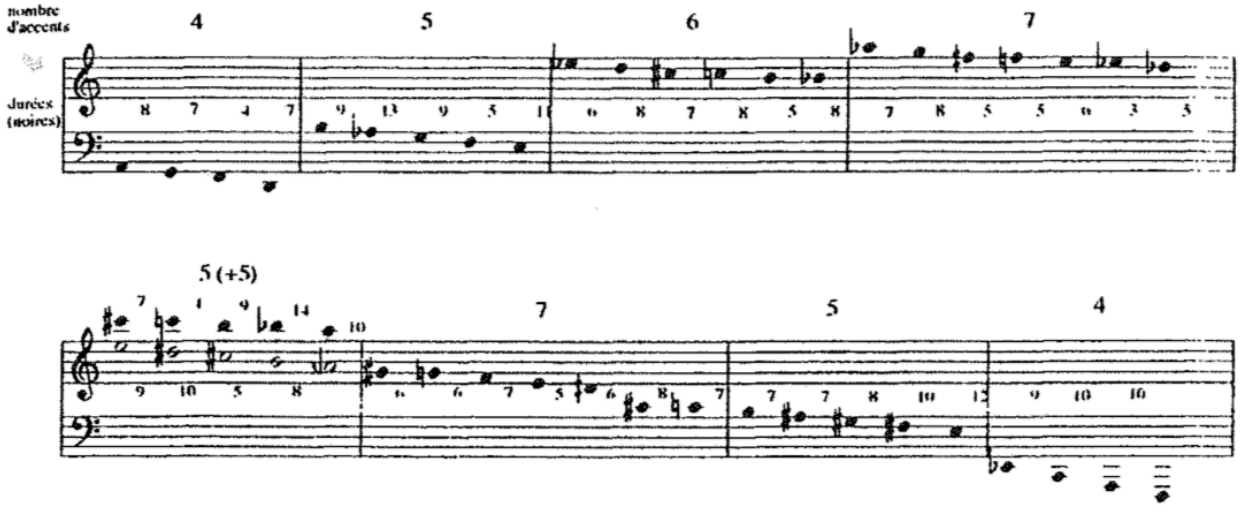
Vortex Temporum I partie 2 : plan structurel



Vortex Temporum I partie 3

Appendix 2. *Jérôme Baillet's formal outline and diagram of accents for* Vortex Temporum II.[38]

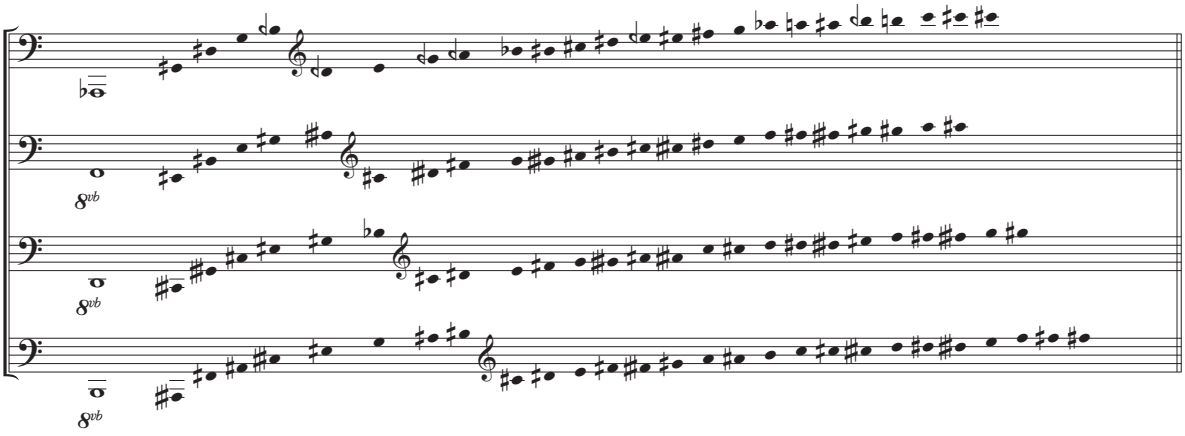




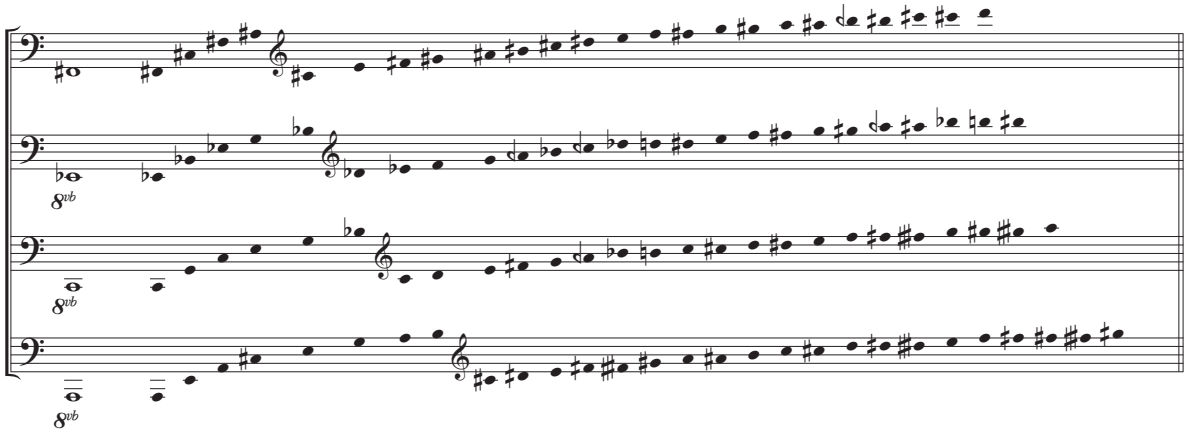
[38] Baillet, *Fondements d'une écriture*, 224-25.

Appendix 3. *Compressed, Natural, and Dilated Spectra in* Vortex Temporum.

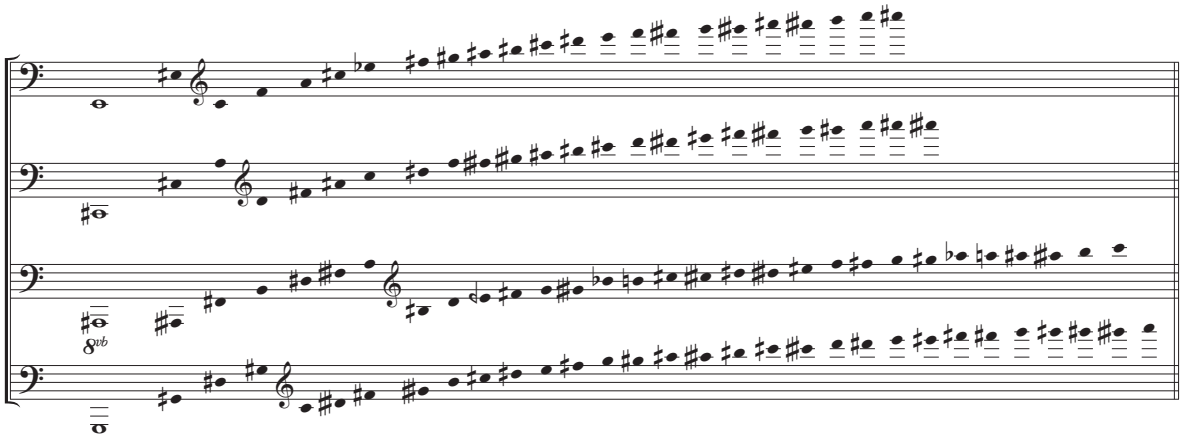
Compressed Spectra (0.956)



Modified Natural Spectra



Dilated Spectra (1.046)



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