Waking Up Into the Moment:

Temporal Awareness as a Primary Composable Parameter of Music

and

be created or, for sextet and electronics

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Abstract

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In this paper I hope to define, quantify, and analyze the way in which a listener perceives and understands the passage of time during a musical experience—in other words, their *temporal awareness*. I explore this concept in three capacities. First, I examine the relevant theory, both philosophical and psychological, surrounding temporal awareness and define its two primary manifestations through demonstrative musical examples. Next, I apply this theory to the analysis of six different pieces of music composed between 1895 and 2016, focusing on what I believe are the two strongest catalysts of change of temporal awareness. Finally, I discuss how I incorporate this theory into my practice both as an instructor and as a composer. A thorough musical analysis of my 2018 work *be created or* is presented through the analytical and compositional lens of temporal awareness, including its descriptive and prescriptive implications.

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Acknowledgments

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Introduction

In 2001, researchers at McGill University studied "intensely pleasurable responses" to music (i.e. chills) to learn more about the stimuli which cause them and the brain activity associated with the physiological response. The stimuli used in the study were subject-selected specific moments in pieces of Western classical music which consistently gave them chills, organized such that one subject's selection was used as another subject's "emotionally 'neutral' control." Among the findings of the study, two in particular stand out for their relevance to the topics explored in this paper:

1. "Chills were never reported for control music."
2. Subjects demonstrated decreased amygdala activity, which is associated with euphoria and/or pleasant emotion, in response to their selected stimulus. "Decreases in the left amygdala [have been previously shown to correlate with] 'craving' rather than 'rush,' suggesting that the amygdala decreases observed in the present study may have occurred *more in relation to anticipation of the chills response than to the chills response itself* [emphasis added]."[1]

The data suggest that a significant portion of the pleasure and reward a listener receives from a compelling musical experience is not inherent to the abstract sonic qualities of the music itself, but is strongly (and perhaps even primarily) associated with anticipation of the music in question. In other words: *when* something happens, and *what we remember and anticipate*

[1] A. J. Blood and R. J. Zatorre, "Intensely Pleasurable Responses to Music Correlate with Activity in Brain Regions Implicated in Reward and Emotion," *Proceedings of the National Academy of Sciences of the United States of America* 98, no. 20 (2001): 11818–23.

regarding what happens, are possibly more important to the musical experience than *what actually happens*.

The specific brain imaging data and neurological conclusions of the above study are well outside of the scope and intent of this paper. Nevertheless, the study offers direct scientific support for an idea that has guided my musical thinking to some degree for nearly a decade: that the *temporal awareness* someone experiences while listening to music (i.e. the details of their in-the-moment understanding of how time is passing and how the music is transpiring within this passage of time) is a crucial component—if not *the most important component*— of any musical experience. This paper explores the function of a listener's memory and anticipation as fundamental elements of music, demonstrating why and how the resulting temporal awareness should be understood as a parameter of music essential to both its analysis and composition.

The paper can be divided into three parts, focusing respectively on the theoretical background, analytic application, and creative implementation of the concept of temporal awareness in music. Chapters 1 and 2 examine the relevant theory, both philosophical and psychological, surrounding temporal awareness and define its two primary manifestations through demonstrative musical examples. Chapters 3 and 4 apply this theory to the analysis of six different pieces of music composed between 1895 and 2016, focusing on what I believe are the two strongest catalysts of change of temporal awareness. Chapters 5 and 6 discuss how I incorporate this theory into my practice both as an instructor and as a composer, including a thorough analysis of my work *be created or*, composed in 2018 for mixed sextet and electronics.

Chapter 1: Theoretical Framework for Conceptualizing Temporal Awareness

Music is a unique art form in that it is both temporal and largely invisible. Sound is our physiological experience of compressions and rarefactions of molecules, a process which cannot be defined by a single moment. In order for sound to exist,[2] multiple different physical states must exist at different times, and a change must occur between these states; the movement of molecules between these states, perceived and filtered through our physical senses, is what we experience as sound. Our inability to see this motion leaves us incapable of visually tracing its progression, so any comparison we could make between two different states in order to quantify and categorize our experience of sound must be similarly intangible. Thus, visualizable representations of music and its common descriptive parameters (pitch, rhythm, timbre, and so on) tend to be metaphoric "fictions that we can mistake for truth."[3]

In combination, the temporality and intangibility of sound place a unique importance on the listener's metaphoric conception of the "passage of time" (itself a metaphoric description). Our *understanding* of our musical experience in the moment, then, relies heavily on our *understanding* of our conception of the passage of time in the moment. Put more simply, the latter could be described as our *temporal awareness.*

Our *conception of time* and our *awareness of our experience of time* are complex notions, complicated by the inaccessibility of the present (described in more detail in sections 1.2 and

[2] In our physical-object-based metaphorical shorthand (discussed in more detail in 1.1), it is logical that a sound does indeed *exist*. It would be more accurate, however, to say that a sound *transpires*, acknowledging the process-based (and perception-based) nature of the physical reality of sound. Similarly, Hasty and others would say that a sound *becomes.*

[3] Arnie Cox, in discussion with the author, December 2011.

1.3) and the inevitable indirectness of the metaphorical language utilized in describing time and its "passage." Any awareness of time that we possess is necessarily pieced together from our recollection of events and states that have occurred and our anticipation of events and states that have not. The primary determinant of our experience of time throughout a musical experience is the way in which our natural tendencies to anticipate future events and recollect past events are engaged.

1.1 Metaphoric Conceptualization of Time

Time is not a physical dimension, but rather tends to be conceptualized via a metaphor of physical dimension that we create in order to make sense of our ability to recollect and anticipate, to conceive of events as having occurred or having not yet occurred. Locations in space are *here* or *there* and we move between them, occupying certain spaces and not occupying other spaces at any given moment in time. We often use remarkably similar language to delineate time and the relationships between current, past, and future moments: seasons *come* and *go*, tomorrow *arrives*, we *find ourselves in* December already, we are *nearing* the recapitulation, and so on. Lakoff and Johnson offer the *location event-structure metaphor,* specifically STATES ARE LOCATIONS, to make sense of this phenomenon of human temporal conceptualization.[4] As sound (and therefore music) has been defined in part as resulting from a change of state or a relationship between states, we can extend the metaphor to TEMPORAL RELATIONS ARE SPATIAL RELATIONS.

In order to define such relations, we must compare different states and quantify differences between these states, which we understand as *change*. Furthering the metaphorical foundation of

[4] George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago, IL: University of Chicago Press, 2003).

this understanding, we generally conceive of change as being continuous, traceable, and direct. In fact, however, it is a fabricated dimension, an indirect measurement between two sets of data perceived by our physical senses. Nevertheless, it is this metaphoric conceptualization of state and change that give us a cognitive window into considering *the present* in all its complexity.

1.2 The Present as Threshold of Immediate Past and Immediate Future

The present derives its slippery nature by virtue of the non-instantaneousness of the cognitive processes which perceive it. The present as we understand it is not a moment, but a process. Mariusz Kozak writes that "We do not experience mere sequences of events, series of isolated 'nows.' We experience the processes of transition from one event to the next.... [The present] is not a durationless point that separates the past from the future, but a kind of *quality* in our experience, one that has both thickness and breadth."[5] In other words, the present is a process because our experience of it is necessarily a process, one that requires time to assign meaning and understanding.

Edmund Husserl's model of the structure of time consciousness, filtered and further developed by Maurice Merleau-Ponty, suggests that the primary linkages connecting these events (and thus steering us clear of the above-mentioned isolated durationless points) are the *retention* (memory) and *protention* (anticipation) of events on either side of the most current moment. These extensions of the moment reach forward and back to create "a network of intentionalities" which, collectively, yields the present in its barest perceivable form.[6]

[5] Mariusz Kozak, *Enacting Musical Time: The Bodily Experience of New Music* (Oxford University Press, 2020), 34.
[6] Ibid., 35-37.

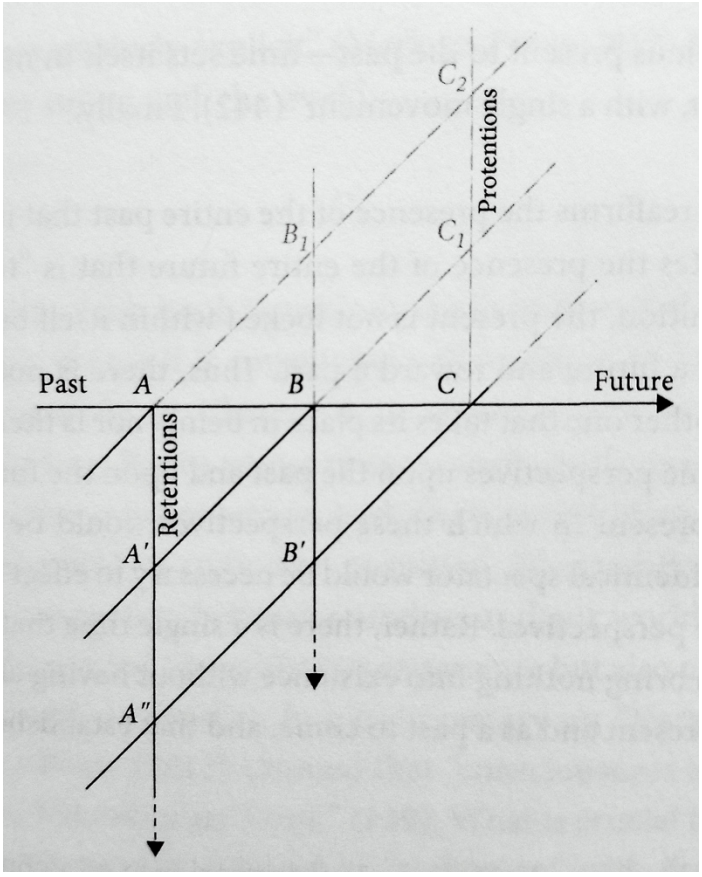

Figure 1: Merleau-Ponty's (2012) modifications to Husserl's diagram of the structure of time consciousness. The horizontal line connects a series of successive now points. Diagonal lines connect each "now" as seen from a later point. Vertical lines show successive retentions of the same "now."[7]

"To be aware of something is, in some measure, to take note of it."[8] Once it has been extended by retention and protention into a perceivable (i.e. note-able) phenomenon, what I will refer to as the *broad present* enters our awareness. David Burrows writes of this awareness-entering that "now-making turns out to be inseparable from past-making: the past makes its first appearance within the now itself. If a now lasts for even the smallest perceptible fraction of a second—and they all do—it acquires pastness. The past then deepens with the retention,

[7] Image and caption taken from Kozak, *Enacting*, 37.
[8] Lawrence M. Zbikowski, "Musical Time, Embodied and Reflected," in *Music in Time: Phenomenology , Perception, Performance*, ed. Suzannah Clark Alexander Rehding (Cambridge, Mass: Harvard University Press, 2016), 39.

reconfigured as a memory, of a now that has been succeeded by the current one."[9] Beyond recollection of the immediate past, anticipation of the immediate future is also implicated by Burrows as a key ingredient in this fundamentally biological engagement with the broad present: "The balancing act of maintaining a life by means of now-acts gives the immediate now of organic existence its quality of charged momentousness, of being forever poised on the brink of whatever next."[10]

Christopher Hasty applies this biological requirement of time to all perceived sonic events, rendering the possibility of an objective, absolute "now" incompatible with the act of attention/awareness. "If we consider [a sonic event] as something that is actually performed and actually perceived or experienced, [as] an actual event that we are attending to, the only coordination we could speak of would be the coordination of our attention with the event that we are attending to, *and such an act of attention cannot itself be durationless* [emphasis added]."[11]

1.3 The Present as "Now(s)"

The present is a process, nestled in the narrow gap between our retention and protention and entirely dependent upon our biological process of cognition, directed by our awareness, in order to "exist" in our consciousness in any meaningful way. Perhaps, then, all of time can be reduced to a series of *connected* "nows," delicately attached to one another by the overlap of our own broad present. Husserl presented this image as pearls on a string, which Kozak interprets as arguing that "…each moment holds on to the one just passed, and anticipates the one about to come, as if each pearl seamlessly melded into the ones on either side of it while simultaneously

[9] David Burrows, Time and the Warm Body: A Musical Perspective on the Construction of Time (Leiden, Netherlands: Brill, 2007), 20.
[10] Ibid., 8.
[11] Christopher F. Hasty, *Meter as Rhythm* (New York, NY: Oxford University Press, 1997), 71.

being held as a discrete unit."[12]

Bob Snyder clarifies these tenuous tendrils of temporal touch as the effect of echoic memory, or "the persistence of a large amount of auditory information for a very short time, usually on the order of 250msec, and probably no longer than several seconds…. The concept of echoic memory reflects the fact that incoming auditory information persists long enough to be processed."[13] As information persists, the current becomes the immediate past and both are absorbed into the present, reflecting forward toward the next moment to be included.

In broadening our definition of the present, we reach the conclusion that in fact the present cannot be understood, interpreted, or measured; in comparing two states, it is necessarily true that neither state is the current, but that both are merely remembered organizations. Given our inability to interpret the present as anything but a fleeting set of data, a broader scope of perception is crucial to our understanding of ourselves and our place in time and space; anticipation and recollection are the means by which we gain this understanding. Mental engagement with non-current states allows for analysis of change, and thus comparison. Comparison, in turn, allows for the imposition of hierarchy on our environment. A hierarchical interpretation of stimuli is absolutely essential to survival. An ability to determine at any moment what is important and what is not important affords us the opportunity to respond to our surroundings and maintain control over the interaction between our physical selves and our physical surroundings; the basis for our hierarchical interpretation of the world is our need to be able to physically negotiate this world. Additionally, physiological processes and their requirements form the basis for our largely metaphorical interaction with and understanding of

[12] Kozak, *Enacting,* 36.
[13] Bob Snyder, *Music and Memory: An Introduction* (London, England: MIT Press, 2001), 20.

time. The latter is a product of the physiological necessity of recollection and anticipation, as well as our cognitive ability to use the information gleaned from these activities to form a conceptualization of non-current states and the perceived differences between them.

1.4 Short-Term Memory, Cognitive Capacity, and the "Choice" of Awareness

Our finite cognitive capacity prevents an entirely comprehensive awareness of time, which would consist of simultaneous recollection of the immediate past and the distant past, anticipation of the immediate future and the distant future, and full awareness of the broad present and the imperceivably current present. As we have seen, even the present requires the engagement of memory, and "the capacity of short-term memory limits the number of elements that can be maintained in immediate memory…. Short-term memory is thus what is immediately *available* to conscious awareness at any given time. Only the focus of conscious awareness is completely conscious."[14]

Regarding the focus of conscious awareness, David C. Rubin invites the consideration of six different questions:

1. What is your name?
2. What is the color and shape of winter squash?
3. How many windows are there in your home?
4. Is the first note of your national anthem higher than, or lower than, or the same as the second?
5. Where is the letter 'a' on your keyboard?
6. How do your feelings when you have a manuscript accepted differ from your feelings when you have a manuscript rejected?[15]

It is immediately clear that answering each of these questions requires accessing a slightly

[14] Snyder, *Memory*, 51.
[15] David C. Rubin, "The Basic-Systems Model of Episodic Memory," *Perspectives on Psychological Science: A Journal of the Association for Psychological Science* 1, no. 4 (2006): 277.

different mode of memory. Of particular interest as it relates to focused awareness and musical time is the third question; "as Rubin notes, while there is a strong visual component to this question, to answer it many people will take an imaginary walk through their home as a way of taking inventory of the windows therein."[16] Revisiting Snyder in this context, we see that "moving through large physical spaces requires that we use long-term memory in much the same way that moving through 'long stretches' of music does. Indeed, the very notion of a musical 'piece' is physical and spatial."[17]

The processes of recalling the number of windows in our home and recalling a previously heard musical development are not dissimilar, in that they both require that we refocus our attention/awareness on a remembered state or event. On the topic of memory and musical form, Snyder writes:

> The formal level and its articulation are associated with the structure and limits of long-term memory. Unlike those on the melodic and rhythmic level, patterns on the formal level exist on a timescale that is too large for them to all be grasped in the present. […] Discovering relations between events on the formal level requires that those events come at least partially back into consciousness (through recollecting or reminding) from long-term memory.[18]

The effect of the different cognitive loads of present-engagement (including the retention and protention of the immediate past and future, respectively) and past-reconstruction is that the two are mutually exclusive at any given moment. The "flow" experience of being fully immersed in the present, so often associated with musical performance, operates to the exclusion of meaningful activation of memory of the recent past.[19] Similarly, the "live analysis" of a musical experience, in which we interpret, reinterpret, and revise our understanding of musical processes

[16] Zbikowski, *Musical Time*, 44.
[17] Snyder, *Memory*, 14.
[18] Snyder, *Memory*, 14-15.
[19] For more detail on flow, including the components which comprise it, see Csikszentmihalyi, *Beyond Boredom and Anxiety*, as well as Peifer and Engeser, *Advances in Flow Research*.

based on the constant flow of new information, necessarily comes at the expense of our capacity to fully engage with the present. At any point during a musical experience, either present-engagement or past-reconstruction must be relegated to the subconscious, while the other receives our limited attention.

1.5 Types of Long-Term Memory

Snyder writes that "relationships between events separated by more than an average of 3–5 sec are not perceived immediately, but only in retrospect; they are not automatically part of the conscious present, but must be recollected."[20] This statement requires a crucial clarification of the different types of *cuing*, or the associative process of one memory or experience being neurologically connected to another memory, and in turn activating this associated memory. *Recollection* is the conscious and intentional reconstruction of a remembered state. *Recognition* is the automatic and unconscious cuing of a memory in response to an event in the environment.[21] We can *recognize* unconsciously; for example, we might hear a sonic event and immediately recognize its similarity to one that has previously occurred. This recognition is unconscious, and does not necessarily have any significant effect on our temporal awareness or capacity to engage with the present. However, in order to process this recognition and draw any conclusions about the recognized information or events (e.g. to ponder how many times something has occurred, try to predict when it might occur again, construct a mental map of the form based on these remembered events and the relationships between them, and so on), we must move beyond recognition into *recollection.* Recollection is conscious, intentional, and

[20] Snyder, *Memory*, 69.
[21] Snyder, *Memory*, 70-79.

cognitively taxing in comparison; therefore, it tends to have a much stronger effect on our temporal awareness, often taking us "out of the moment."

Long-term memory (LTM) is divided into *implicit memory*, which is not available to consciousness, and *explicit memory*, which is conscious. Explicit memory is further divided into *episodic memory,* which is the memory of specific events and experiences in one's past, and *semantic memory*, which consists of abstract conceptual knowledge. "Semantic memory is what we refer to when we speak of 'knowing' as opposed to 'remembering.'"[22] The function and balance of these types of memory during a musical experience are largely determined by one's mode of engagement with the musical experience, and by the novelty of the musical experience.

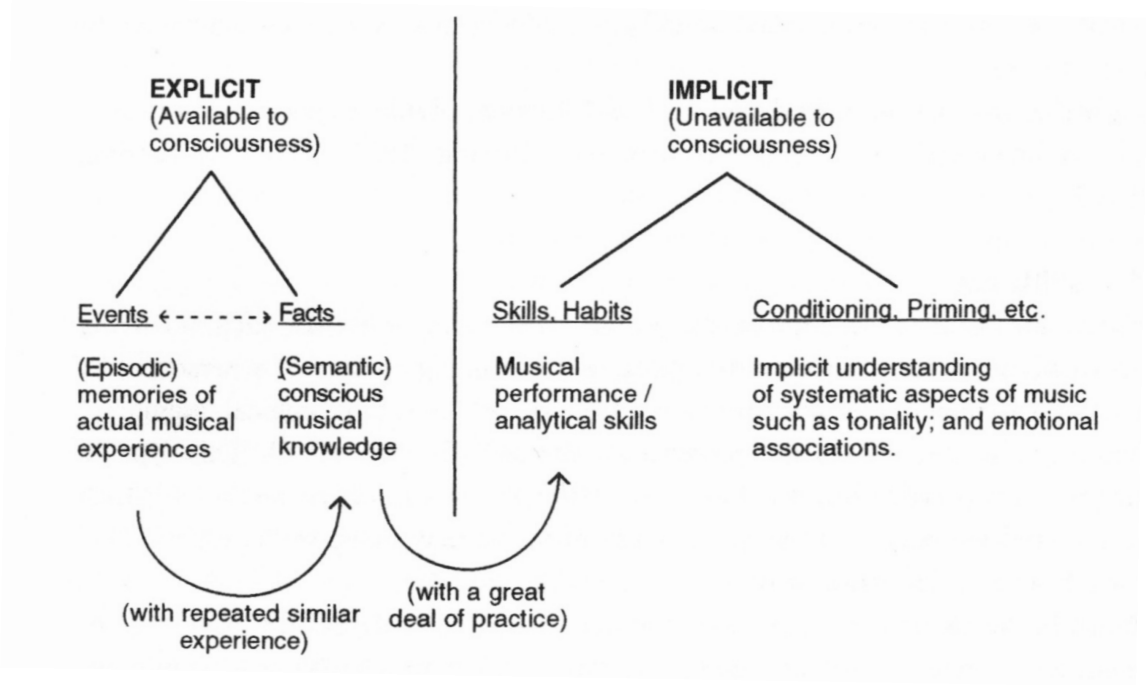

Figure 2: Types of long-term memory[23]

[22] Snyder, *Memory*, 72-77.
[23] Image taken from Snyder, *Memory*, 76.

1.6 Implicit vs. Explicit Memory as Determined by Mode of Engagement with the Musical Experience

Implicit memory operates below consciousness, without the subject being "consciously aware that [they] are memorizing or recollecting anything at all."[24] This memory system manifests primarily during a *performed* musical experience (as opposed to a *heard* musical experience), as it is most closely associated with physical and muscular activities, or "skill memory."[25]

Performing music, particularly at a high level of mastery, constitutes the ultimate musical activation of implicit memory. This can be seen in the processes of both learning to play an instrument and learning to perform a specific piece of music. Over the course of a tremendous amount of repetition, the complex details of instrumental technique gradually shift from being the products of conscious effort to being the products of unconscious muscle memory. Similarly, the complex relationships between the many ordered sonic events that comprise the piece of music are cemented into implicit memory through the process of repetition, changing from recollected events into unconscious knowledge. Upon mastering the performance of a piece of music, one no longer *remembers* the music; one *knows* the music.

This distinction may appear semantic, but is in practice quite significant; this can be seen in the way the "flow state," discussed in the previous section, manifests in musical performance. While performing a memorized and mastered piece of music, one is often in this flow state, fully attuned to the moment to the exclusion of external stimuli. In this state, the motor activities of performance are primarily unconscious, and the musical experience is driven by implicit memory

[24] Snyder, *Memory*, 72.
[25] Snyder, *Memory*, 73.

that is "quickly and automatically recallable, without conscious effort. In fact, conscious effort often impedes the use of implicit memory."[26] The latter phenomenon is all too familiar to experienced performers. While experiencing a flow state during a performance, a sudden shift from the activation of implicit memory to the activation of explicit memory can have devastating effects on the performance itself. This shift can be caused by an unexpected disruptive event which demands the performer's attention. Such a distraction, by virtue of its novelty, activates the explicit memory of the performer, and it is precisely this moment of consciousness which can cause errors, whether technical or "errors of memory" (though it is clear from the above that both musical technique and musical memorization are manifestations of the same implicit memory).

Error-causing moments of consciousness can also have solely internal causes. As discussed above, the implicit-memory-activating flow state of a mastered performance takes place largely below consciousness. Even without any external disruption activating explicit memory, a performer can unwittingly slip into a moment of consciousness. The sudden awareness of what one is doing places similar demands on explicit memory, which is at odds with the implicit performance of known (not remembered) actions. In this instance, even entirely free of external influence, a performer can find that a performance which one can give "in one's sleep" can in fact often be given *exclusively* in such a state; "waking up" from activation of implicit memory into the sudden activation of *explicit memory*,[27] in which "we consciously

[26] Snyder, *Memory*, 73.

[27] There is much similarity between this change of activated memory and the changes of temporal awareness discussed in Chapter 2 and throughout the rest of the paper, justifying the use of the "waking up" metaphor. The primary difference lies in the *physical* emphasis of implicit memory as discussed here. Snyder points out that "the memory of well-learned physical skills may actually be stored in 'lower' parts of the nervous system, closer to the actual muscles that execute them" (Snyder, 73). Despite the importance to the heard musical experience of Mimetic Motor Imagery and Mimetic Motor Action (discussed in Chapter 2), these phenomena are not as deeply rooted in unconscious physiology as the implicit memory of a performed musical experience. The implicit/explicit memory shift is a "waking up" from unconscious memory into conscious memory, whereas the Transitionary/Momentary Awareness shift is a "waking up" from one type of conscious awareness into another.

memorize or recall information"[28] (such as where we are, what we are doing, and what we are supposed to do next), brings with it the unfortunate realization that at a certain level of mastery, the vast complexity of a performance is available only to implicit memory, and cannot be accessed explicitly. The author has experienced this phenomenon more than enough times during his career as a pianist, and is sure that any serious performing musician can say the same.

1.7 Episodic vs. Semantic Memory as Determined by Novelty of the Musical Experience

Unlike performed musical experiences, heard musical experiences primarily activate explicit memory. Snyder summarizes the difference between the two:

> Explicit memory is usually organized into spatial or temporal sequences or into knowledge hierarchies. Most implicit memories take much repetitive practice to establish but are then used automatically and quickly, whereas more explicit memories are established quickly, but take relatively slow conscious deliberation to use.[29]

Whether the explicit memories formed when listening to music are primarily episodic or semantic is largely determined by the relative novelty or familiarity of the musical experience.

During a heard musical experience, every new sonic event activates episodic memory. These memories do not consist solely of acoustic information, but rather encapsulate the time, place, and other circumstances of the experience in addition to the acoustic fact.[30] During the musical experience, these episodic memories are accessed during periods of Transitionary Awareness (discussed in Chapter 2) as we develop our mental map of the music's content and form in real time. Once the musical experience has ended, we can recall elements of the

[28] Snyder, *Memory*, 74.
[29] Snyder, *Memory,* 74-75.
[30] Snyder, *Memory,* 75.

experience, which is what we think of as remembering the piece. Strictly speaking, we do not remember the music, so much as we remember our experience of it. "Much of our initial memory of a particular piece of music may be episodic, especially if we are hearing it for the first time;"[31] the *where, when, how, with whom*, and so on of the musical experience constitute our fallible and subjective memory of it.

Repeating a musical experience moves us away from engagement of episodic memory, and toward semantic memory. Snyder writes that "Over time, multiple episodic memories of similar experiences begin to lose their individuality, and form another type of long-term memory,"[32] semantic memory. With each subsequent experience sharing some critical threshold of similarity with a previous experience, our initial episodic memories are more thoroughly replaced by increasingly semantic memories; that is, our awareness of the musical work shifts from being rooted in the experience of hearing the work to being more abstract and "factual." In other words, we move beyond *remembering* the music into *knowing* the music.

For this reason, the analysis of works in the paper is not presented as objective, abstract analysis of an acoustic fact. Rather, they aim to analyze the musical experience from the perspective of a relatively unfamiliar listener. The experience of one who is intimately familiar with the details of a piece of music—who does not merely remember episodically, but *knows* the work more semantically—is given less attention in these analytical perspectives. As the musical experience moves from novel to intimately familiar, it in fact becomes less experiential in a fundamental sense. Every sonic event that once activated episodic memory has been replaced over and over by memories of memories, until the act of listening is effectively "replaced" by the act of recollecting semantic memories in temporal conjunction with the events they contain. At

[31] Snyder, *Memory,* 75.
[32] Snyder, *Memory,* 77.

this point in the understanding of a piece of music, a new performance or interpretation of the piece in question can create an experience novel enough to demand the real-time processing and discovery of episodic memory, but only in the manner and degree to which it departs from the semantically remembered version. *Novelty is what drives musical experience*, and musical experience is the object of analysis in this paper.

1.8 Further Defining Temporal Awareness

The past-reconstruction mode of temporal awareness is marked by a holistic inclusion of all recollected states. This engagement with time and memory, which I will call *Transitionary Awareness*, involves a clear recognition of multiple past states, as well as a conscious comparison between them. Differences between states are understood as changes of physical state (that is, location) in the imagined dimension of time. Greater awareness of location in this dimension, then, is similarly reliant on more extensive comparison between current and past states, as well as between past states of varying removal from the present. Such comparison is only possible through an acute awareness and recollection not only of these states, but also of the capacity in which they differ from each other and from the present. Changes between states, or transitions, are the critical component of this type of awareness of time; such awareness is only possible as the product of a thorough engagement with and analysis of states that have already been experienced.

The present-engagement mode of temporal awareness is more focused, with limited scope in the dimension of time, marked by an acute attention to the anticipation of future events and states. I will call this engagement with time and anticipation *Momentary Awareness*, as it is defined primarily by an engagement with the present, to the exclusion of any broader scale of

reference. This type of awareness does not depend on an understanding and analysis of change, as change necessarily occurs across a greater duration than is included in such awareness. Instead, it includes only the current and the immediately predicted, the latter holding important function in the cognitive suppression of our tendency to recall; a cognizance of the past inhibits Momentary Awareness, as does preoccupation with change. Of the five parameters of what Cox refers to as the "acoustic fact" (timbre, frequency, proximity, loudness, duration), duration is the only one with the potential to identify (i.e. "locate") a moment in time.[33] Thus, since Momentary Awareness neglects the mental measurement of duration, it often leads to the immersive, un-self-aware experience commonly described as being "lost in the moment." To be lost means to be unaware of one's whereabouts, at least to the extent that they can help one determine both one's location and the intended path to or from it. Similarly, a Momentary Awareness of time suggests the absence of a mental depiction ("map") of the dimension of time, as such a conception would have to be constructed from memories for which a true Momentary Awareness leaves insufficient cognitive capacity.

While it is almost certainly true that some individuals have a greater propensity for a particular kind of awareness—during a musical experience or otherwise—I believe that one's awareness of time during a musical experience is primarily inherent not to the individual, but to the individual's engagement with the acoustic fact, with the emphasis on the latter. This engagement is sensorially driven, a product of the sonic data being received and processed throughout the musical experience. Burrows points out that "a listener has only the sound of the moment to work from, and any impression of a whole is necessarily grounded in a fraction of the whole, the event of the moment. […] Events that have already run their course or are yet to come

[33] Arnie Cox, Music and Embodied Cognition: Listening, Moving, Feeling, and Thinking (Bloomington, MN: Indiana University Press, 2017).

have to be accessed other than sensorially, by remembering and conjecturing."[34] We attend either to our senses and perceptions in the broad present or to our memories and analyses in the past. Thus, at any given moment during a musical experience, the music is likely to motivate a certain type of awareness, depending on its relative compatibility with the contemplation of both the Momentary and the Transitionary.

[34] Burrows, *Warm Body*, 65-66.

Chapter 2: The Spectrum of Temporal Awareness

Music (i.e. moments of musical experiences) which primarily motivates recollection and macro-awareness of many different moments in time (and of the musical experiences which occurred during those moments) activates Transitionary Awareness. This "zoomed-out," self-aware state consists primarily of the keen preoccupation with the past as it relates to the present and more distant future, most notably including observations of form and large-scale development (*When have we heard that material before? Is it returning? Are we entering a new section?)* as well as more existential musical ponderings (*How long has this been happening? How much longer might it continue? Is this the end of the piece? What did the beginning sound like again?*).

Music which primarily motivates anticipation and micro-awareness of the immediate past and future activates Momentary Awareness. This "flow" state is marked by complete surrender to the music of the moment, looking no farther forward or back than the very next occurrence, notably precluding one's capacity to ponder the musical experience "from a distance." The moment is the only thing that matters, and indeed the only thing that *can* matter, as temporally broader consideration is by definition rendered cognitively inaccessible.

Transitionary Awareness is a product both of thoughtful recollection of past states and of comparison between these states. It allows for the creation of a metaphoric map of the passage of time, constructed from our memory of events and states that have already occurred. Momentary Awareness is a product of anticipation and embodiment of future events, particularly events follow a regular temporal pattern. It reduces our capacity for Transitionary Awareness, instead focusing our cognitive energies on the present and on our particularly profound proclivity to predict future states.

2.1 Transitionary Awareness and Momentary Awareness from the Perspective of Embodied Cognition

The field of embodied cognition offers significant support for the delineation of temporal awareness into Transitionary and Momentary Awareness. Arnie Cox writes extensively on the role of the *mimetic hypothesis* in musical awareness, particularly as the latter is determined by mimetic motor action (MMA) and mimetic motor imagery (MMI)[35]. A thorough reconstruction and analysis of these theories is beyond the scope of this paper, but in summary Cox argues that we engage with and learn about the activities and events we witness by confronting two core questions: "*What's it like to do that?* and its twin question, *What's it like to be that?*" He adds that "we answer these questions in part by overtly and covertly imitating the behavior of others."[36] In lieu of extensive entanglement with embodied cognition in this writing, three significant principles may be gleaned from the topic that have particular relevance to our examination of temporal awareness.

1. MMI/MMA are dependent on attention, which is (to a degree) dependent on the interest of the attendee:

> Activation of mimetic motor action and mimetic motor imagery depends on interest in an observed behavior, whether practical or aesthetic. If I am not particularly interested in a performance, or if I am interested but then my interest wanes or I am distracted, my mimetic engagement will be correspondingly weak, weakened, or interrupted.[37]

[35] Brief definitions of these terms, distilled from Cox's more thorough explanations: *mimetic motor action* (MMA) refers to overt (plainly evident, though not necessarily conscious/intentional) imitative behavior in response to a stimulus; *mimetic motor imagery* (MMI) refers to the relevant muscle-related brain processes that do not manifest in overt imitative behavior. Tapping your foot to a heard or imagined beat is an example of MMA; the neurological process of imagining or remembering tapping your foot to a beat is an example of MMI.
[36] Cox, *Embodied Cognition*, 11-12
[37] Ibid., 38.

2. Certain musical experiences motivate MMI/MMA more than others:

> While some music can invite or even 'compels' mimetic singing or dancing, other music can seem to 'resist' mimetic participation, or to otherwise offer an attenuated mimetic response. To understand this situation, it will help to recall the continuum of imitability, which depends upon both the musical features and the habits and proclivities of individual listeners.[38]

3. Familiarity with a musical experience increases MMI/MMA, which increases our propensity to anticipate, which increases our potential to experience reward:

> Through repeated exposure we come to understand, appreciate, and even prefer the music in question. [David Huron's *Sweet Anticipation* (2006)] suggests that we can think of this as the *prediction* effect, since exposure increases our ability to predict what will happen next, and successful prediction is rewarding. But we also get better at predicting what we will vicariously *do* next, as mimetic participants, and successful mimetic participation is also rewarding. Through repeated exposure one finds a way to mimetically engage with the music; it requires no voluntary, conscious, or overt imitation, but only attention, which co-occurs with mimetic motor imagery.[39]

The above principles yield an understanding of awareness as rooted in action, in process, in what the individual *does* (and perhaps even *chooses to do*) when confronting a particular musical experience. This is consistent with Zbikowski, who observes that "One of the marks of awareness is that it is under cognitive control. [It] involves having various images derived from perceptual and proprioceptual cognitive activity, and being able to in some fashion control which images are at the center of attention."[40]

In order to further analyze the experiencing, processing, and controlling of these "images," it will be useful to examine two musical examples, each uniquely suited to nearly exclusively inspire one type of temporal awareness throughout.

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[38] Ibid., 48.
[39] Ibid., 48-49.
[40] Zbikowski, *Musical Time*, 40.

2.2 Examining Transitionary Awareness: Ligeti's *Atmosphères*

György Ligeti's *Atmosphères*, for large orchestra, is particularly motivative of a Transitionary Awareness of time. The work focuses primarily on the composite sonority of the orchestra, gradually developing and manipulating textures on an expansive scale. One of the most salient features of the piece is its almost complete lack of discernible pulse. Throughout the piece's nine-minute duration, there is no time at which any regular pattern of sonic events is detectable. One strong effect of this absence of regularity is that the listener's capacity to precisely anticipate future musical events is attenuated. This goes hand-in-hand with a diminished mimetic invitation; with little to delineate or predict, there is little to imitate.

A term commonly and appropriately ascribed to *Atmosphères* is "timeless." This is, of course, a metaphorical designation, as any sound, and thus any musical experience or work of art that is based in sound, is entirely dependent on time in order to exist. Time is no more or less significant a parameter of this music as of any other music; the key difference is the way in which we perceive time while listening to it. In this instance, "timeless" is a reference to our attempt to embody the more salient temporal characteristics of the acoustic fact. In engaging with music, one typically has the most powerful physical response to sonic events and articulations that are rhythmically measurable; the strongest response is elicited by patterns of durations that we can perceive, organize, and predict. Huron observes that "since accurate predictions are of real benefit to an organism, it would be reasonable for psychological rewards and punishments to arise in response solely to the accuracy of the expectation."[41] By design, *Atmosphères* is almost entirely devoid of rhythmic measurability; there are no opportunities to reap the rewards of accurate predictions, and thus little incentive to expend cognitive energy

[41] David Huron, Sweet Anticipation: Music and the Psychology of Expectation (Cambridge, MA: Bradford Books, 2008), 12.

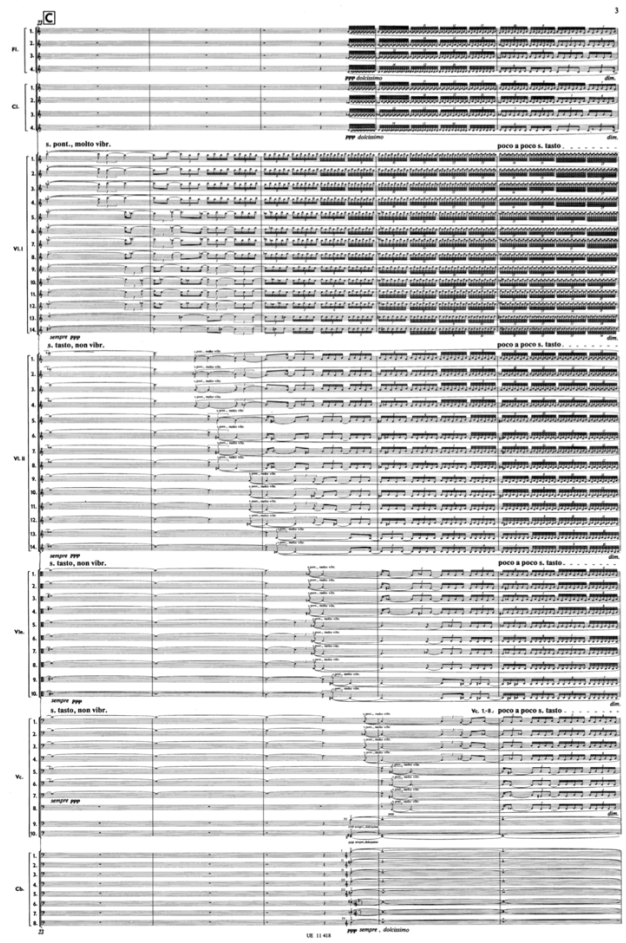

Figure 3: György Ligeti, *Atmosphère*s, mm. 23-27 (2:18-2:44). In this clear example of Ligeti's famous micropolyphony, one need not be able to read the individual notes to surmise that absolute density of sonic events does not necessarily yield perceivably measurable rhythm, nor, in turn, opportunity for accurate durational prediction.

toward such an end. Our propensity to anticipate is unable to manifest itself, which causes a severe reduction in our Momentary Awareness. As our Momentary Awareness is reduced, our perception of time attains a broader focus, prioritizing Transitionary aspects of the music.

By severely limiting our capacity to anticipate, *Atmosphères* enhances our inclination to recollect. Although the work does not motivate a compelling engagement with Momentary rhythmic events, it does follow an easily discernible form. Perhaps because of the lack of emphasis on perceivable rhythm, development of the remaining musical parameters becomes particularly noticeable. The work can be neatly divided into multiple sections, none lasting for

more than a minute or two, each marked by a characteristic orchestration and timbre. The divisions between these sections vary in their degree of clarity and distinctiveness, but the sections are each so unified in character that even the most fluid partitions are easily detectable. The emphasis on formal and sectional unity creates an exceptionally traceable temporal development that yields a particularly accessible repository of potential memories. This motivates more or less continuous comparison between the current musical state and recalled musical states; we are aware not only of what is transpiring at the moment—since "the moment" is in this case such an extended slice of easily-accessible memory—but also of the ways in which it differs from what we have already experienced.

In drawing direct connections between current and past states, we essentially construct, over the course of the performance, a mental timeline of the music, consisting of associations between periods of time (as well as their relation to the present) and musical states (as well as our engagement with and affective response to them). By motivating such an organizational response, the act of listening to *Atmosphères* creates a compelling Transitionary Awareness of time, marked by a pronounced cognizance of both the passage of time and the development of sonority over time. At any given point in the piece, we are likely aware of our position in the imagined dimension of time, measured according to our recollection of the positions and states that we have at that point already experienced. This work defines our experience of time as a series of extended states (as opposed to events), the organization and categorization of which yield continuous disengagement with the present, recognition and organization of recollected states, and active comparison of these states and the extent to which they differ.

2.3 Examining Momentary Awareness: Lachenmann's *Wolken im eisigen Mondlicht*

Wolken im eisigen Mondlicht, the second movement of Helmut Lachenmann's solo piano work *Ein Kinderspiel*, motivates an awareness of time almost exactly opposite that created by *Atmosphères*. *Wolken* does not present music that can be separated into sections, states, or any other subdivisions of substantial duration. The movement consists of 144 consecutive eighth notes, followed by a quarter rest and then two more eighth notes. With the exception of this brief cadential silence, every moment of the piece is nearly identical to every other moment; slight variations in pitch and timbre, following no clearly perceivable pattern or form, are the only evolving parameters. The acoustic fact is a simple one, immediately understandable and as such immediately prone to anticipation of continuity.

This music could also be described as "timeless," but for a very different reason than *Atmosphères*. *Wolken* essentially reduces the acoustic fact to a regular pattern of exertions possessing incredibly salient and perhaps even overwhelming regularity. To the extent that one can become "lost" in this temporal regularity, the piece can indeed be described as timeless; the movement, less than three minutes in duration, can often seem significantly longer or as though its duration is undefined. In this case, "timeless" refers to the complete absence of Transitionary Awareness the piece inspires. The sense of time passing is typically a product of our comparison of present states to recalled states, and *Wolken* provides no opportunity for distinction between these; we do not experience different sonic states during the piece, but instead remain under the influence of one continuous pattern of sound for its entirety. Without any capacity to compare the current to the recalled, we cannot conceive of the piece in terms of the *passage* of time.

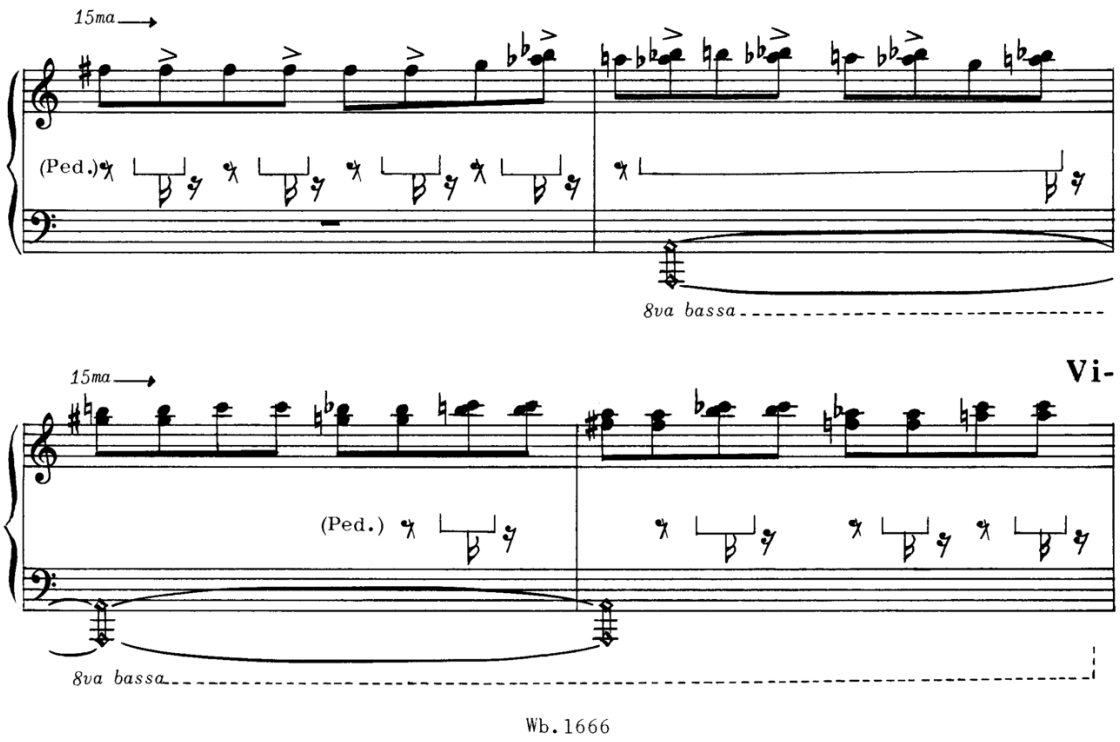

Figure 4: Helmut Lachenmann, *Wolken im eisigen Mondlicht*, mm. 5-8 (0:34-1:09). Appreciation of the relative nuance present on the page (e.g. pedal activity, silently-depressed left hand pitches, apparent harmonic development) is precluded by the more burdensome sensorial demands of the aggressively regular rhythm and dynamic level.

While cognizance of the passage of time inspires Transitionary Awareness, the complementary approach to understanding a musical work's temporality is through a focused understanding of the present, specifically of current patterns of duration. Music, temporal as it is, depends on articulation, on sonic events, to define its temporality by marking moments in time. Within seconds of *Wolken's* beginning, we comprehend the rhythmic patterns that the sound follows. This comprehension leads to an intensification of our inclination to predict, and we begin to anticipate each new moment, each new sonic event. Generally speaking, the successful prediction of such events often combines with an engagement with the techniques of the sound's production to yield a feeling of "groove"—physiological embodiment of regular and predictable

patterns of exertion. In the case of *Wolken*, however, our motivation to engage with the techniques involved in producing the sound are severely attenuated, due both to the minimality of the elements of the acoustic fact and to our immediate and profound habituation to the few elements that are manifested in that fact. Instead of creating a feeling of groove, the predictability of the music's patterns of duration creates a state of mesmerization brought on by the motivation of an acute Momentary Awareness and the exclusion of any other understanding of the music's temporality. Unable to recollect and thus unable to compare, we are left with anticipation as our only direct engagement with time. On this thinking, Cox offers:

> Each note in *Wolken* activates the *startle* response, [attenuating to a degree] our proclivity to comprehend the sounds mimetically…. Each note demands our attention, just as noises (sounds) do in everyday life. The mimetic invitation is, I think, necessarily there, but masked by, or following, our first dealing with the 'shouted' announcement of each event. So, even though there is relatively little change, each event's demand upon our attention works … to keep us in the present.[42]

This particular engagement with Momentary Awareness is more physiological than psychological, taking advantage not of our capacity to reason and differentiate, but of our biological proclivity for periodicity. If the articulations occur at a rate that we are able to perceive as regular, regardless of the specific duration between them, we are inescapably at the mercy of our predisposition to anticipation. Put another way, the difficulty of ignoring a recognized pattern is a direct result of our need to embody and to anticipate. In the Lachenmann, we seek an understanding of the acoustic fact, which we accomplish through engagement with and consequent embodiment of that fact. By embodying the regular pattern, we gain awareness not only of the auditory stimulus but also of our own physiological imitation; much like becoming aware of our heartbeat, we become aware of our own regular pattern of physical

[42] Arnie Cox, in discussion with the author, December 2011.

exertions performed in response to the stimulus. This awareness is so deeply felt that for the entirety of our engagement we are incapable of any significant departure from anticipating the next event; our cognitive capacity is monopolized by the anticipation of what we know so well—and feel so profoundly—is going to occur. After each sonic event, we have a precise amount of time during which there exists any potential to focus our thoughts on something other than the next event. This time is rarely enough to accomplish such a task, made all the more difficult by the strength of our internalization and embodiment of the events, and so we cannot help but continue to anticipate the next one. This struggle with our natural tendencies can be abandoned to a degree, by effectively embracing the anticipation and engaging with it fully. In the case of *Wolken*, the result is a profound absorption into the stasis of the music. Our physiological experiences with regularity, our embodiment of those experiences and of comparable external stimuli, and our developmental need to anticipate all combine to create a Momentary Awareness that consumes the entirety of our capacity for conscious cognition.

2.4 Significance of Change of Awareness ("Waking Up" From One Awareness Into Another)

Most musical works do not simply motivate one type of temporal awareness. Any musical experience is likely to include significant capacity for *change of temporal awareness*. This change is an essential component of compelling musical experiences, and the bulk of the remainder of this essay will aim to establish the ways in which this change can form the foundation of both the creation and the analysis of musical experiences.

Snyder offers the concept of *intensity* to refer to "any change in a stimulus that causes an increase in neural activity."[43] Interestingly, this measurement is affected by nearly any imaginable parameter of sound; parametric change, especially if sudden or toward the more intense end of its own spectrum, yields an increase in intensity in that moment. "Points of higher intensity are said to be 'in motion,' and points of low intensity are said to be 'at rest.' In this metaphor, musical motion operates by continually oscillating between these two poles of tension and release."[44]

I am indebted to my good friend and fellow composer David Bird, who most directly put into my head the words that capture this notion of motion and its significance to the musical experience. After the premiere of my string quartet *on Intimations* in 2019, we were discussing the work and his impressions of it. It is a long, slow, soft, delicate piece, developing only gradually and only when it chooses. As a result of this, understandably, his attention wavered at times as the present slipped out of focus. Freed from the grip of the present and any concern for the immediate future, he was able to ponder the music (and, realistically, other topics entirely) from a distance and on his own timescale. However, he pointed out, there were moments throughout the piece, at junctures of musical change and inflection points of developmental processes, at which he would "wake up" into a keen awareness of the present, pulled unwittingly back into the musical moment.

While he did not use the following language to describe his experience, his wavering focus on the music of the moment could of course be described as a particularly "removed" state of Transitionary Awareness. Likewise, his periods of keen anticipation of the immediate musical future, indicated by the inability to devote attention to macro-consideration of the entire piece of

[43] Snyder, *Memory*, 62
[44] Ibid.

music (or other unrelated topics) and experienced as being "in the moment," fall quite neatly into the definition of Momentary Awareness. The evidence for having experienced these different types of awareness in turn is unremarkable on its own, with Transitionary Awareness expected during the course of a musical experience such as that which *on Intimations* invites, and Momentary Awareness a welcome sign of having found the music sufficiently interesting for at least a few moments. The revelatory detail, for me, was the description of and significance afforded to the accelerated process of change out of these states of Transitionary Awareness and into the subsequent states of Momentary Awareness. He likely drifted into Transitionary Awareness by minute degree as a natural consequence of the musical material. The return to Momentary Awareness, on the other hand, was acute and unexpected, defining to a significant degree his characterization of his experience of the musical work as a whole.

As a composer who takes great care in manipulating the temporal experiences of my listeners, I was naturally pleased to receive this feedback. Importantly, it left me with a newfound prioritization of a number of questions relating to this concept of *change of temporal awareness*:

- Do the absolute "values" of the pre- and post-change states of Temporal Awareness matter?
- …or only the degree of change?
- …or only the presence of change?
- Does the "direction" of change matter?
- To what extent is such change imposed by the composer, or is it imposable at all?
- What invites these moments of change?
- How do their circumstances interface with the many composable parameters of music?
- *Is this change a composable parameter of music?*

In the next two chapters I will present analysis of a number of musical examples in order to shed light on these questions and others. I believe some will be answered, and some will be

shown to be perhaps unanswerable. All of them have proven to be worth serious consideration from perspectives of musical analysis, instruction, and, as we will see in Chapter 6, composition. The examples are grouped by chapter into those whose significance to this paper is primarily characterized *by rhythm* and those primarily characterized by *social-performative context* (defined in Chapter 4). It is important to note that all of the musical examples analyzed here are complex, multi-dimensional works of art, made great by many nuanced elements beyond isolated processes of rhythm or social-performative context. This paper aims to examine a particular approach to musical analysis that seems to be most effective when these parameters are prioritized, but such analysis is neither exhaustive nor sufficient to maximize holistic understanding of these works and the many facets of artistry they contain.

Chapter 3: Analyzing Catalysts of Change of Temporal Awareness – Rhythm

"Perhaps the most obvious thing that bodies do in response to sounds is to synchronize with them."[45] Kozak's study of how humans naturally *entrain* to periodicities present in external stimuli suggests that this response is inherent in human behavior.[46] A listener's synchrony with periodic sonic events and that listener's mimetic participation seem to be two sides of the same coin, both motivated by the regularity they perceive and their natural inclination to anticipate its continuation. It follows that deviations from such regularity would yield an attenuation of anticipatability, and with it a change in mimetic engagement. We have already seen that a change in one's mode of engagement with a musical experience is one of the most direct motivators of change of one's temporal awareness, and disruptions to our ability to anticipate the immediate future are a powerful example of this. Regardless of one's level of engagement prior to the change, a sudden inability to predict (or a sudden clear invitation to predict where this inclination was previously obfuscated) disrupts the musical experience significantly enough that it tends to transform a mere consciousness-level engagement into the level of awareness, giving all but the most disengaged listener little choice but to reevaluate their temporal awareness in response. The following sections analyze three different manifestations of this phenomenon.

[45] Kozak, *Enacting*, 112.
[46] Mariusz Kozak, "Listeners' Bodies in Music Analysis: Gestures, Motor Intentionality, and Models," *Music Theory Online* 21, no. 3 (2015), https://doi.org/10.30535/mto.21.3.7.

3.1 Zimmermann: *Die Soldaten – Preludio*

Bernd Alois Zimmermann's opera *Die Soldaten "*has a prelude of such stupefying intensity that it stands for the moment as the ne plus ultra."[47] Gargantuan sound masses from a very large orchestra twist and tangle, at times flying by in a frenzy and at others suspended in space. The composition is an assault on the senses, mirroring the brutal assaults that take place throughout the drama. Despite the obviously overwhelming nature of the music, the precise mechanism of this sensorial assault is far from trivial, and is best understood through the lens of changing temporal awareness.

Setting aside the infamous timpani part for now, the vast majority of the orchestra contributes individually unique and identifiable sonic material to a composite texture that is anything but. Huge clusters spread across wide ranges from all instrumental families create a swirling mass that is simply too chaotic and overpowering to parse in the moment. While textural change and timbral change generally occur on a shorter timescale in this work than in Ligeti's *Atmosphères*, the quasi-intangibility of the results (again, excluding timpani) bears considerable similarity between the two. Change is present in Zimmermann (and more so than in Ligeti) yet the sheer sensorial burden of the assembled sonic materials renders the experience surprisingly "timeless," since cognitively grasping onto any musical element consistent enough against which to measure the passage of time proves quite challenging for the average listener. Like *Atmosphères,* the *Preludio* invites both disconnection from the moment and the engagement of longer-term form-constructing memory, with the subtle but significant difference that the

[47] Alex Ross, "Infernal Opera," *The New Yorker*, July 14, 2008, https://www.newyorker.com/magazine/2008/07/21/infernal-opera.

question asked of oneself is less likely to be *How long has this been going on?* but rather *How much longer?*

The above analysis is sound enough, yet only in the absence of the most immediately salient musical element of the *Preludio*: from the first downbeat, the timpani play a very loud pulse "in iron rhythm"[48] of *mostly* quarter notes, outlining the 2/4 time signature. This relentless march of thunderous articulations undergirds the proto-saturationism of the rest of the orchestra, providing a foundation upon which the listener (and their attention) may seek relative stability. However, the characterization of the timpani rhythm as "iron" appears to be a misnomer, as in fact Zimmermann meticulously crafts a rhythm that deviates from its own established pulse in ways neither regular nor predictable. Nevertheless, the *near*-regularity of the timpani line invites synchrony and mimetic engagement from the listener, successful activation of which is just close enough to feasible to maintain the invitation, despite the frequency with which Zimmermann disrupts and unsettles such realization through unprepared rhythmic change. It is the combination of this ongoing mimetic invitation and the subversion of its acceptability by subtle rhythmic irregularity that counterintuitively allows the sonic onslaught from the rest of the orchestra to so profoundly penetrate the listener's awareness. We can't easily tune out the present mess and retreat to the relative quietude of Transitionary Awareness because the regularity of the timpani demands our mimetic attention. Yet we can't anticipate the pulse and prioritize the relative reward of synchrony because the *irregularity* of the timpani aggressively shuns our attempts. We are constantly being pushed and pulled between attempted but failed Transitionary Awareness and attempted but failed Momentary Awareness, and this unease reinforces the assault on our senses by the full orchestra. It is a violent sonic experience because it holds our engagement *just*

[48] Ibid.

enough but never permits us to settle into a consistent temporal awareness for more than a second or two. We are all unwitting witnesses to the brutality but our awareness is held hostage; we just can't seem to look away.

3.2 Tenney: *Beast*

In contrast to Zimmermann's four-minute bombardment, James Tenney's *Beast* for solo contrabass is a rather tame "seven-minute study in rhythm."[49] One of his "Postcard Pieces" from the late 1960s, the score consists only of a single wavy line, imprecise indications of duration and "rhythm," and five sentences of performance instructions; naturally, it fits entirely on a postcard.

The sonic content of *Beast* is remarkably consistent, with the only changing parameter throughout being the pitch played on the (scordatura) low E-flat string in a double-stop with the open A-string. Given the extreme register of these pitches, the harmonic intervals present in the piece—ranging from a unison to a tritone—are perceived more prominently as beating than as separate pitches. The widest interval reached in the piece consists of a pitch difference of only 16.2 Hz, easily heard as a rhythmic, rather than harmonic, phenomenon.[50]

What is most interesting about this work's extremely limited musical material is that there's almost no discernible difference between a majority of moments. While the rate of beating ranges from 0 Hz to 16.2 Hz, in practice it is difficult to distinguish between the rates above roughly 3-5 Hz. Objective change between *beating* and *no beating* is easily perceived, but the nuanced relative development between beating at 8 Hz and beating at 12 Hz, for example, is

[49] Brian Belet, "Theoretical and Formal Continuity in James Tenney's Music," *Contemporary Music Review* 27, no. 1 (2008): 31.
[50] Ibid.

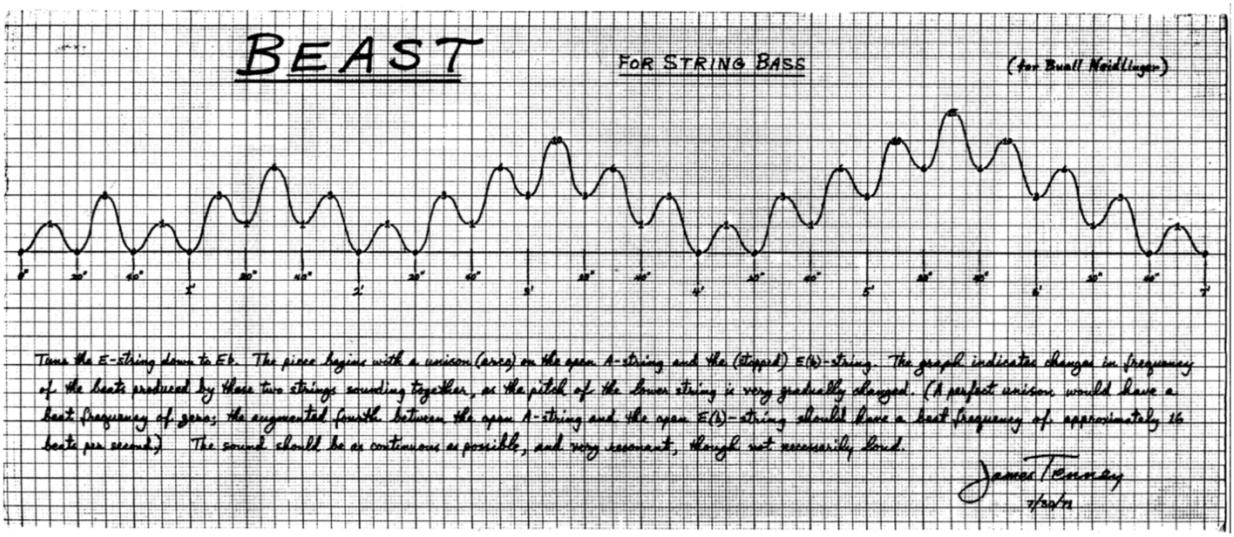

Figure 5: James Tenney, *Beast*, in its entirety.

easily missed by the listener. Based on our previous analyses, it would seem logical that the moments of *Beast* during which there is more rhythmic density would yield greater engagement than those during which there is less rhythmic density. Here, the opposite appears to be true: it is precisely the moments of *no rhythmic density* (i.e. no beating) when we are likely to be most engaged with the present, by virtue of the much more perceivable change that takes place within the beating range of 0 Hz to 3 Hz or so. This clarifies our definition of "rhythmic activity," insofar as it is a crucial component of temporal awareness, pushing it closer to "perceivable rhythmic change" as opposed to the more traditional "rhythmic density." We can imagine a version of the piece in which the periods of less-perceivable beating-rate change are much longer in duration; it would likely prove very difficult to maintain anything near Momentary Awareness during these sections, as the mimetic invitation would near zero when the acoustic fact offers so little in the way of either change or anticipatability. Momentary Awareness in this piece is dependent upon the musical moments at or near the threshold of unison, since despite being the "least rhythmic," they are the most easily grasped. The nuance and complexities of the sound

during these moments are the least consistent and anticipatable, yet their consistently perceivable rhythmic change affords the listener the best opportunity to achieve something resembling an in-the-moment flow state.

Knowing that the listener's temporal awareness is largely dependent on the crucial lower threshold of perceivable beats, we can use the latter's distribution throughout the duration of the piece to gain insight into the form of the piece and its interface with temporal awareness. The work consists of four broad gestures, with respective durations of either 40, 80, 120, and 180 seconds, or 60, 100, 140, and 180 seconds, depending on where one chooses to delineate and whether gestural overlap is permitted.[51]

In either case, each gesture has a longer duration than the previous, spending a greater proportion of its duration at or near this lower threshold of perceivable beats. Consequently, the shorter early sections yield more frequent shifts into Momentary Awareness, allowing more direct engagement with the present. Then, as we move toward longer durations between these attention-demanding changes of awareness, we are granted more time in Transitionary Awareness to access our memories of past sonic states and construct our ongoing formal analysis therefrom. Naturally, the listener is less prepared at the beginning of the piece to complete this task (due to their relative lack of familiarity with the musical material), so Tenney delays the more extended ventures into Transitionary-Awareness-motivating material until later in the piece, once we have our aural bearings. Whether or not such an analysis would be consistent

[51] Belet makes the argument that the gestures are proportioned according to the Fibonacci series in ratios of 1, 1, 2, and 3 minutes respectively. Examination of the score makes clear that this is not actually the case, as such a formal interpretation would require the gestures to be structured in manners fundamentally different from each other. A sounder analysis would treat each gesture as structurally equivalent, either each beginning with the lowest beating-peak (as in my first proposed form, which requires the final 20-second sub-gesture to be treated as a coda which I have "attached" to the fourth gesture) or each beginning *and ending* with the lowest beating-peak (as in my second proposed form, which requires an overlap of 20 seconds between each pair of adjacent gestures, with the three internal lowest beating-peaks functioning as part of both neighboring gestures).

with Tenney's actual goals in the composition of the work, it nevertheless proves highly logical and effective from a perspective of temporal awareness as a guiding factor of composition; this Postcard Piece is not only a study in rhythm, but also in compelling and hyper-efficient formal construction. [52]

3.3 Grisey: *Vortex Temporum*

Gérard Grisey's 40-minute masterwork offers significant opportunity for fruitful analysis, far beyond the scope of its role as a single musical example in this paper. The piece's most intriguing instance of rhythmic change yielding temporal awareness change occurs at the end of the first movement, when the massive 3.5-minute piano solo gives way to the *interlude* which precedes the second movement.

This piano solo includes significant rhythmic variety and complexity, but the rhythmic material is at all times reasonably accessible and familiar to the listener, since Grisey spends the preceding eight minutes of the piece developing the rhythm very clearly and gradually to this point. Adopting a technique straight out of Stravinsky's playbook, the solo's unpredictable rhythmic variety attenuates our ability to precisely anticipate, yet the rhythmic familiarity and

[52] The author recognizes that imagining such a practical motivation on Tenney's part could easily miss the mark. The lengthening of each section of *Beast* in comparison to the previous does yield a certain "pedagogical" effectiveness (that is, the capacity of the musical experience to convey to the listener meaningful information regarding how and why the musical work is constructed); the sections grow longer simply because shorter earlier sections and longer later sections are more useful to the listener trying to make their way through the musical experience for the reasons noted above. However, it may be at least equally true that the lengthening sections are motivated not by the listener's resulting awareness of these growing sections and the form they create, but simply by the phenomenological effect of spending longer periods of time in the absence of notable temporal delineations. As the sections grow longer and we spend decreasing percentages of each hearing rhythmically distinguishable beating relationships, we are invited not only to shift toward Transitionary Awareness and active engagement with the past, but also (or instead) toward a kind of temporal awareness marked by a drastically extended sense of the "broad present." Perhaps if retention and protention are attenuated significantly enough by a lack of perceivable change from one moment to the next, yet the listener remains cognitively immersed in the unchanging sound of the present, the latter can be expanded beyond the typical bounds of normal human physiology; we can exist for the duration of the musical experience not in "human time," but in what G. F. Haas has referred to in conversation as "tree time."

"groove" motivate an earnest attempt regardless; to the best of our abilities, we engage mimetically with the present. Throughout the solo, material continues to *develop*—rather than suddenly change—which avoids rhythmically triggering any real change of temporal awareness, so the listener is permitted to simply bask in the flow state of witnessing thrilling virtuosity.

At the end of the solo and movement, we do suddenly encounter the unprepared rhythmic change that is a hallmark of changing temporal awareness. Importantly, this is (for most listeners) not an instance of "waking up" from a disengaged Transitionary Awareness into a sudden Momentary Awareness; instead, the sudden shift from rapid-fire rhythmic complexity to a single loud, sustained cluster pushes us in the opposite direction. As the final piano sonority is struck, we are thrust out of the moment, but not to applaud the thrilling conclusion. The sound decays for a full twenty seconds before the next sound transpires,[53] when a ghostly rattling overpressure from the cello begins the interlude. During this decay, we are thrust from an experience of near-maximal sonic event density (if limited to the range within which one can be expected to successfully engage with each non-periodic event, at least) into one that is quite nearly event-less. The interlude provides nothing to be recognized and nothing to be anticipated. With our retention and protention left empty-handed, we naturally take advantage of the moment to *process*—what just happened, how far we have come, where we are now, where we might be going long-term, and so on. The Momentary Awareness of the piano solo is suddenly cut off, and we catch our breath in a welcome period of Transitionary Awareness.

In addition to unprepared rhythmic change being a primary catalyst of change of temporal awareness, the interlude between the first and second movements demonstrates another

[53] Gérard Grisey, *Vortex Temporum*, with Ensemble Recherche, conducted by Kwamé Ryan, recorded November 1996, on *Gérard Grisey - Ensemble Recherche – Vortex Temporum – Taléa*, Accord, 464 292-2, 2001, compact disc.

significant contributing factor. Recalling the questions posed by Cox in Section 2.1 (*What's it like to do that?* and *What's it like to be that?*), there are few musical experiences that more successfully invite mimetic engagement than witnessing a brilliantly virtuosic solo performance of familiar but complex music on arguably the most familiar Western instrument. Thanks to this engagement, we the listener "are" the pianist during the solo. Every exertion triggers our MMI and MMA as we exist in a state of heightened awareness not unlike that experienced by the actual pianist. We have been absorbed into the individual. Then, at the sudden conclusion of the solo, as the resonance hangs in the air and we snap out of the moment, we remember the others on stage who have been silent for so long. We remember ourselves, sitting silently in our seats. We are thrust out of the individual and into a strong sense of the collective as unfamiliar gestures create the abstract sounds of the interlude. It is this *change of performative context* that heightens the already significant rhythm-induced change of temporal awareness, and which will be the focus of the next chapter.

Chapter 4: Analyzing Catalysts of Change of Temporal Awareness – Social-Performative Context

Writing further on humans' capacity for synchronization with external stimuli, Kozak observes:

> [Synchronization] appears to be contingent on our ability to *entrain* to an external stimulus…. Having successfully entrained to the same isochronous signal, listeners can synchronize their movements not only with the sound, but also with each other, resulting in an experience that is thoroughly communal and intersubjective. In turn, these synchronized listeners share both the goals of their actions and the trajectories of their movements in response to opportunities afforded by the auditory context.[54]

On a similar note, and with the addition of a more change-oriented perspective, John Dewey writes:

> Life itself consists of phases in which the organism falls out of step with the march of surrounding things and then recovers unison with it—either through effort or by some happy chance. And, in a growing life, the recovery is never mere return to a prior state, for it is enriched by the state of disparity and resistance through which it has successfully passed. […] Life grows when a temporary falling out is a transition to a more extensive balance of the energies of the organism with those of the conditions under which it lives.[55]

Both of the above address an essential facet of rhythmic coordination and synchronization (and of the elements of rhythm that motivate such coordination and synchronization in the first place) that has already surfaced in the previous section's analysis of Grisey's *Vortex Temporum*: they are fundamentally social, communal, and human. Engaging with an external musical rhythm is to some extent an act of communication and understanding

[54] Kozak, *Enacting*, 113.
[55] John Dewey, *Art As Experience* (New York, NY: Perigee Books, 2005), 12-13.

with the creator of that rhythm, and invites consideration of *who* that individual is. It is inherently self-aware and existential.

If the previous chapter explored the *when* of rhythm, it is this *who* which will serve as the central focus of this chapter. Who is performing? How are they performing? Why are they performing? These existential questions follow very naturally from an examination of the influence of rhythm, synchrony, and mimetic engagement therewith upon one's temporal awareness during a musical experience. I will refer to these types of questions and their answers as *social-performative context*. As we saw in Grisey, change (especially sudden, significant, and/or unprepared) of social-performative context tends to motivate change of temporal awareness. It forces the listener to confront the human element of the musical experience, i.e. the *performance* of it and the *performers* involved. This more philosophical engagement with the performative process (as opposed to just the result) and with the agency of those involved naturally attenuates our ability to engage with the present moment, often—but not always—pushing us in the direction of Transitionary Awareness. The following sections analyze three different manifestations of this phenomenon.

4.1 Mahler: *Symphony No. 2*

Gustav Mahler's famous quote that "A symphony must be like the world: it must embrace everything"[56] certainly applies to his *Resurrection Symphony*. Comprising five movements and over 90 minutes of music for large orchestra, soprano and alto soloists, and chorus, the work includes too many instances of sudden and significant change of performing forces to meaningfully evaluate the impact each of them has on temporal awareness. For this

[56] Various sources cite this quote alternately as "A symphony must be like the world: it must *contain* everything."

reason, the focus will be almost entirely on what the author deems the single most impactful instance, in which change of performing forces truly transcends mere orchestration to become change of social-performative context, yielding the kind of "special moment" that this technique tends to create. This moment is the entrance of the choir during the fifth movement of the symphony.[57]

As social-performative context is the topic of consideration, it is important to firmly establish the context which precedes this moment. For a full 76 minutes (not including pauses between movements, most notably the *Pause von mindestens 5 Minuten* that follows the first movement) prior to their first sung notes, the choir has sat silently on or behind the stage. Their presence has been apparent from the beginning, but their function has been withheld. During this time, multiple subsets of the orchestra have played multiple times from offstage, completely hidden from the audience. Musical themes, references, and styles have come and gone. The world of the symphony appears to have contained everything already, demonstrating no need for a full chorus after all.

The technique through which Mahler prepares a maximally effective choral entrance under the above circumstances does of course relate to his command of harmony, texture, orchestration, form, and so on. However, I believe the clearest understanding of the process is reached through analysis of the form primarily as it relates to temporal awareness and the effect thereon of change of social-performative context.

[57] Honorable mentions are deserved by the remarkable instruction by the composer to include a pause between the first and second movements of at least five minutes (about as direct an invitation to exit the present and engage in some perhaps-extremely-disconnected Transitionary Awareness as I can imagine), and by the beautifully tender entrance of the alto soloist which begins the fourth movement, "Urlicht."

The symphony's fifth movement can be fairly logically divided into ten sections, such that the choir entrance marks the beginning of the ninth section.[58] The primary criterion for this delineation (which is unique to this particular analysis, as far as the author is aware) is that each section must *conclude* in some capacity, allowing a literal or metaphorical breath before beginning the next section with substantively different musical material. This sense of conclusion/closure appears to be an important component of potential special-moment-inducing

Figure 6: Table of sections in Mahler's *Symphony No. 2,* Movement 5

Movement 5 section	Measure number at beginning of section	Duration of section	Cumulative duration at beginning of section	Notes on section
1	1	1:45	0:00	
2	43	1:35	1:45	
3	62	2:25	3:20	
4	97	1:22	5:45	
5	142	3:58	7:07	Contains build to musical arrival at m.162
6	194	3:57	11:05	
7	325	4:01	15:02	Contains build to musical arrival at m.395
8	448	2:45	19:03	Played primarily by offstage musicians
9	**472**	**8:07**	21:48	**Chorus entrance**
10	560	8:37	29:55	
(end)	(765)		(38:32)	

[58] For the purposes of this analysis, and consistent with some degree of convention in modern presentations of the symphony, I will refer to the part of the fifth movement preceding the chorus entrance (here denoted as sections 1-8) as 5A, and the remainder (here denoted as sections 9-10) as 5B.

changes in social-performative context, so such instances have been afforded reasonable significance.

Based on the above methodology for delineating sections, the resulting analysis of the form indicates a few notable relationships between sections, duration, and the concept of social-performative context change.

In a movement that lasts nearly 40 minutes, as part of a symphony that lasts over 90 minutes, the use of such brief musical sections is an unusual compositional choice. One would expect much longer sections that include extended and continuous musical development, as is clearly the case in the first three movements (and arguably the case even in the fourth movement as well, itself a kind of extended special moment which transpires on a different timescale than the rest of the symphony)[59]. Instead, movement 5A introduces short section after short section, usually concluding the section without reaching any kind of developmental growth to a musical point of arrival. Such a multitude of sectional divisions—marked as they are by changes of overall rhythmic language, musical material, and performing forces—would seem to indicate a particularly high likelihood of frequent changes of social-performative context, but I argue that no significant changes to the latter actually occur during movement 5A. This is most significantly due to the fact that the preceding symphonic form as a whole (as well as the specific moments of change of social-performative context which this form invites), effectively nullifies any potential for social-performative contextual change that the eight distinct sections of movement 5A might otherwise have.

[59] The first movement, which is most similar in form to the fifth, lasts nearly 25 minutes and consists of five sections (using the same definition of "section" as above). These sections last 7:11, 5:47, 0:20, 8:05, and 3:32 respectively; 60% are longer than the longest section in movement 5A, and these sections include much more and longer continuous development than 5A.

To put it simply: the listener does not need Transitionary Awareness during movement 5A, as there is relatively very little "residual" musical experience left unprocessed during this period. The first movement, significant in scope, complexity, and musical variety, is followed by an astounding five-minute silence, providing sufficient opportunity for even the most thorough Transitionary processing of the preceding 25 minutes. The second and third movements are comparatively rather straight-forward, creating the potential for the very significant change of social-performative context offered by the striking introduction of the alto soloist which begins the fourth movement (a change which can be perceived as lasting for the full duration of this exceptional movement). By the beginning of the fifth movement, the listener is (as I often say to my composition students) ready for something else. Rather than giving us the extended development and dramatic Momentary-Awareness-inducing musical arrival for which the preceding formal context has primed us, the fifth movement waffles about for almost 22 minutes and never quite "gets going." After eight short sections of this type of limited formal development, the last of which takes place primarily offstage and out of sight, the average listener (including the author) is, with apologies to Mahler, simply bored.

Fortunately, boredom, visual disengagement, expectation of relatively long timescales, and a long-unmet desire for social-performative contextual change are precisely the ingredients required to maximize the effect of the chorus's entrance at the beginning of movement 5B. Rather than snapping out of a flow experience, from Momentary Awareness to a suddenly communal Transitionary Awareness, we experience a different type of awareness shift: from a rather removed, perhaps even disengaged state into the satisfaction of the inherently Transitional contemplation "Ah, here we are at last." The activation of the long-dormant chorus triggers a change of social-performative context that the many preceding temporal/formal/orchestrational

changes failed to achieve. The significance of the chorus's entrance as a "special moment" is reflected in the vast difference between the durations and developmental content of the two sections of 5B as compared to the eight sections of 5A. Only once we finally "get going" can the gradual continuous development and extended builds to compelling musical arrivals (fundamental elements of the symphony and Mahler's music as a whole) that so dramatically define movement 5B transpire.

4.2 Eastman: *Gay Guerrilla*

Like Mahler's symphonies, the long-form piano works of Julius Eastman contain worlds within them. Unlike Mahler, however, this is not the world of eternal reward for life's suffering in the afterlife; Eastman's works confront the world which he occupied, including the prejudice, cruelty, and violence he experienced during his life. The tragic details of his short life are beyond the scope of this paper, but their evidence in Eastman's music is apparent and deserving of an appropriate analytical approach. Given the incredible and oft-discussed[60] uniqueness of his compositional technique and musical style, traditional pitch-centric (and even rhythm-centric) analysis proves insufficient to gain any real understanding of *why* his music is as compelling as it is. For the above reasons and more, Eastman's work is particularly well-suited to analysis from the perspective of Temporal Awareness, especially vis-à-vis social-performative context.

The cover page of Eastman's *Gay Guerrilla* specifies that it is written "for unspecified instruments (usual version for 4 pianos)."[61] Before the first note appears, the notable flexibility of the instrumentation speaks to the relative lack of a written history or established performance

[60] This has increasingly become the case over the last 15 years, thanks to the efforts of Eastman's friend and collaborator Mary Jane Leach, who organized the first commercial release of recordings of his work in 2005.
[61] Julius Eastman, *Gay Guerrilla*. (New York, NY: Music Sales Corporation, 2018).

conventions for this and much of Eastman's other work. Any accessible tradition is an aural tradition, communicated by those who performed with Eastman and by the recordings they produced together. The guideline of the score, abstract and impersonal, is secondary to the lived and communicated human experience contained in the life of the work. The performance, not the document, *is* the work of art. How, then, should *Gay Guerrilla* be understood from a social-performative context? How does this context influence the listener's temporal awareness, and what role does the latter play in the experience of the piece? In Eastman's distinctive brand of minimalism, temporal awareness—filtered through communal, social awareness—is everything.

Like most works of minimalism, *Gay Guerrilla* is musically built upon a foundation of *flexibility* of temporal awareness. Speaking broadly of minimalism: the acoustic fact is constantly developing at a gradual, but nevertheless apparent, rate. It is not defined by *moments* of arrival or change, as these concepts are instead relegated to continuous (rather than discrete) processes. The present is always available for engagement because its mechanism of change is always perceivable. This change is so gradual and continuous, however, that there is generally very little resistance to a wavering focus. Exist in the moment and let the music happen to you, or zoom out and ponder the process; either Momentary or Transitionary Awareness is valid and accessible, most of the time. There are of course exceptions (generally manifested as moments, rather than entire works, that deviate from the above) and pieces of music that derive much of their interest and character from these exceptions, but the default engagement of listener-selected (or perhaps listener-selectable) temporal awareness appears for the most part as a defining feature of the style, in both intent and practice. Eastman's "organic music,"[62] as he called it, does not always

[62] For further discussion of this topic, see Gann, 98 and Chessa, 193 in:
Renee Levine Packer and Mary Jane Leach, eds., Gay Guerrilla: Julius Eastman and His Music (Rochester, NY: University of Rochester Press, 2018).

fall so neatly into the category of minimalism—Kyle Gann characterizes Eastman's musical language as "particularly distinctive, as though he had not only absorbed minimalism, but could see into its future,"[63]—but many of the temporal and developmental characteristics described above are sufficiently applicable to what we might call *Gay Guerrilla's* "proto-postminimalism" to warrant the comparison.

In this musical context of constant, gradual, perceivable change, Eastman succeeds at constructing a special moment of extreme emotional impact. His quotation of Martin Luther's hymn "Ein feste Burg ist unser Gott" serves as the only notable musical material in the piece, and is present for fewer than 5 of its 29 minutes. The ramifications of this quotation, however, are absolutely work-defining, and are best understood through the quotation's interaction with temporal awareness and social-performative context.

The piece begins by establishing a quarter-note pulse that is at once consistent and non-rigid. Subtle rhythmic variations occur in each part, lending nuance and variety to the rhythmic material while maintaining the pulse. The tightness of the ensemble waxes and wanes, at times hinting at the collective coordination that is eventually coming. By 9:00, the default rhythm of straight quarter notes has finished evolving into a slightly more intentional default rhythm of a quarter note, followed by two eighth notes, repeated endlessly underneath the slower-moving layers of the increasingly elaborate counterpoint. For the next 9.5 minutes, there is almost no change to the texture or material; harmonic and pitch development continue, but the most salient element of the music—the constant quarter-eighth-eighth rhythm—continues unaffected. This passage echoes classic minimalism in a significant way, occupying the threshold between the

[63] Gann, Kyle. "Julius Eastman and the Conception of 'Organic Music.'" In Gay Guerrilla: Julius Eastman and His Music, 191–99. Rochester, NY: University of Rochester Press, 2015.

static and the evolving while very effectively motivating the choose-you-own-awareness engagement described above.

At 18:31, the world of the piece changes. The melody of "Ein feste Burg" enters in a single piano, beginning a meandering and heavily overlapping quasi-*fugato* through each of the four voices. For listeners previously engaged in Momentary Awareness, the entrance at 18:31 likely marks a sudden change of social-performative context, pulling them into a macro-awareness of the communal shared melody and the referential intent of the composer. For listeners previously engaged in Transitionary Awareness, the entrance at 18:31 could just as likely wake them up into the present, as the sudden ability to accurately anticipate more complex layers of the immediate future either permits or demands their mimetic engagement. The importance of this moment does not lie in any unification of listeners' previously disparate temporal awarenesses. The quotation brings to the surface the questions of *Who is performing? How are they performing? What are they performing? What does my understanding of this musical reference tell me about the composer who chose to make it?* It also sets a crucial precedent for change of temporal awareness, which brilliantly prepares the final remaining section of the work.

At 23:12, the final iteration of "Ein feste Burg" concludes, and with it we reach the endpoint of our recent clear yet non-linear evolution from the quarter-eighth-eighth rhythm to a new foundation of steady eighth notes. Aside from some flux in the rigidity of the pulse—the eighth notes are frequently just shy of fully "locked in" between performers—the eighth notes continue without change until the end of the piece, right around 29:00. This new pulse holds us on the edge of an incredible Momentary Awareness for the remaining duration, suspended in anticipation of a return to a state that never comes. The non-hierarchical eighth-note rhythm in

all four voices flattens the texture, largely eliminating the perceivable counterpoint that functioned as the most salient element of change in earlier sections of the piece. We are left waiting for this change to return, expecting the rhythm to lock in and reveal the shared intention of the ensemble, expecting another shift in texture or material to change the social-performative context of the piece again. This expectation of change *is* the new social-performative context. Our collective awareness of what we've left behind *is* what is being performed. We can peek around the corner and get a glimpse of Transitionary Awareness as we wait for this change, but since *the waiting for change is the musical present*, we never quite abandon the Momentary Awareness. Being held in this state as a listener, experiencing the engagement of Momentary Awareness concurrently with the acute self-awareness of Transitionary Awareness and the other-awareness of the current social-performative context, is an incredibly, exhaustingly, emotionally powerful experience. The beauty of the musical material, the philosophical reference and heavy implications of the quotation, and the unity of the ensemble are all elements of our musical experience of the piece, but none of them has a more profound impact than the changes of social-performative context and their effect on our temporal awareness and our understanding thereof.

4.3 Saunders: *Skin*

The above examples by Mahler and Eastman both utilize change of social-performative context to create a special moment. These moments tend to be "the point" of the piece or otherwise be similarly integral to the character, narrative, and/or form of the piece; the whole piece leads up to this moment, and the moment in turn (re)defines the work as a whole. In inspiringly illustrative contrast, *Skin* by Rebecca Saunders upends this concept entirely, achieving not satisfaction, surprise, or arrival by virtue of its change of social-performative

context, but rather creating a singular fusion of syntax and sonority that is positively virtuosic in its capacity to unsettle. Compelling change of performing forces, far from being a target of musical development, is taken by Saunders as the starting point in crafting the uncanny musical language of this brilliant work.

Change is the focus of this chapter and the previous, and there is no more apt concept with which to begin analysis of *Skin*. Scored for soprano and 13 instruments, the piece contains a greater number of unique sounds than just about any work of comparable duration and ensemble size. The 11 pages of meticulous explanatory notes and notation keys in the score make immediately clear that this is a work of tremendous timbral dexterity, and therein lies the first indication of how exactly Saunders implements change of social-performative context: *constantly*. The answers to the performative *who*, *how*, and *what* of the musical moment are always in flux throughout the entire piece. On a micro level, extremely detailed timbral manipulation and imitation between instruments yields a counterpoint that consistently blurs our perception of the sources of most sounds we hear. On a macro level, the unfolding of the form is interrupted[64] by very frequent grand pauses and halts to the music's perceived forward motion, after each of which the following sonority is as likely to resemble the preceding sonority (in timbre, orchestration, texture, dynamics, and so on) as it is to drastically differ. With a nod to *musique concrète instrumentale*, the sonic environment often feels more iterative and non-continuous than gestural.

These musical factors have a significant impact on our relationship to the social-performative context throughout the piece, largely as a result of their impact on our mimetic engagement and memory. The striking rhythmic activity and the presence of the human voice

[64] Of course, the grand pauses and other arrests of forward motion are not interruptions to the form; they *are* the form. The experience of the listener, however, is one of halting motion throughout.

both invite significant MMA and MMI, which ought to motivate a very engaging Momentary Awareness. However, the hyperactive texture and seemingly source-removed sounds drastically

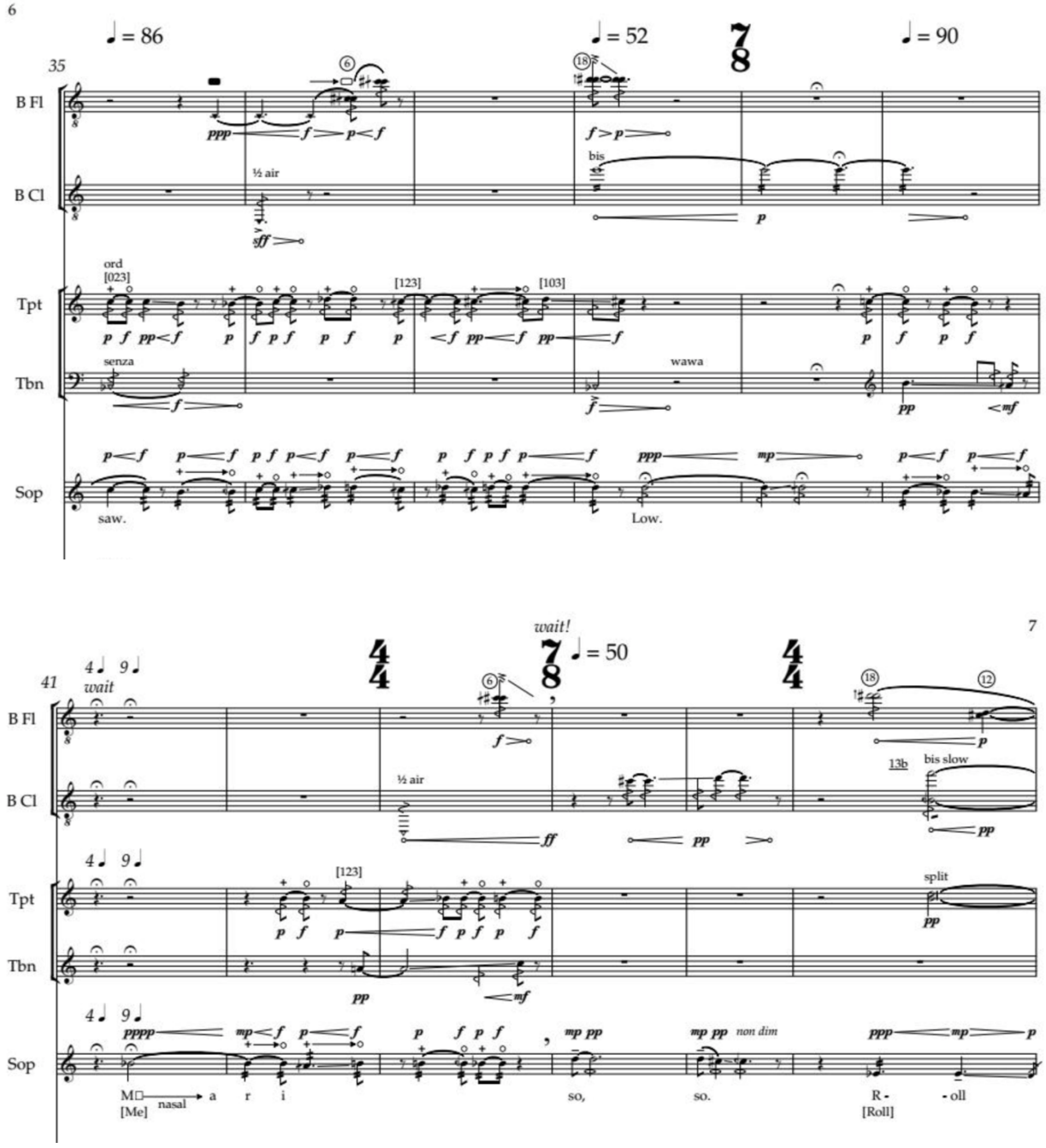

Figure 7: Rebecca Saunders, *Skin*, mm. 35-46 (2:41-3:30), partial score only. This example demonstrates both the pervasive micro-level timbral imitation and the macro-level "stopping and starting" which complexify our understanding of the music's social-performative context.

complexify any consideration of *What's it like to be that?* and *What's it like to do that?*, which attenuates the very same mimetic invitation. Our capacity to ponder and process the past faces similar interference, as the disengagement with the present which Transitionary Awareness requires is challenging to achieve due to the demand that constant textural changes place on our attention. As was the case with *Die Soldaten*, our temporal awareness is never given the opportunity to "settle in" for any substantial period of time. The effect on the listener is one of agitation and even discomfort. As the title suggests, however, *Skin's* social-performative context includes an intimacy which the Zimmermann lacks. Rather than presenting an enormous orchestra creating enormous assemblages of otherwise familiar instrumental sounds, Saunders places the listener face-to-face with a much more vulnerable facet of the musical experience. It is near, and human, and personal, yet intensely unfamiliar. Unable to settle into a specific temporal awareness, we are made more aware of the agents causing this inability; the cold, disinterested musical discomfort of *Die Soldaten* is transplanted into an intimate, corporeal, uncanny chamber performance.

The constantly shifting yet hyper-focused social-performative context of *Skin* precludes the possibility of a special moment anything like those encountered in Mahler and Eastman. In those works, a single most important change of context triggers our awareness to shift, bringing with it our understanding and subsequent reevaluation of the form of the work as a whole. It is an arrival, a sinking into a feeling or a moment. Saunders employs her flawless technique to circumvent any and all such moments throughout the piece, yielding a form that is notable in its sheer absence of sensations of arrival or return. In the paradigm of anticipation as tension, and arrival as satisfaction, the listener receives neither. Every moment is masterfully crafted, beautiful and intriguing in its complexity. The aggregate of all moments, however, uses our

natural tendencies and expectations against us, deftly manipulating our temporal awareness to create an intensely personal musical experience equally disquieting and fascinating.

Chapter 5: Temporal Awareness and Creative Techniques

We have seen that analysis of the temporal awareness which music motivates can give valuable insight into a listener's experience of a piece of music. This listener-centric model of musical analysis provides at least as much value to the composer during the compositional process as it does after the fact in the analysis of completed works. How can the theoretical and practical analysis presented above be meaningfully applied as a compositional and pedagogical tool to shift the focus of the compositional process away from the acoustic fact of the result, and toward the skilled control of musical parameters in order to motivate the intended musical experience for the listener? This chapter provides a brief overview of approaches to incorporating such a shift of focus into compositional practice, in preparation for a more in-depth examination of my own compositional approach in Chapter 6.

5.1 Addressing Temporal Awareness Pedagogically

I often say to the composition student eager to learn how to write like [admired composer] that there is more value in learning to write music that *works* like [admired composer's] music than in learning to write music that *sounds* like [admired composer's] music. What we wish to emulate in our own writing is the way that the target music makes us feel—the musical experience that it creates. I find that this is usually a function of temporal parameters of composition at least as much as it is a function of more traditional harmonic and pitch-centric parameters. In other words, the temporal experience of the listener is to a significant extent a composable parameter of music; the construction and manipulation of a compelling temporal experience are techniques which can be studied, learned, and developed.

This approach applies to the compositional process across fairly disparate musical styles as well.[65] Studying Mozart can teach us how to more effectively write music "like" Lachenmann (i.e. that sounds like Lachenmann) if we focus less on relationships between pitches and more on relationships between the listener and the moment. The musical style is not imposed upon the piece by the compositional techniques utilized in its creation; it is a fundamentally separate choice made by the composer. With this in mind, attempts by the student composer to "emulate" existing works can be very effective exercises, even (and perhaps especially) if similarity of musical aesthetic is superseded by similarity of compositional craft as the primary goal of the exercise. For example, one could aim to identify the mechanism of temporal control at work in a piece of music, then try to reproduce it in a different musical context. One could analyze the form of an existing piece without specifying any musical materials, focusing not on the content of sections, moments, and progressions, but on the relationships between them. To reframe this concept as less analytical and more creative, one could compose a musical form similarly devoid of musical material, essentially composing the intended function and development of the listener's memory and anticipation throughout the piece. Instead of a melody, chord progression, rhythmic cell, texture, or other "sonic object," this listener-centric formal plan could be used as the starting point of the compositional process. It is my personal experience that such a pedagogical approach is often extremely productive, inspiring a more musically creative and technically demanding compositional practice than merely prioritizing the manipulation of more traditional musical parameters.[66]

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[65] It is worth noting that this tends to be the case when the two different styles are still governed by relatively similar meanings/functions of *composition*, *composer*, etc. For example, Western classical music that is largely improvised or aleatoric could in fact have less to offer the contemporary composer in terms of temporal lessons than the more popular style of a singer-songwriter, even if the former *sounds* more similar to the student's intended style than the latter does.

[66] Naturally, a varied and multi-faceted pedagogical approach, in which study of traditional techniques takes place alongside these proposed ideas, is likely to be most fruitful of all.

5.2 The Composer's Job

The title of this section is admittedly a bit tongue-in-cheek, but it does address the very sincere question at hand: *What are we trying to do when we compose?* The answer of course varies between individuals, and a universal declaration of the function of the artist is not the intention of this paper. However, I personally view the act of composition as serving a very particular function beyond the blandly generic notions of *creating art*, *creating beauty*, or even *creating music*. I also think the evidence of how music is consumed, engaged with, and understood requires the serious composer to prioritize the listener[67] in their creative consideration. For these reasons I gravitate to more specific and perhaps controversial language: I consider it my job as a composer (and encourage composers I mentor to *consider* considering it their job as composers) to *create opportunities* for the listener to engage with compelling moments, sounds, actions, memories, and awarenesses of all of the above. The more attractive (that is, the less easily cognitively resisted) these opportunities, the better.

Why concern oneself with the listener? Why indulge in such preoccupation with controlling the experience of another person, rather than simply "seeking beauty" or some equivalent? Put simply, *this is what I want from a musical experience*. As a listener, as a composer, as a musician, as a person: I want to be pulled along against my will and control, I want to be manipulated, I want my sense of time and my engagement with memory and anticipation to be controlled such that the music *happens to me*. I am not interested in observing on my own terms a sonic activity that is indifferent to my participation; I want the terms,

[67] By "prioritize the listener," I mean prioritize the understanding that *music is listening*, and listening is a process and an experience. Music is not a sonic object to behold, it is the cognitive engagement of another human over a period of time.

whatever they are, to be dictated by the composer. As a composer, I feel this is what I owe to the listener.

Chapter 6: Temporal Awareness and Other Primary Composed Parameters in *be created or*

be created or was composed in 2018 for the International Contemporary Ensemble. The piece is written for baritone saxophone, violin, viola, contrabass, piano, percussion, and 4-channel electronics. The percussion setup includes 25 homemade windchimes, tuned to partials 5-7, 9-15, and 17-31 of Db2. The chimes tuned to partials 11 and 22 are played by the percussionist at two key moments throughout the piece, and the rest are divided into four groups, each of which is hung from a separate device that can be turned by the use of a hand crank. The piece incorporates more directly than any other in my catalogue the many facets of a listener-centric, temporal-awareness-guided compositional approach.

What follows is not an exhaustive analysis of the work and its many inner workings. Instead, the piece is divided into sections according to loose conceptual delineations, and each one is discussed from a perspective of the most significant way(s) in which the ideas of this paper operate within it.

6.1 Material and Temporal Exposition (mm. 1-45, 0:00-5:00)

The saxophonist establishes two foundations of this work in the course of their first few breaths:

First, the piece unfolds slowly. The amount of time each gesture requires to fully transpire is significant, relative to the number of perceivable sonic events each contains. However, the complexity of the timbre (and by extension the imagined difficulty of producing it) develops on a much shorter timescale within each gesture, likely motivating a strong focus on the present. This combination yields a sort of "slow-moving Momentary Awareness" which serves

as a baseline for the musical experience, setting precedents and creating expectations regarding change, growth, and our role as listeners in both.

Second, the social-performative context of the musical experience is immediately understood to revolve around a very intimate and human mode of communication. The lone performer, the inherently vocal quality of the sound and its apparent mechanism of production, and the clear alignment of musical durations to biological rhythms and processes (most notably the salient breathing of the saxophonist) all yield a high likelihood of strong mimetic engagement on the part of the listener. No questions are posed to the listener in the first 90 seconds of the piece; they are simply invited to internalize both the rate at which sonic change occurs and the physical realities of the sonic production they are witnessing.

In addition to the temporal exposition described above, a great deal of the piece's musical material is presented in the first five minutes. The sparsely intimate solo texture of the first few measures, the lilting melodic contours of mm. 18-22, the "looping" unison rhythms of m. 27, the spectral swirling over an unmoving fundamental of mm. 25-26, the micro-chaos and macro-alignment of mm. 29-39, and the delicate timbral shimmering of mm. 40-44 collectively outline the vast majority of textures, timbres, harmonic content, and intra-ensemble relationships comprising the entirety of the piece. This sets the stage for many degrees of familiarity, from the immediately apparent to the distantly subconscious, throughout the remaining musical experience.

6.2 Melting Connections (mm. 46-98, 5:00-8:17)

From the first entrance of the percussion and piano in mm. 46-47, the roles of the members of the ensemble have been altered. The most significant change belongs to the

saxophone, which (despite a relative continuity of musical material) gives up its function as the primary driver of musical change, in turn allowing the rest of the ensemble to take control of the developmental process. Whereas the saxophone primarily contributed continuous change of timbre, the strings shift the sound toward continuous change of pitch, lending this section an unstable "melting" quality in stark contrast to the often-rigid fundamental frequencies of the previous section.

This harmonic instability is closely mirrored in the (lack of) clarity regarding temporal perception and social-performative context. Temporally, we've moved away from distinguishable phrases governed by biological rhythms and denoted by salient sonic events. The passage of time is less easily parsed by the listener as phrases overlap and events decay into states. We are likely to slip into periods of Transitionary Awareness, ranging in duration from a few seconds to perhaps well over a minute, as recognizable markers of time melt into background noise along with any opportunities for strong mimetic engagement.

The electronics first enter during this section, though their entrance is almost certainly missed by the listener. The electronic component of this piece consists solely of unmanipulated recordings of the instruments in the ensemble playing musical material that is more or less consistent with what is being played by their "live" counterparts at any point in time. The effect of this is that, for example, a viola gesture in the electronics is only distinguishable as separate from the acoustic ensemble if the listener happens to be observing the violist closely enough at that moment to notice the discrepancy between apparent action and resulting sound, or happens to notice subtle displacement in stereo space of the sound from its presumed source. However, the listener's shift toward Transitionary Awareness during this section makes such detailed observations improbable, allowing the reality of the ensemble to shift away from the listener's

perception of the ensemble, undetected. The social-performative context changes right in front of our eyes, but just beyond our awareness.

6.3 Paradigm Shift (mm. 99-126, 8:17-10:19)

As the uncanny details of the acoustic fact fade past the reach of our attention, some other facet of the musical experience must take its place as the primary mechanism motivating a compelling change of temporal awareness. In this case, the event that extends its hand to us, presenting an opportunity to recognize that the world of the piece has been changing in our absence, is the process of physical relocation that begins in m. 99. The percussionist, having nothing left to contribute to the musical texture of the moment, signals the impending redefinition of the ensemble by slowly walking to the piano and sitting down. Even this action may go unnoticed by some listeners, who might not recognize that a change has occurred until the strings begin to follow suit, one by one, over a minute later. At some point, the image of the pianist and the percussionist sharing the piano bench, with their backs to the audience, registers for the first time. The relinquishing of each individual's instrument, set down silently on the floor, indicates a fundamental restructuring of the performance we are witnessing and the performers who comprise it. Eventually, the only sound comes once again from the solo saxophone, playing distant, introverted multiphonics that recall an earlier breath-centered intimacy, while the rest of the ensemble huddles around the piano in silence. Gently awakened from our Transitionary Awareness not by an event, but by a gradual dawning of realization, we have been made keenly aware of the fragile potential of the moment, holding our collective breath so as not to disturb the future before we can learn what it holds.

6.4 Family Piano Time (mm. 127-158, 10:19-12:56)

What follows aims to combine the present-engagement of Momentary Awareness with the long-term memory of Transitionary Awareness. This may well be paradoxical and unachievable, but the music makes an attempt nonetheless. The imagery is simple, communal, and nostalgic, completing an obvious change in social-performative context and thereby motivating Transitionary existential ponderance. The familiarity and utter simplicity of the bare melodic material, however, lend the moment a kind of near-predictability, or at least make more attractive a barely-conscious engagement with the broad present. The subtle spectral filtering of tonal piano material through natural harmonics creates just enough Momentary intrigue to keep the listener from fully sinking into Transitionary comfort. The *feeling* is one of a special moment, despite the fact that the moment is a natural, foreseeable culmination of materials and processes with which we've spent the entire piece familiarizing ourselves. There is no sudden change, but rather a shared arrival of many traceable developments, each inviting a particular brand of awareness in response. The *breadth* of these awarenesses, and not the absolute value of their sum, is what defines this moment.

6.5 Rupture (mm. 158-164, 12:56-13:12)[68]

The comfort is short-lived. While Family Piano Time began with absolute clarity, it soon recedes through cumulating layers of obfuscation, lacking any comparable clarity of conclusion. The increasingly active material in the strings which ultimately lifts us out of the previous section is identical to that near the end of the first section of the piece; the disturbance of

[68] The rupture of all that Family Piano Time represents can be thought of as starting as early as m. 155, 151, or even 147. The division between these two sections is porous and subjective.

familiarity offers distant recognition itself. As the electronics reenter amidst the confusion, this interaction of the anticipatably familiar and the unforeseeably disruptive rapidly intensifies, boiling over as we witness for the first time—fully along for the Momentary Awareness ride—the music accumulate, grow, and *arrive*.

6.6 Everything in All Directions (mm. 165-240, 13:12-15:41)

During the final measure before the arrival at m. 165, the electronics (stereo only thus far) smear toward the rear speakers, enveloping the listener in a swirling, richly immersive 4-channel sonic environment when the downbeat of m. 165 is reached. The macro-rupture (of most musical parameters, as well as of social-performative context and temporal awareness) of the previous section has given way to an unprecedentedly cohesive sonic environment nevertheless marked by incongruous micro-ruptures (of rhythmic anticipatability and physical-dimensional awareness) which continuously threaten to force the listener out of any otherwise consistent temporal awareness.

The dizzying complexity of the rhythm is juxtaposed with moments of perceivable groove, daring the listener to embrace mimetic engagement with the present. The spectral harmonic language of the acoustic world, muddied by the unchanging electronic backdrop, is a direct synthesis of the saxophone sonorities which opened the piece, challenging the listener to access memories of the past. The electronics are grounding and foundational, yet uncannily disconnected from the listener's perceived physical reality of the performers in front of them, calling into question the listener's understanding of the current social-performative context. The apparently unified arrival of m. 165 brings with it a fracturing complexification of the many

layers of the musical experience, pushing the listener (and their temporal awareness) in one of many sensorial directions at any given moment.

6.7 Individual Settling, Collective Dispersion (mm. 241-284, 15:41-18:00)

As before, temporal clarity of arrival leads to temporal ambiguity of conclusion, as the onset of the shift away from the previous section and into the beginning of the end transpires without a trace. The musical activity of each of the performers continues unchanged, while the enveloping sound of the electronics begins a four-minute pitch shift upwards, initially moving at a rate far too slow to be perceived. This unheard dissolving of the harmonic floor that has been supporting us for the last two minutes marks the beginning of the ensemble's dispersion toward non-interrelation. Over time, individual musical material settles as intensity lowers and development slows. The collective sound, however, becomes increasingly chaotic as we lose hold of the synchrony that previously allowed us to grasp a single unified present. Do we join any single performer in settling into an increasingly continuous awareness at the expense of attending to the multifaceted activity surrounding us? Do we continue the increasingly taxing mental exercise of processing the moment as a whole? While we wrestle with our cognitive options, the fundamental frequency of our environment continues to drift, leaving us with less of a floor to stand on at every moment.

6.8 Chimes and Distillation (mm. 285-end, 18:00-21:37)

Just as the electronics' fading dynamic level and accelerating pitch shift cross-fade respectively out of and into clear audibility, the saxophonist—always the last hold-out in the name of individuality—proposes one more potential manifestation of synchrony and complexity.

They once again set down their instrument and assume an altered performative identity, this time by retreating to the back corner of the stage and beginning to turn a crank connected to a collection of tuned windchimes. One by one, this action is repeated by the string players in their own individual corners of the stage, and the percussionist nearly resumes their Family Piano Time position, this time standing at the side of the piano, perpendicular to their previous bench companion.

This end-state incorporates elements of nearly every facet of the preceding musical experience. Questions of the individual versus the collective, synchrony versus rhythmic randomness, present engagement versus memory activation, and more are all made relevant once more. We exist in a sonic environment on the cusp of intentional clarity and indifferent disorganization across most perceivable parameters. The novel social-performative context begs for Transitionary consideration, while the ritualistic turning of the cranks counters with a Momentary mimetic invitation. Even the harmony, ostensibly more straightforward than at any point in the previous 20 minutes, is built on the juxtaposition of perceived clarity and complexity.

It is in fact this harmony which ultimately achieves a state most nearly approaching unification and consensus. Each set of chimes on its own includes insufficient pitch content to adequately convey the coherence of the D-flat harmonic series. Even in combination, partials 1-4, 8, and 16 are still missing, and the crucial 11^{th} and 22^{nd} remain in the percussionist's reserve. In a final reference to the communal intimacy that once took place around the piano, the pianist and percussionist provide two isolated sonic events; chimes tuned to partials 11 and 22 are played in unison with the piano's fundamental Db2, distilling the harmonic, rhythmic, and social

dispersion of the environment into a final moment of shared intention. With nothing left to accomplish, the windchimes slow, and we fade into silence.

Conclusion

The temporal awareness of the listener has been shown to be not just a composable parameter of music, but an essential component of the musical experience. Deeply rooted in the ways in which we perceive, comprehend, and engage with the world, our experience of time's passage and our understanding of this experience shape our interactions with music in ways that extend far beyond pitches and rhythms; our natural capacities to recollect and anticipate are key factors in how we interpret change. Changes in temporal awareness, often marking significant moments in musical development, can serve as an especially illuminating basis for the analysis of music. By understanding the musical factors that influence our temporal awareness, we can greatly expand our understanding of *how music works*—not how it sounds, but how it makes us feel. I hope to have demonstrated that it is at least the great opportunity, if not the artistic duty, of the composer to consider the experience of the listener as a core priority of the compositional process, and the most direct way to guide this experience is the careful and intentional control of the listener's temporal awareness.

Bibliography

Belet, Brian. "Theoretical and Formal Continuity in James Tenney's Music." *Contemporary Music Review* 27, no. 1 (2008): 23–45.

Blood, A. J., and R. J. Zatorre. 2001. "Intensely Pleasurable Responses to Music Correlate with Activity in Brain Regions Implicated in Reward and Emotion." *Proceedings of the National Academy of Sciences of the United States of America* 98, no. 20 (2001): 11818–23.

Burrows, David. Time and the Warm Body: A Musical Perspective on the Construction of Time. Leiden, Netherlands: Brill, 2007.

Chessa, Luciano. "Gay Guerrilla: A Minimalist Choralphantasie." In *Gay Guerrilla: Julius Eastman and His Music*, 191–99. Rochester, NY: University of Rochester Press, 2015.

Cox, Arnie. *Music and Embodied Cognition: Listening, Moving, Feeling, and Thinking*. Bloomington, MN: Indiana University Press, 2017.

Csikszentmihalyi, Mihaly. *Beyond Boredom and Anxiety: Experiencing Flow in Work and Play*. London, England: Jossey-Bass, 2000.

Dewey, John. *Art As Experience*. New York, NY: Perigee Books, 2005.

Eastman, Julius. *Gay Guerrilla*. New York, NY: Music Sales Corporation, 2018.

Eastman, Julius. *Gay Guerrilla*, with Frank, Janet Kattas, Julius Eastman, and Patricia Martin, piano, recorded January 1980, on *Julius Eastman – Unjust Malaise*, New World Records, 80638-2, 2005, compact disc.

Gann, Kyle. "Julius Eastman and the Conception of 'Organic Music.'" In *Gay Guerrilla: Julius Eastman and His Music*, 191–99. Rochester, NY: University of Rochester Press, 2015.

Grisey, Gérard. *Vortex Temporum*, with Ensemble Recherche, conducted by Kwamé Ryan, recorded November 1996, on *Gérard Grisey - Ensemble Recherche – Vortex Temporum – Taléa*, Accord, 464 292-2, 2001, compact disc.

Hasty, Christopher F. *Meter as Rhythm*. New York, NY: Oxford University Press, 1997.

Huron, David. *Sweet Anticipation: Music and the Psychology of Expectation*. Cambridge, MA: Bradford Books, 2008.

Kozak, Mariusz. "Listeners' Bodies in Music Analysis: Gestures, Motor Intentionality, and Models." *Music Theory Online* 21, no. 3 (2015). https://doi.org/10.30535/mto.21.3.7.

Kozak, Mariusz. *Enacting Musical Time: The Bodily Experience of New Music*. Oxford University Press, 2020.

Lachenmann, Helmut. *Ein Kinderspiel*. Wiesbaden: Breitkopf & Härtel, 1982.

Lachenmann, Helmut. *Ein Kinderspiel*, with Bernhard Wambach, piano, recorded August 1991, on *Helmut Lachenmann – Chamber Music*, cpo, 999 102-2, 1992, compact disc.

Lakoff, George, and Mark Johnson. *Metaphors We Live By*. Chicago, IL: University of Chicago Press, 2003.

Levine Packer, Renee, and Mary Jane Leach, eds. Gay Guerrilla: Julius Eastman and His Music. Rochester, NY: University of Rochester Press, 2018.

Ligeti, György. *Atmosphères*. Vienna: Universal Edition, 1963.

Ligeti, Györg. *Atmosphères*, with the Berliner Philharmoniker, conducted by Jonathan Nott, recorded December 2001, on *The Ligeti Project II*, Teldec Classics, 8573-88261-2, 2002, compact disc.

Mahler, Gustav. *Symphony No. 2 in C Minor, "Resurrection"*, with the New York Philharmonic and the Westminster Choir, conducted by Leonard Bernstein, recorded April 1987, on *Mahler: Symphony No. 2*, Deutsche Grammophon, 423395, 1990, compact disc.

Merleau-Ponty, Maurice. *Phenomenology of Perception*. Translated by Donald A. Landes. New York: Routledge, 2012.

Peifer, Corinna, and Stefan Engeser, eds. *Advances in Flow Research: Second Revised and Extended Edition*. 2nd ed. Cham, Switzerland: Springer Nature, 2021.

Ross, Alex. "Infernal Opera." *The New Yorker*, July 14, 2008. https://www.newyorker.com/magazine/2008/07/21/infernal-opera.

Rot, John. *be created or*. YouTube video, 21:37. Posted by John Rot, October 11, 2018. Accessed January 7, 2021. https://www.youtube.com/watch?v=eHlOp1ES2ng

Rubin, David C. "The Basic-Systems Model of Episodic Memory." *Perspectives on Psychological Science: A Journal of the Association for Psychological Science* 1, no. 4 (2006): 277–311.

Saunders, Rebecca. *Skin*. Leipzig: Edition Peters, 2016.

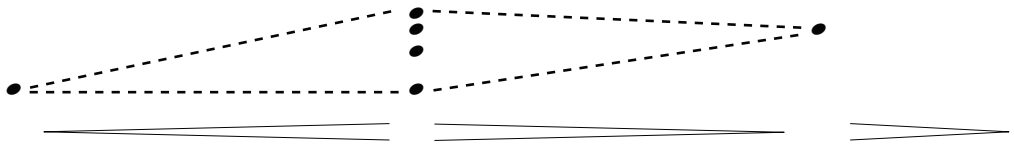
Saunders, Rebecca. *Skin*, with Juliet Fraser, soprano and Klangforum Wien, conducted by Titus Engel, recorded October 2016, on *Donaueschinger Musiktage 2016*, Neos, NEOS1171617, 2018, compact disc.

Snyder, Bob. *Music and Memory: An Introduction*. London, England: MIT Press, 2001.

Temperley, David. *The Cognition of Basic Musical Structures*. London, England: MIT Press, 2004.

Zbikowski, Lawrence M. "Musical Time, Embodied and Reflected." In *Music in Time: Phenomenology , Perception, Performance*, edited by Suzannah Clark Alexander Rehding. Cambridge, Mass: Harvard University Press, 2016.

[ ] be created or [ ]



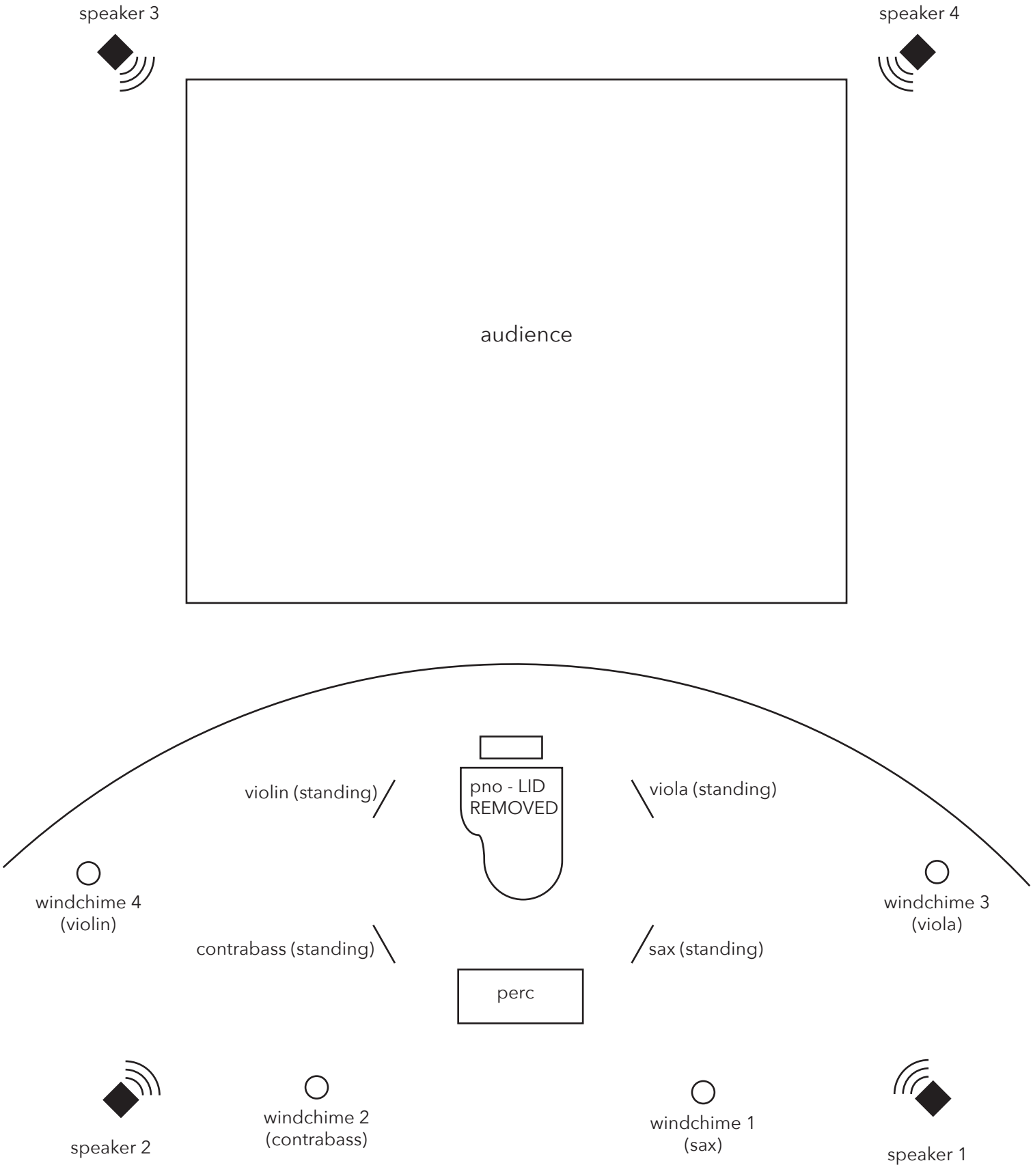
John Rot

2018

for the International Contemporary Ensemble
with admiration and gratitude

"Locally, entropy can be lowered by external action. This local increase in order is, however, only possible at the expense of an entropy increase in the surroundings; here more disorder must be created."

be created or - stage setup



performance notes

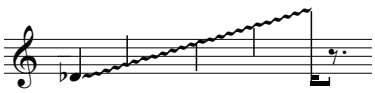
all

the standard quarter-tone accidentals
are further modified as follows:

small arrow attached to the accidental = 14-cent adjustment (equivalent to 5th partial deviation)
large arrow preceding accidental = 31-cent adjustment (equivalent to 7th partial deviation)

a thin horizontal arrow indicates a smooth,
continuous transition from one state to another,
for example: **MST** ——————→ **PSP**

the following technique occurs in most parts, and indicates that some sort of scale should be played.
to the extent that it is idiomatic on each instrument, these scales should be as "non-standardized" as possible;
that is, they should not be major, minor, diatonic, chromatic, or, if possible, even- (or otherwise-) tempered.
beyond insuring that we are not all playing in C major, try not to think about the details of pitch;
merely ascend or descend:



score/parts: all players read off of the full score for pages 1-4, then have individual parts following. there is a separate "saxophone version" of these four pages which has the multiphonics fingerings written in. the composer suggests that the percussionist or pianist (who do not play in section A) give cues at indicated moments in section A, as well as conducting the metered portions of section A. alternatively, short clicktracks, started and stopped by whomever is running the electronics, may be used for these metered portions.
all sections of the piece follow the preceding without pause.

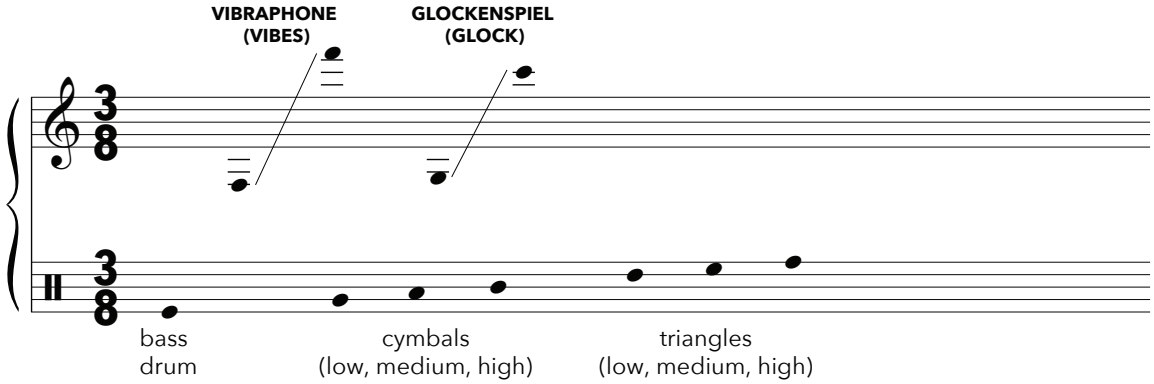
electronics:
this piece makes use of 4-channel pre-recorded audio playback, coordinated with the ensemble via clicktrack. materials available from composer.

windchimes:
this piece makes use of four sets of home-made windchimes, tuned to the D-flat harmonic series and attached to cranks.these should be hung from microphone stands (or similar) in the locations indicated, where they will be played at the end of the piece by the saxophonist, violinist, violist, and bassist. additionally, two separate chimes tuned to partials 11 and 22 are played by the percussionist at the end of the piece. if possible, these should be hung near the piano, as they are played in rhythmic unison with the piano at that time.

prepared/manipulated piano:
section C of this piece involves all six performers interacting directly with the piano. the percussionist should join the pianist on the piano bench, where they play the written piano-four-hands part. the reamining four should huddle around the non-keyboard end of the lidless piano, touching strings in pre-marked locations to produce harmonic overtones. the intimate, collaborative aesthetic of this section is as important as the sonic result.

performance notes (cont.)

percussion



on the non-pitched staff, "held" (tied and/or played with a crescendo) are to be bowed in the case of the cymbals, and played with a superball in the case of the bass drum. if struck (single note with an articulation), a mallet or beat should be used

sempre l.v. unless otherwise noted
N.B. other metals tuned to the pitch E (such as crotales, almglocken, etc.) may be used during Section D

---

piano

the pianist is required in a couple instances to touch the strings with "harmonic" pressure to produce a rich, complex multiphonic. experimentation will yield the optimal placement and pressure, but aim for a location near the dampers.

---

strings

scordatura: all three instruments should begin the piece with their G string tuned down a whole step to F. the string is retuned back to G after measure 27 in section A

MMST	molto molto sul tasto
MST	molto sul tasto
ST	sul tasto
PST	poco sul tasto
ORD	ordinario
PSP	poco sul tasto
SP	sul ponticello
MSP	molto sul ponticello
OB	on bridge

IV.7	seventh partial on string IV
II.3	third partial on string II
I.6/7	multiphonic located between partials 6 and 7 on string I

●	normal pressure
◆	half pressure
◇	harmonic pressure

⊡	light pressure
⊟	normal pressure
⧄	slight overpressure (excite upper partials, not yet perforated)
𝅘𝅥𝅯	scratch tone (heavy, perforated sound)

---

bari sax

section A functions in many ways as a saxophone concerto. play the (semi-)unmetered passages freely, allowing your soloistic sensibilities and the capacity of your lungs to determine phrase length, etc.

all multiphonics fingerings are taken from Marcus Weiss and Giorgio Netti, "The Techniques of Saxophone Playing," and can be found online at https://www.baerenreiter.com/materialien/weiss_netti/saxophon/multiphonics.html

transposed score

be created or

John Rot

(♩= 66, where applicable)

baritone saxophone

1

x5

mf f mp

3

bs

1

x6

mf f mp p

approx. rhythm

5

bs

3

1

bend as much as possible

x5

mp f mf

7

ar

3:2

3

12.2

D (overblown), coming down to normal pitch

1

(click)

= conductor cue

x4, once strings are done

bs

f ff f mp pp

violin

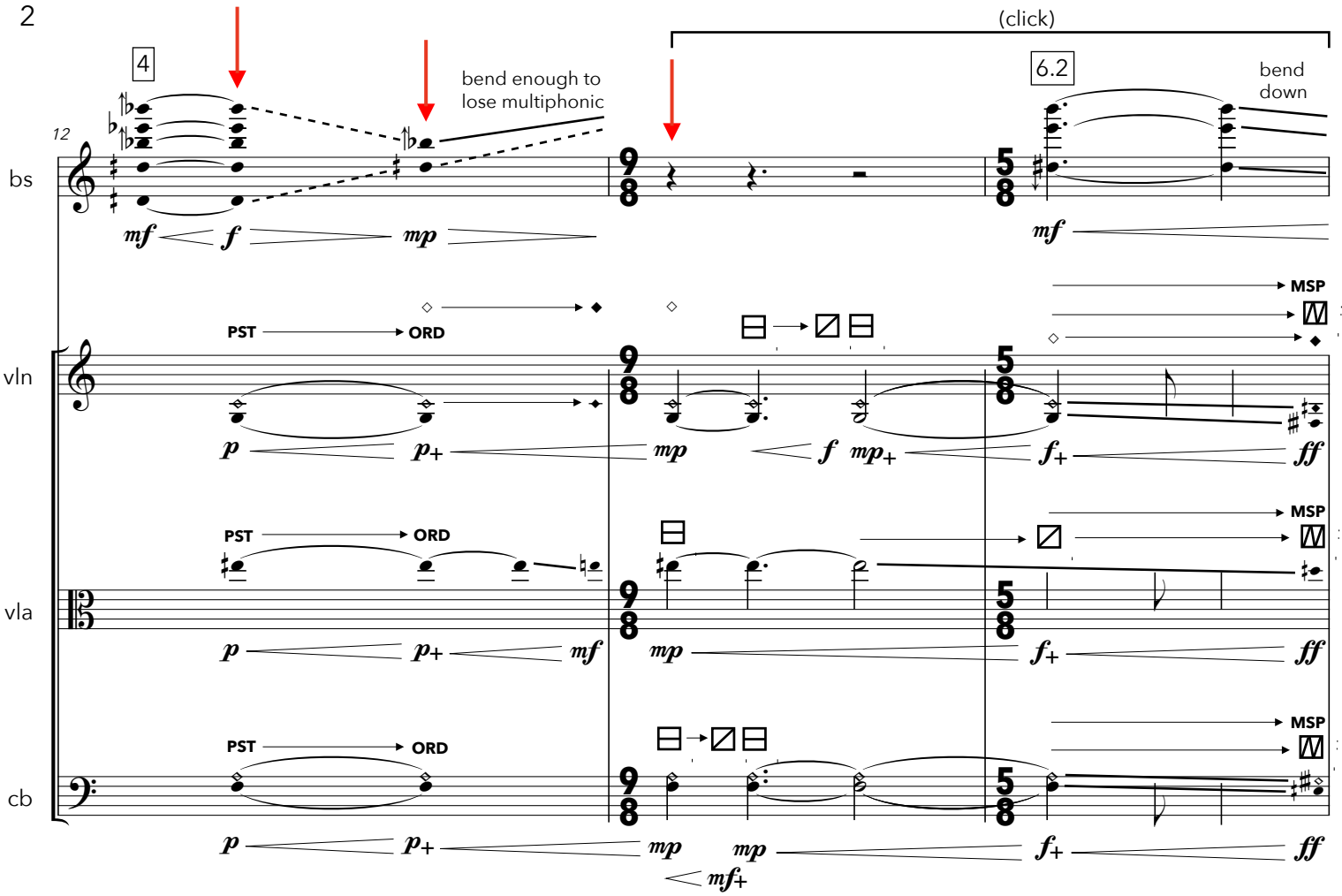
viola

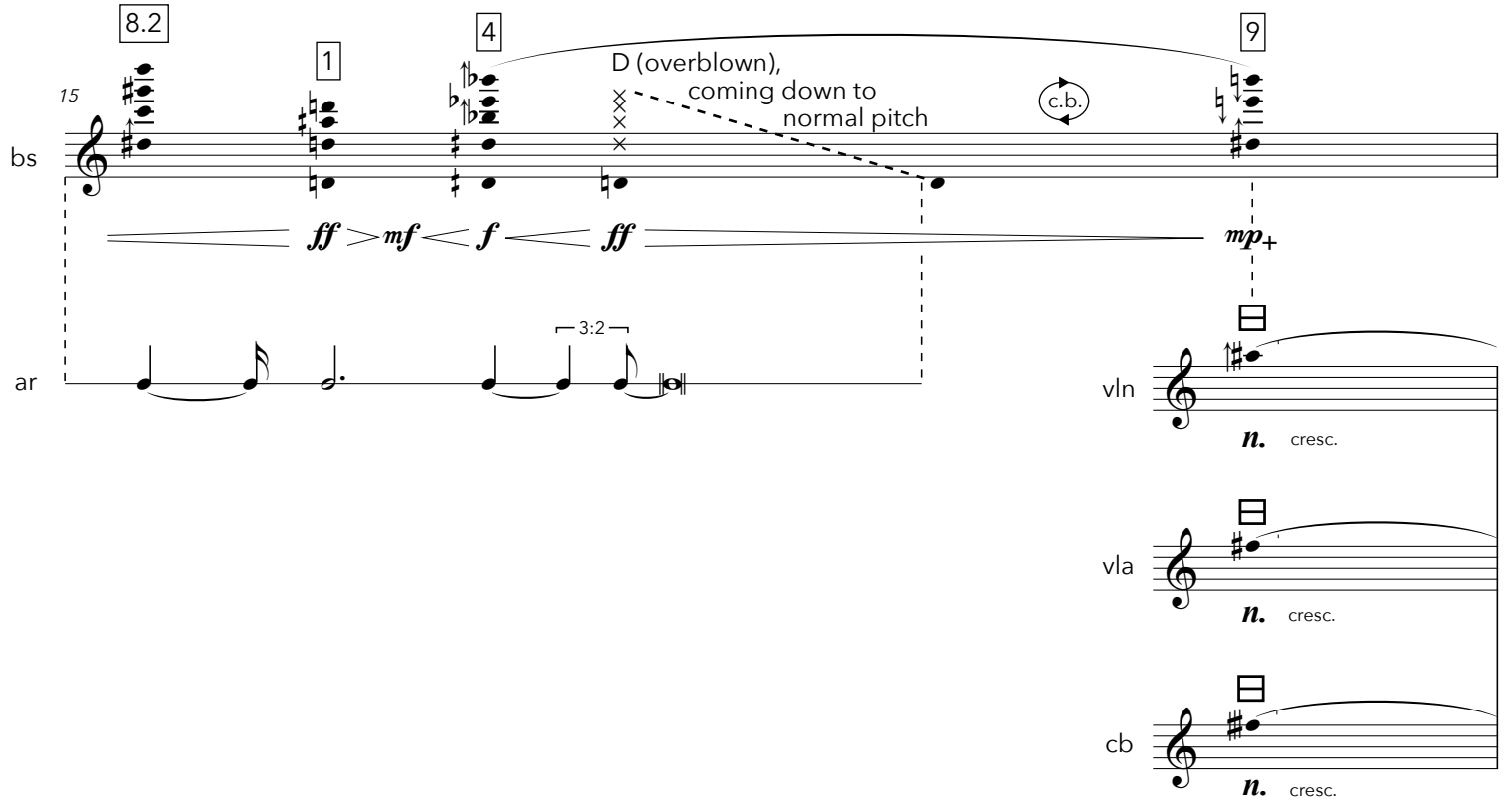
contrabass

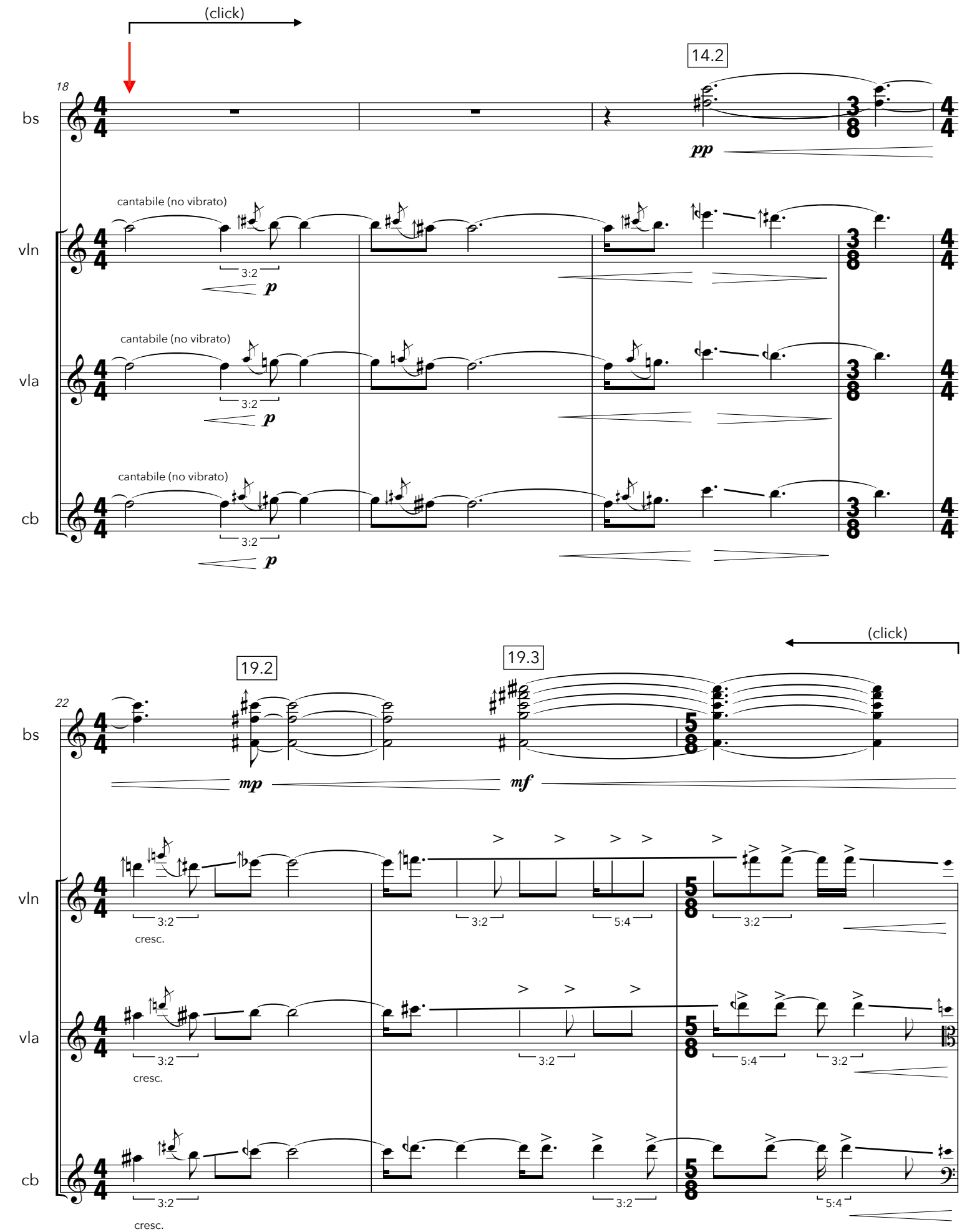
dim. gradually while repeating, arriving at ***n.*** independently ~5 cycles after sax is done.

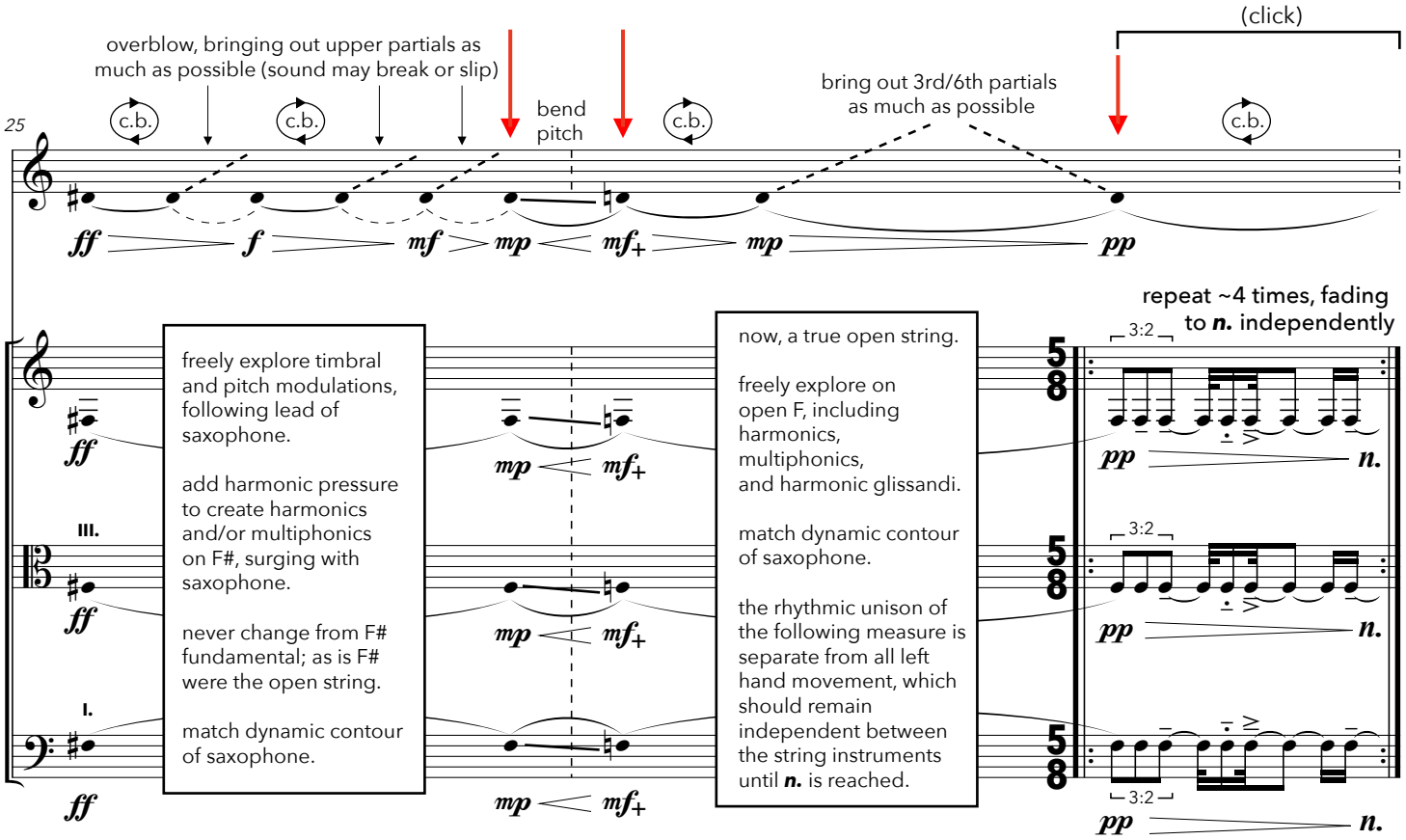
move from **ORD** to **ST poss.** over course of passage

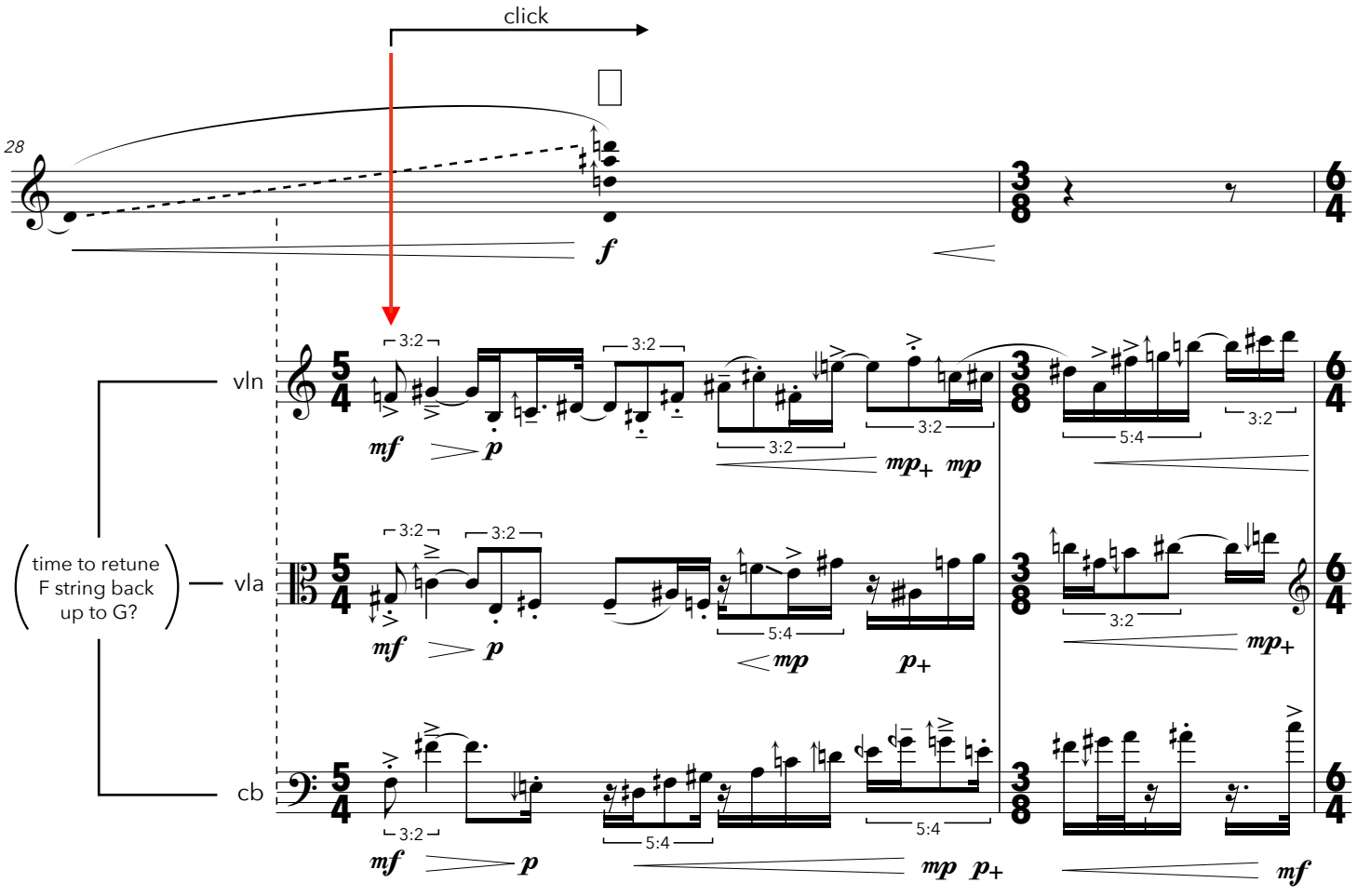
pp pp pp

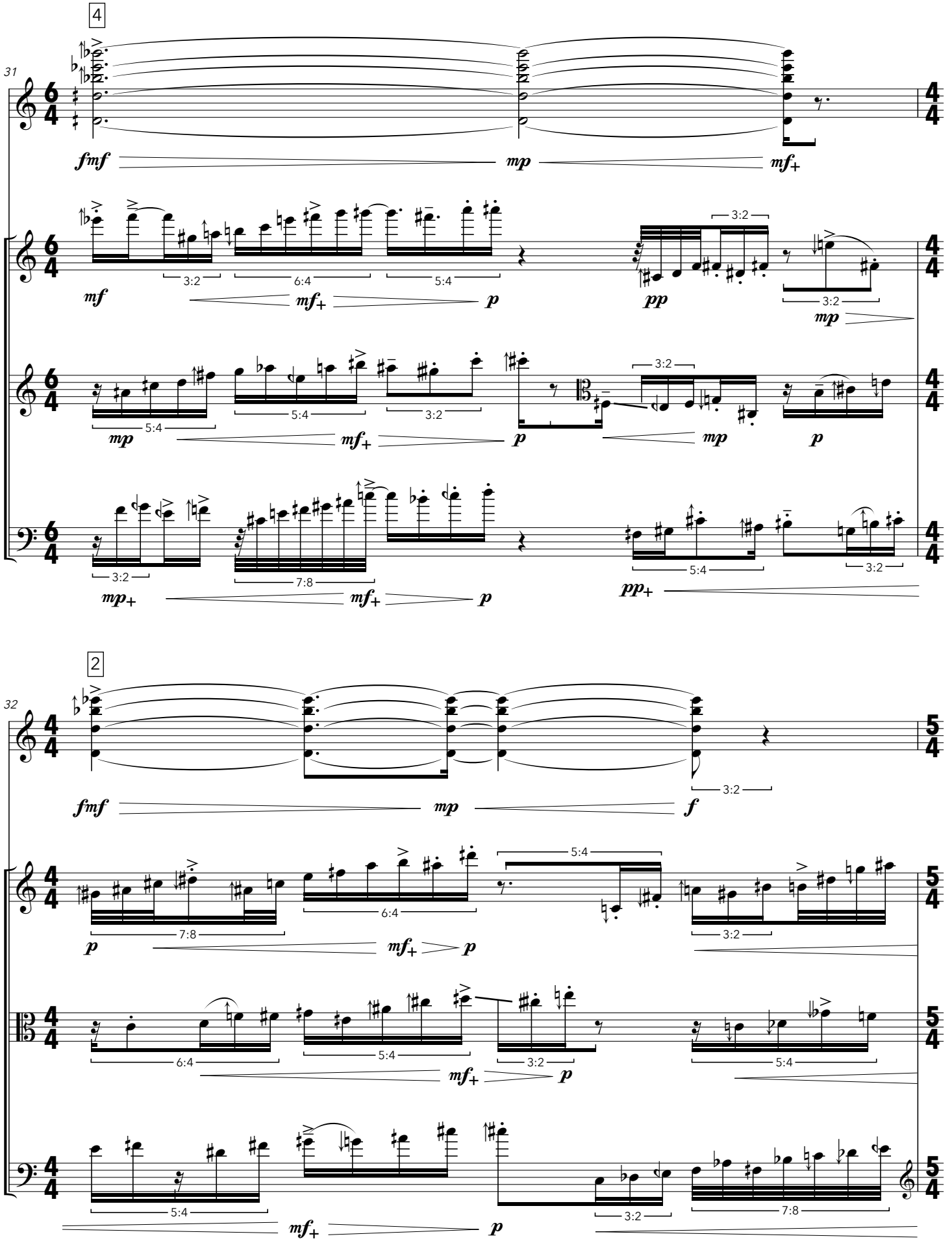

4
bend enough to lose multiphonic
(click)
6.2
bend down
12
bs
vln
vla
cb
PST
ORD
MSP
mf
f
mp
p
p+
mp+
f+
ff
mf+

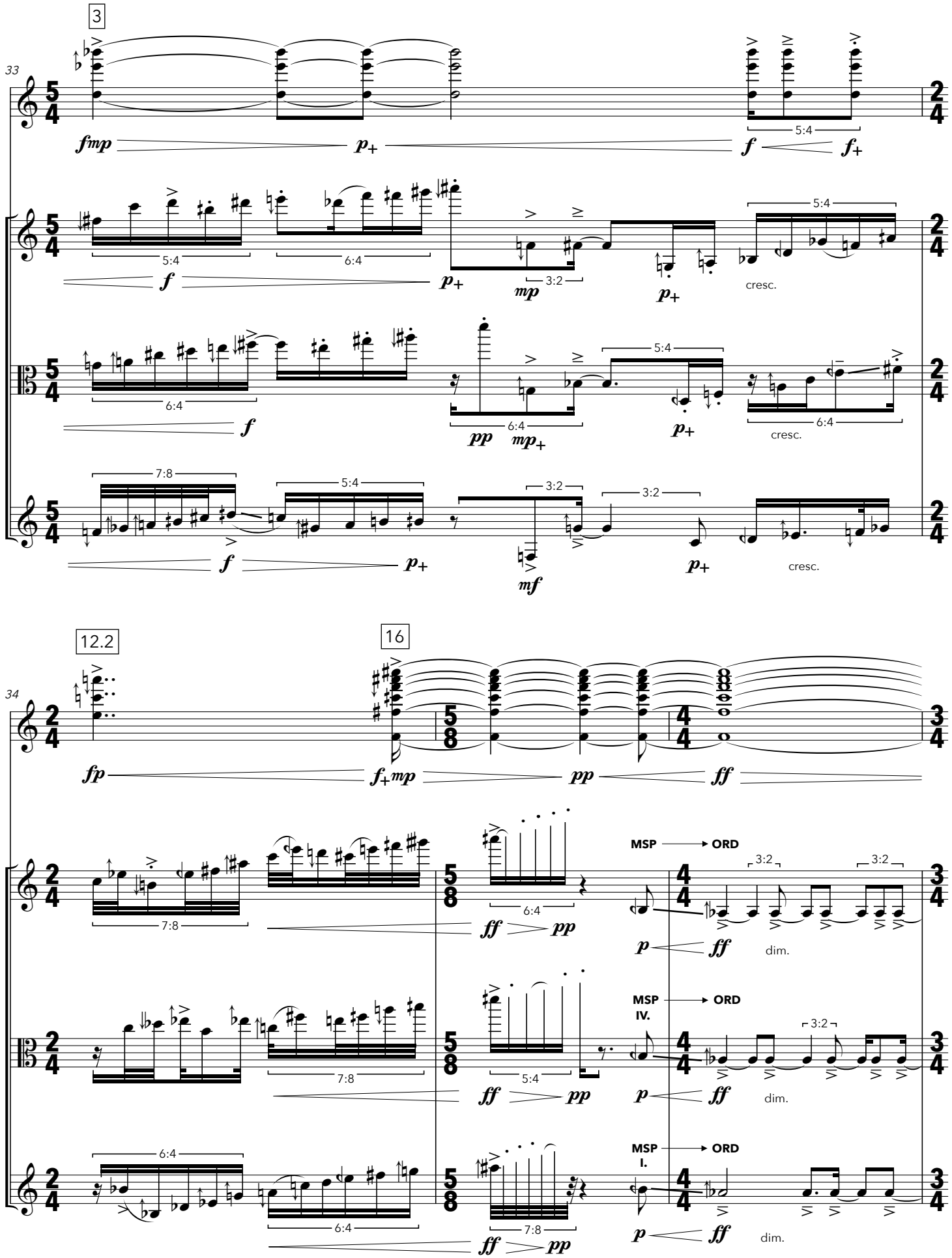

8.2
1
4
9
D (overblown), coming down to normal pitch
c.b.
15
bs
ar
3:2
ff
mf
f
mp+
vln
vla
cb
n.
cresc.

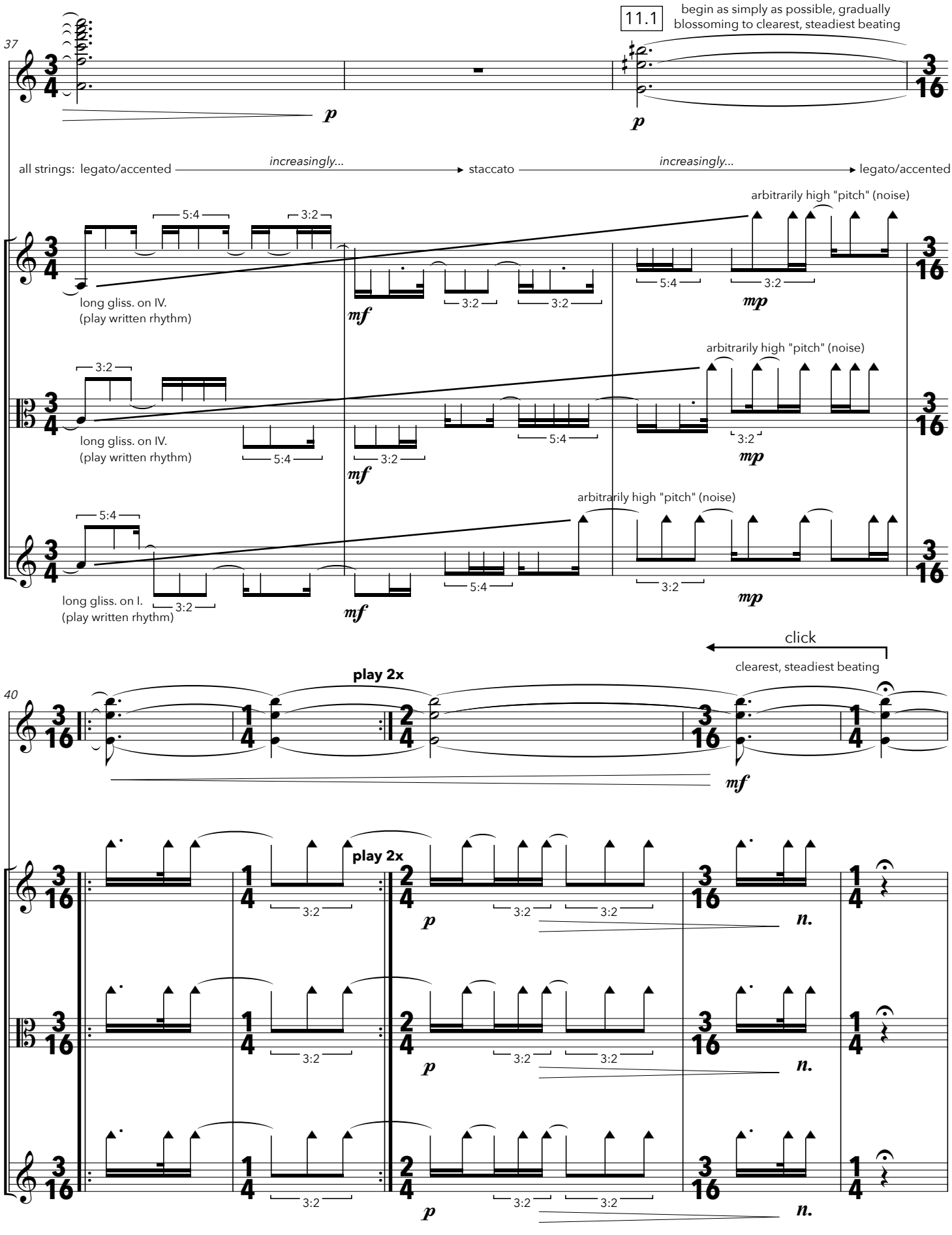

(click)
18
14.2
bs
pp
cantabile (no vibrato)
vln
3:2
p
cantabile (no vibrato)
vla
3:2
p
cantabile (no vibrato)
cb
3:2
p
(click)
22
19.2
19.3
bs
mp
mf
vln
3:2
cresc.
3:2
5:4
3:2
vla
3:2
cresc.
3:2
5:4
3:2
cb
3:2
cresc.
3:2
5:4

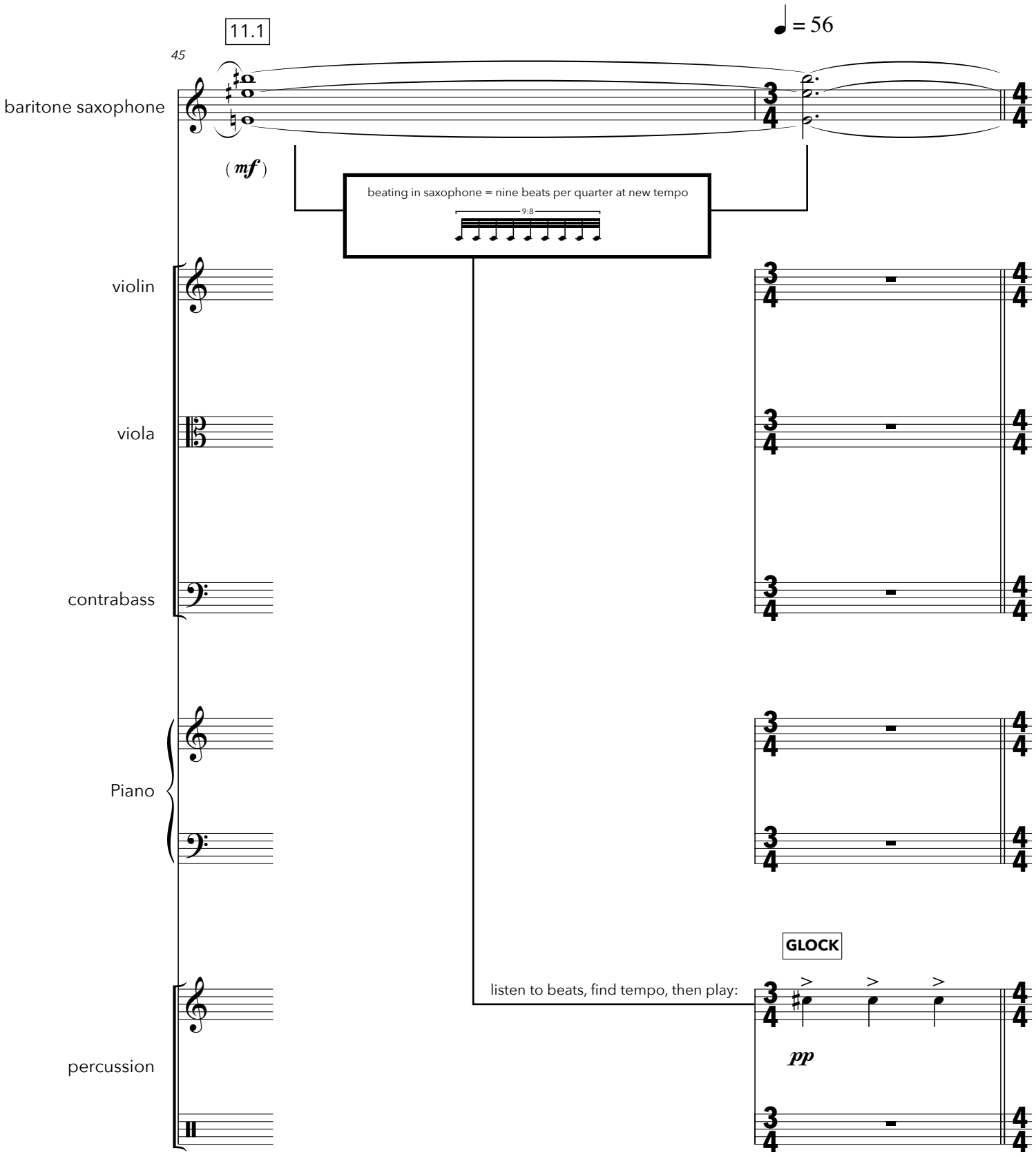

(click)
overblow, bringing out upper partials as much as possible (sound may break or slip)
bend pitch
bring out 3rd/6th partials as much as possible
25
c.b.
bs
vln
vla
cb
ff
f
mf
mp
mf+
pp
freely explore timbral and pitch modulations, following lead of saxophone.
add harmonic pressure to create harmonics and/or multiphonics on F#, surging with saxophone.
never change from F# fundamental; as is F# were the open string.
match dynamic contour of saxophone.
now, a true open string.
freely explore on open F, including harmonics, multiphonics, and harmonic glissandi.
match dynamic contour of saxophone.
the rhythmic unison of the following measure is separate from all left hand movement, which should remain independent between the string instruments until n. is reached.
repeat ~4 times, fading to n. independently
III.
I.
3:2
n.

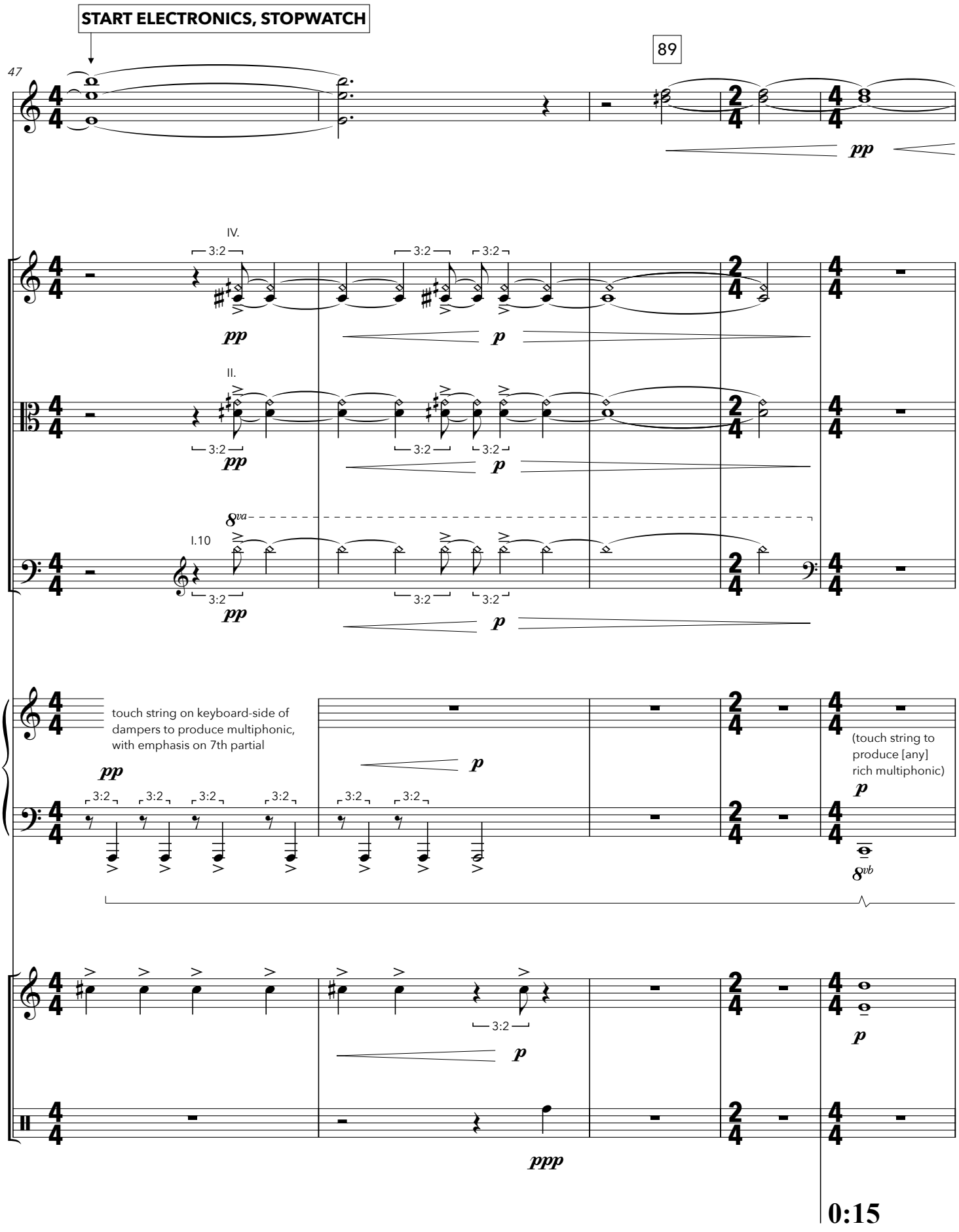

click
28
bs
f
vln
vla
cb
time to retune F string back up to G?
mf
p
mp
mp+
p+
3:2
5:4

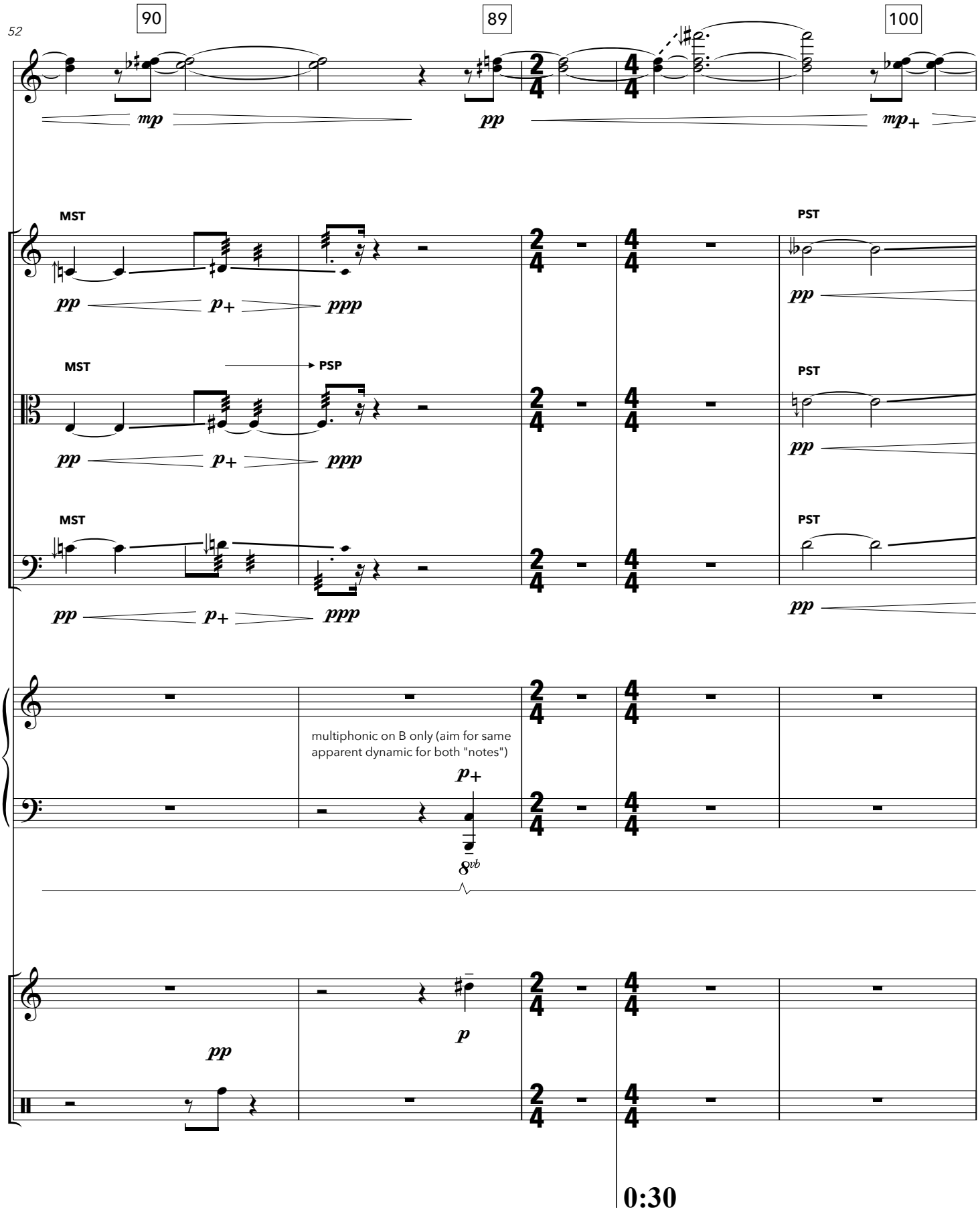

4
31
bs
vln
vla
cb
fmf
mp
mf+
mf
p
pp
mp+
pp+
3:2
6:4
5:4
7:8
2
32
f

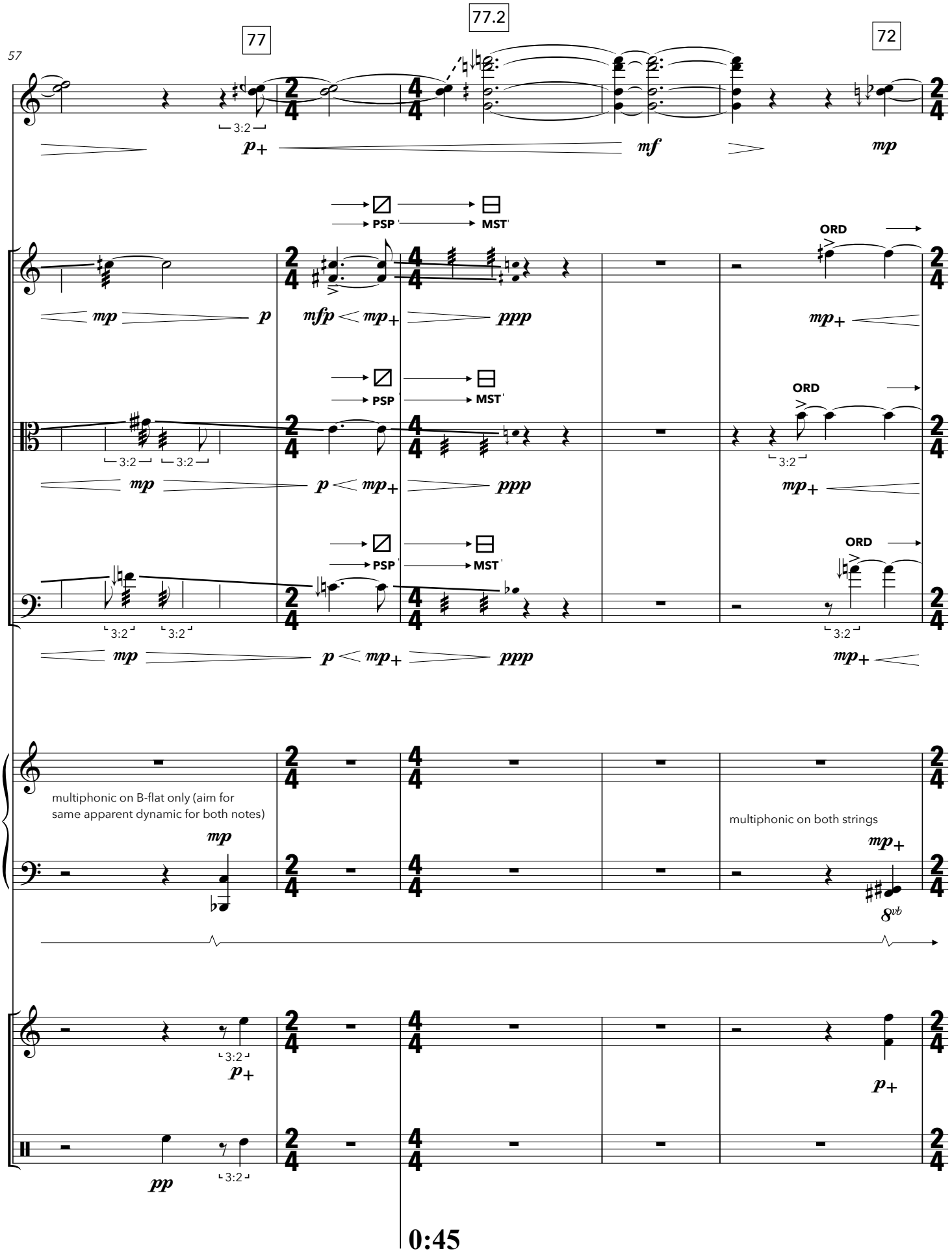

3
33
bs
vln
vla
cb
fmp
p+
f
f+
5:4
6:4
7:8
3:2
mp
pp
mp+
mf
cresc.
12.2
16
34
fp
ff
MSP → ORD
IV.
I.
dim.

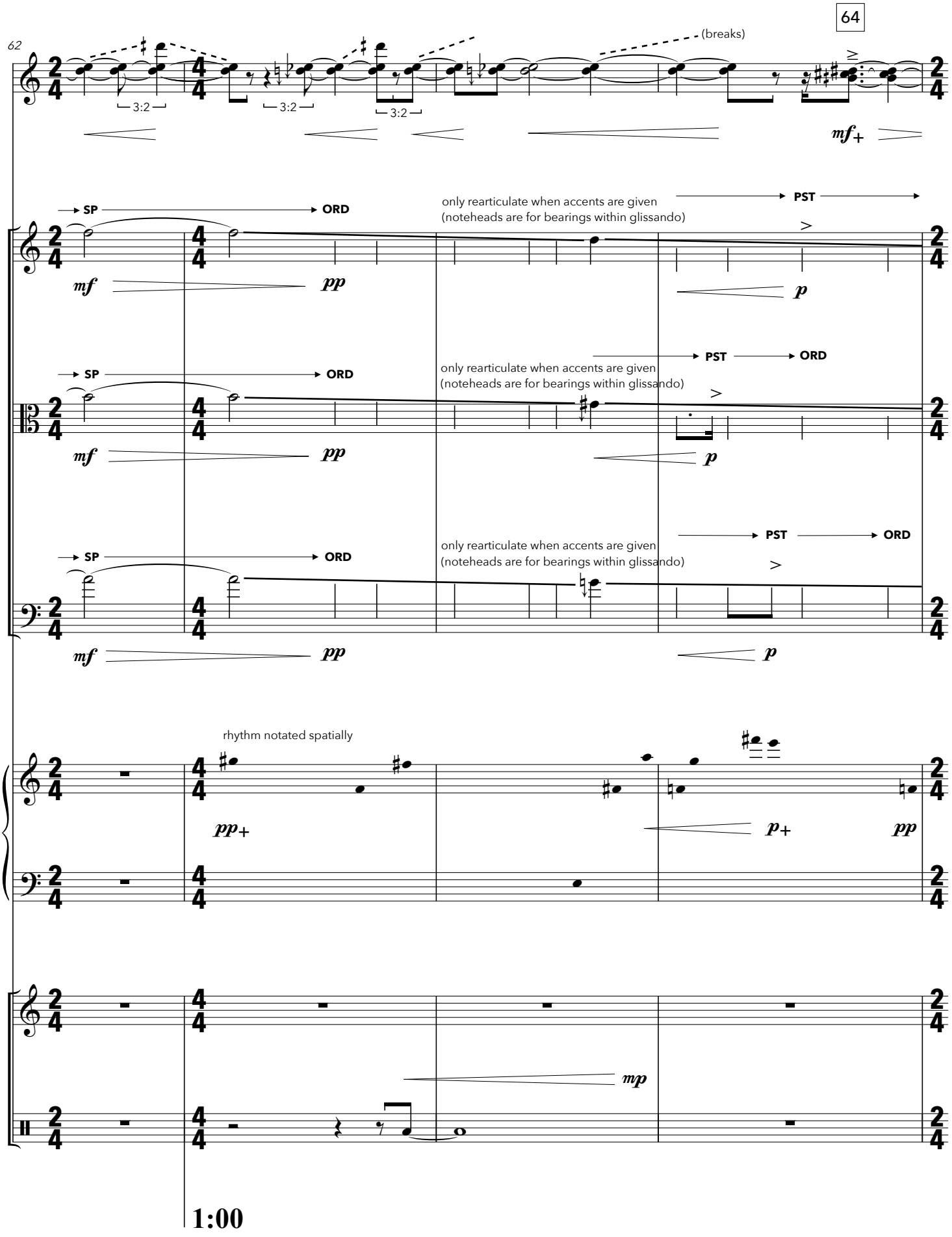

37
bs
vln
vla
cb
11.1
begin as simply as possible, gradually blossoming to clearest, steadiest beating
all strings: legato/accented
increasingly...
staccato
increasingly...
legato/accented
arbitrarily high "pitch" (noise)
long gliss. on IV.
(play written rhythm)
long gliss. on I.
(play written rhythm)
5:4
3:2
mf
mp
40
play 2x
click
clearest, steadiest beating
p
n.

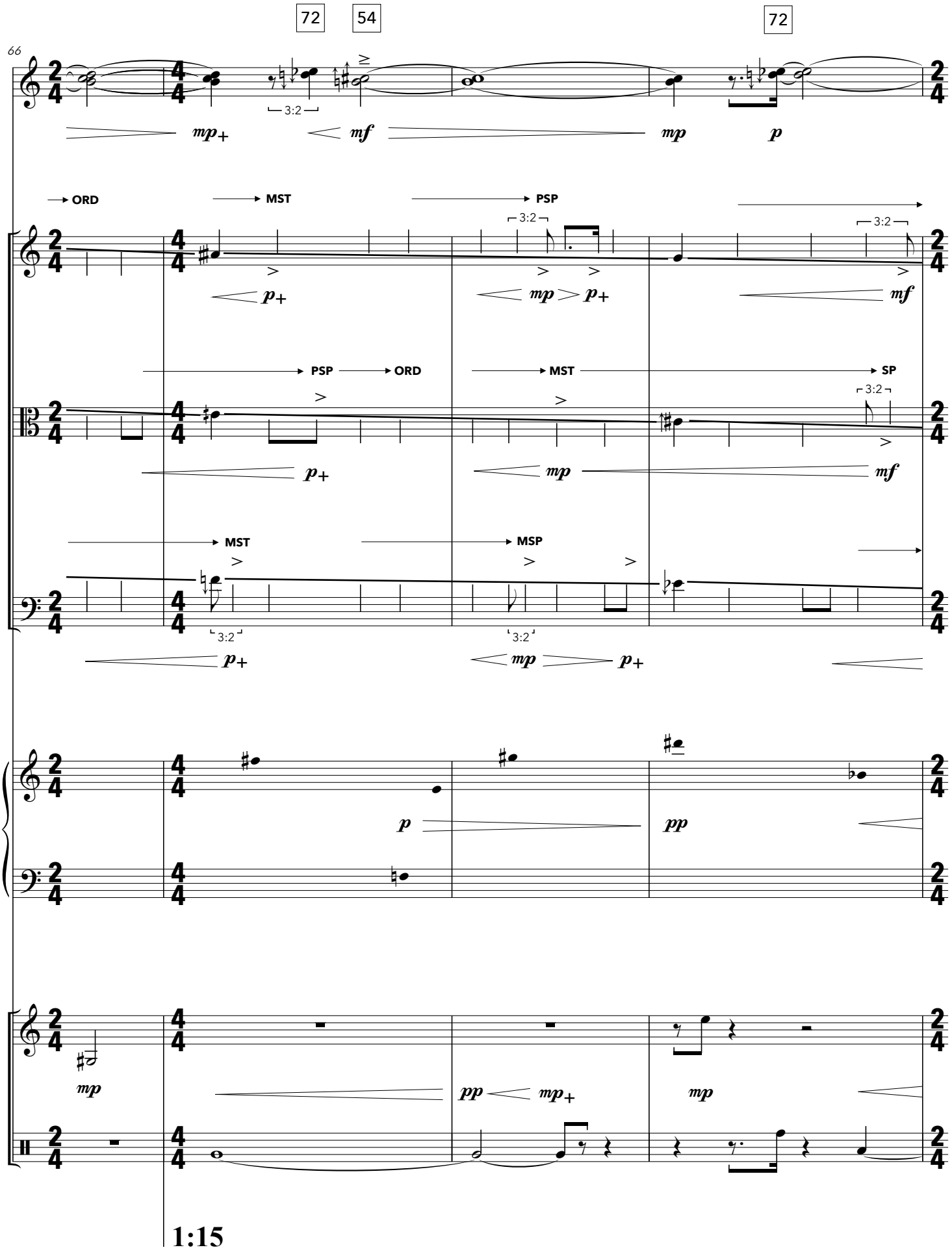

11.1
45
♩ = 56
baritone saxophone
(mf)
beating in saxophone = nine beats per quarter at new tempo
9:8
violin
viola
contrabass
Piano
percussion
GLOCK
listen to beats, find tempo, then play:
pp

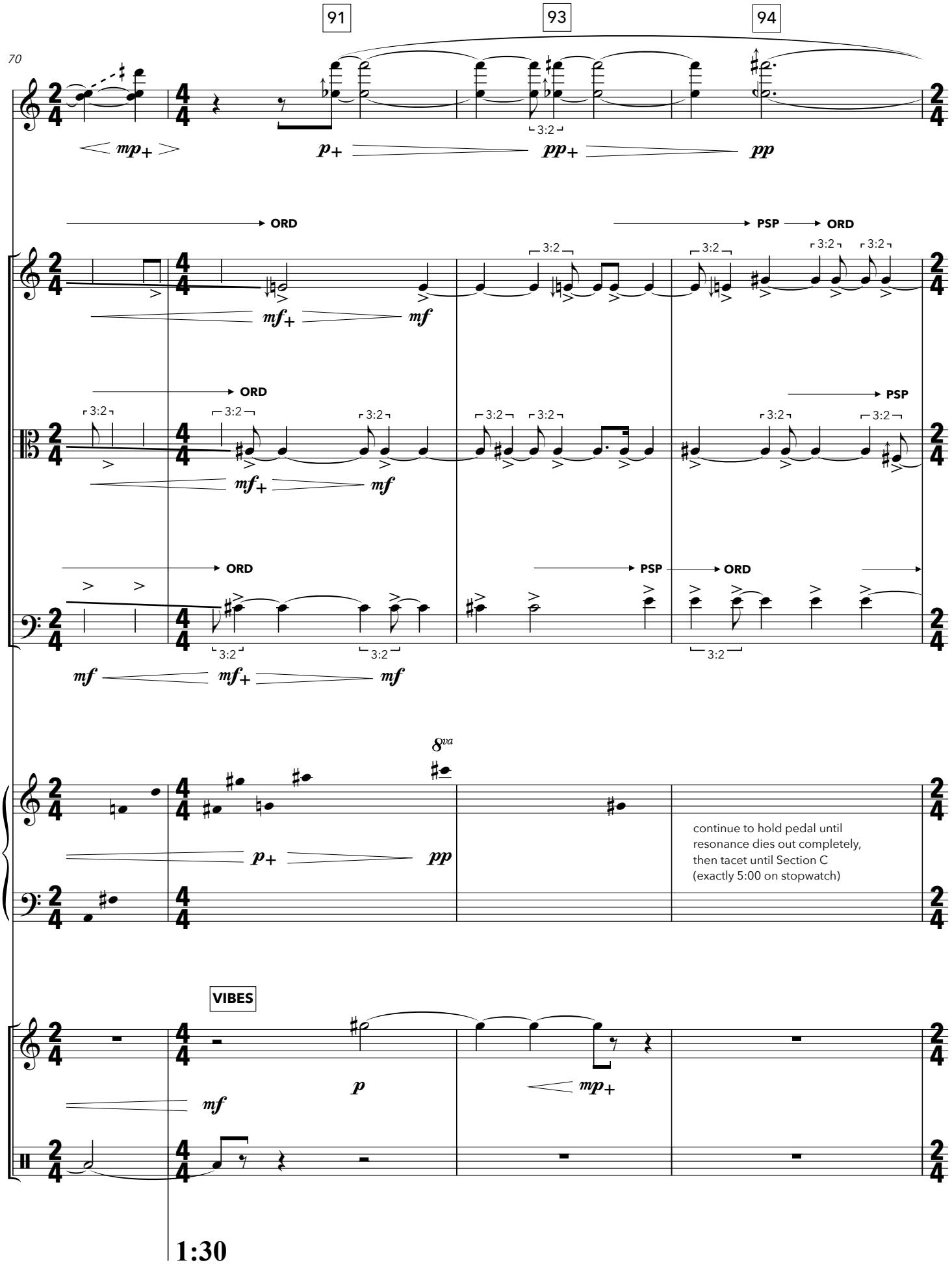

START ELECTRONICS, STOPWATCH
47
89
bs
pp
vln
IV.
3:2
pp
p
vla
II.
cb
I.10
8va
touch string on keyboard-side of dampers to produce multiphonic, with emphasis on 7th partial
Pno.
(touch string to produce [any] rich multiphonic)
8vb
pc
ppp
0:15

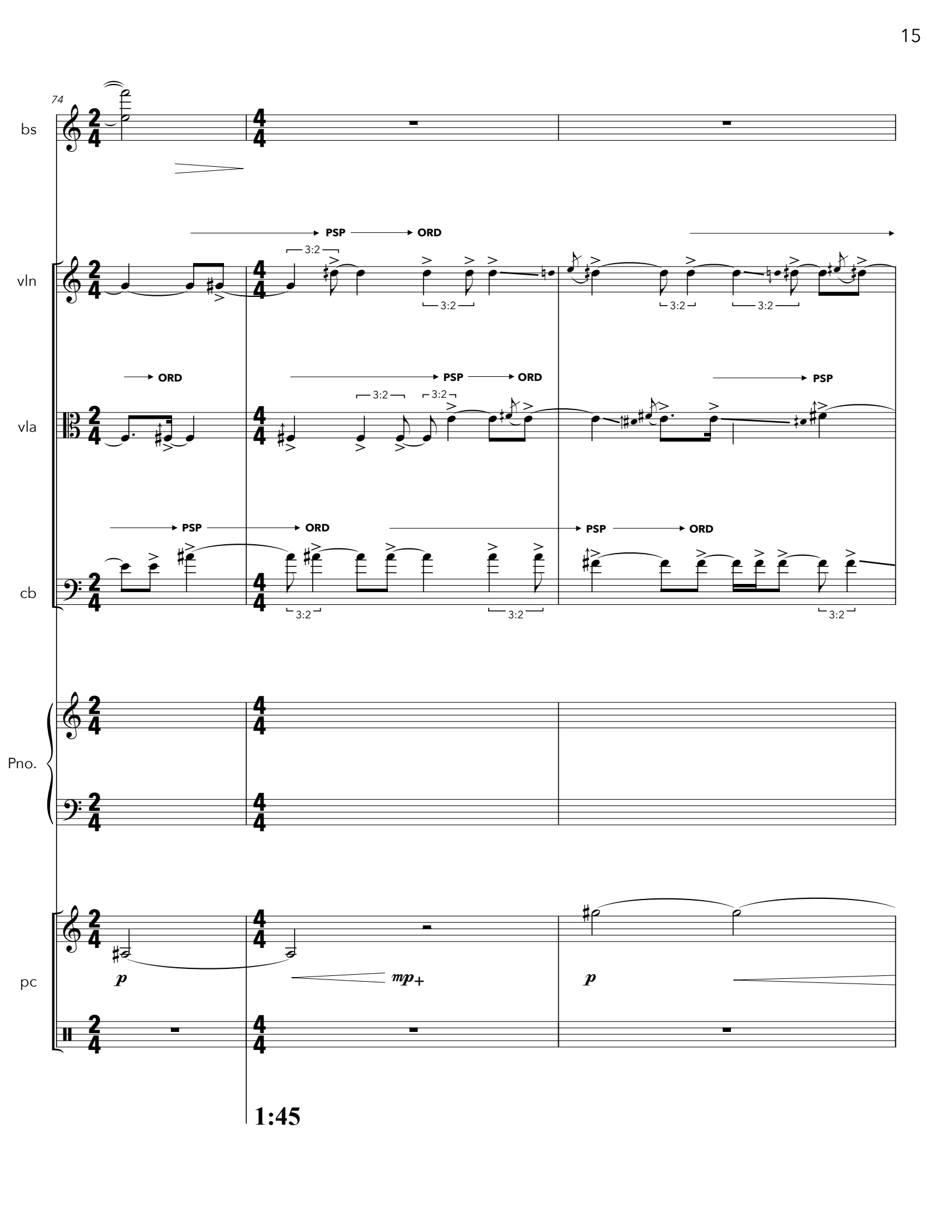

52
90
89
100
bs
mp
pp
mp+
vln
MST
pp
p+
ppp
PST
pp
vla
MST
PSP
pp
p+
ppp
PST
pp
cb
MST
pp
p+
ppp
PST
pp
Pno.
multiphonic on B only (aim for same apparent dynamic for both "notes")
p+
8vb
pc
pp
p
0:30

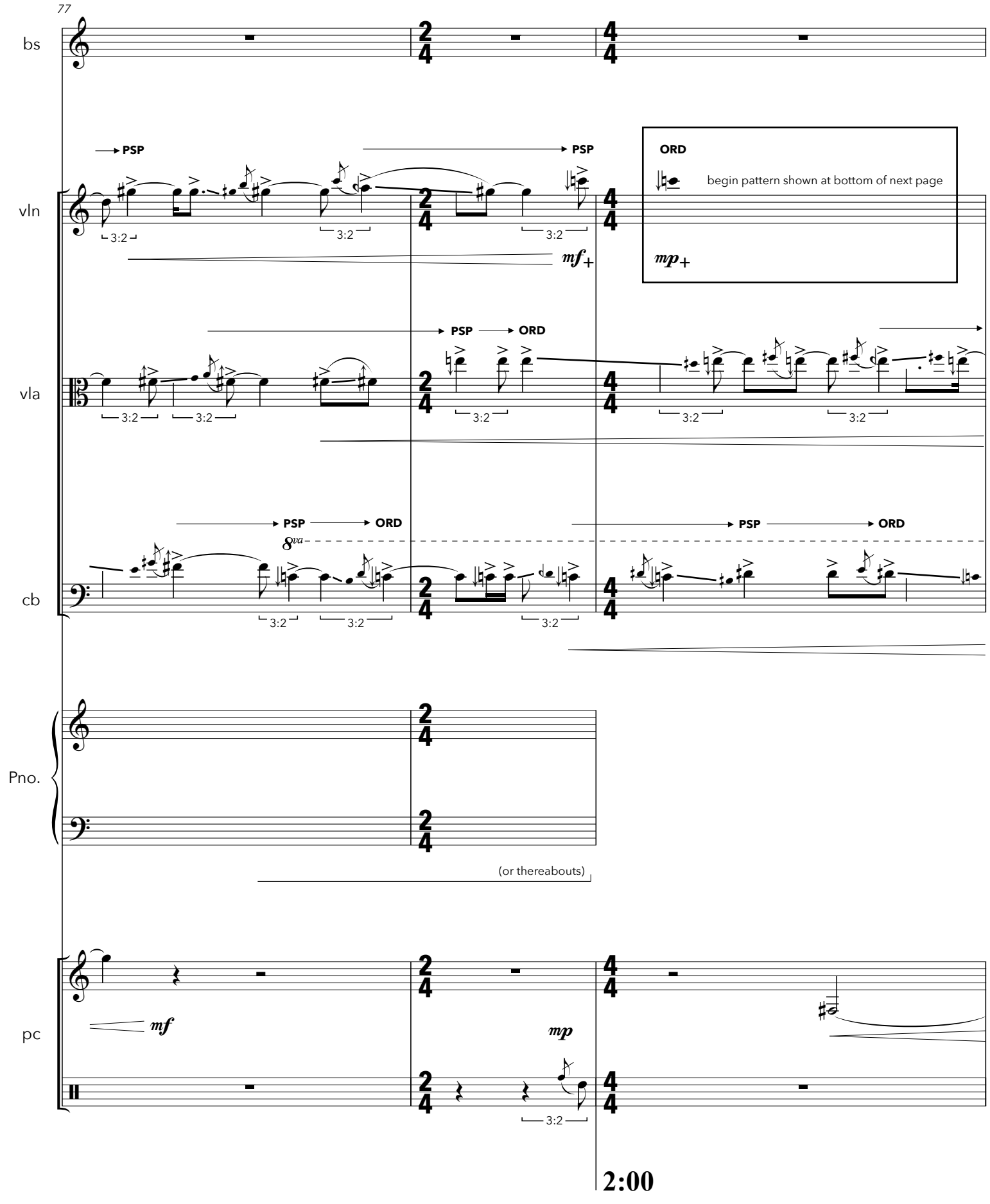

77
77.2
72
57
bs
vln
vla
cb
Pno.
pc
PSP
MST'
ORD
3:2
multiphonic on B-flat only (aim for same apparent dynamic for both notes)
multiphonic on both strings
0:45

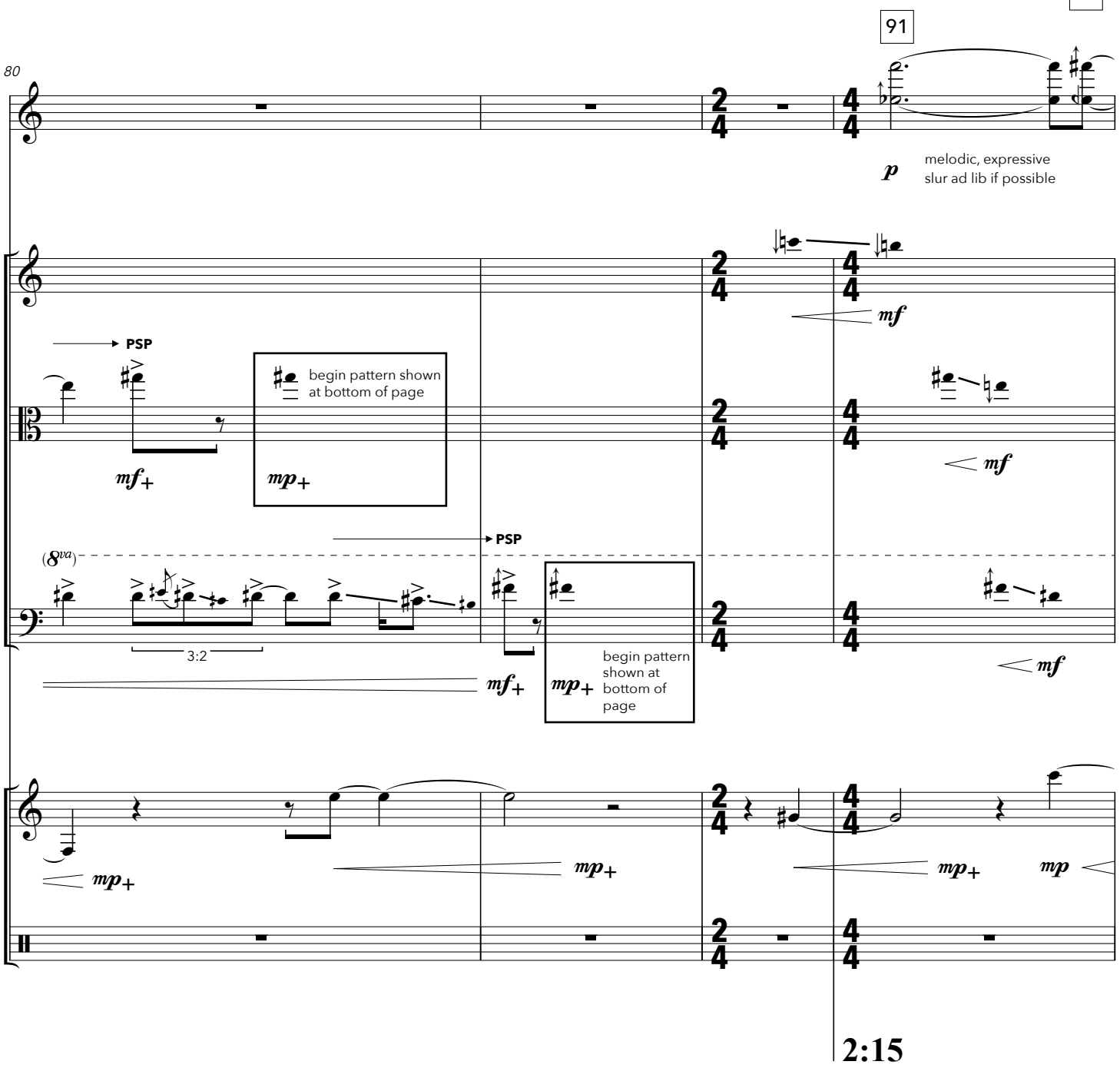

64
62
(breaks)
bs
3:2
3:2
3:2
mf+
vln
SP
ORD
mf
pp
only rearticulate when accents are given
(noteheads are for bearings within glissando)
PST
p
vla
SP
ORD
mf
pp
only rearticulate when accents are given
(noteheads are for bearings within glissando)
PST
ORD
p
cb
SP
ORD
mf
pp
only rearticulate when accents are given
(noteheads are for bearings within glissando)
PST
ORD
p
Pno.
rhythm notated spatially
pp+
p+
pp
pc
mp
1:00


72
54
72
66
bs
mp+
mf
mp
p
ORD
MST
PSP
3:2
vln
p+
mp
p+
mf
PSP
ORD
MST
SP
vla
p+
mp
mf
MST
MSP
cb
p+
mp
p+
Pno.
p
pp
pc
mp
pp
mp+
mp
1:15

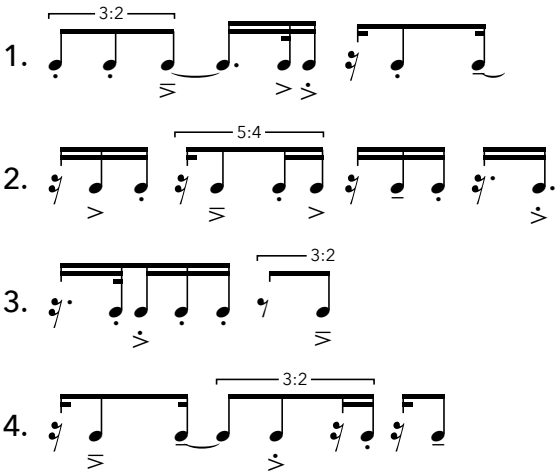

91
93
94
70
bs
mp+
p+
pp+
pp
3:2
vln
ORD
PSP
ORD
mf+
mf
vla
ORD
PSP
cb
ORD
PSP
ORD
mf
mf+
mf
8va
Pno.
p+
pp
continue to hold pedal until
resonance dies out completely,
then tacet until Section C
(exactly 5:00 on stopwatch)
VIBES
pc
mf
p
mp+
1:30


74
bs
vln
vla
cb
Pno.
pc
PSP
ORD
3:2
p
mp+
1:45


77
bs
vln
vla
cb
Pno.
pc
PSP
ORD
3:2
mf+
mp+
begin pattern shown at bottom of next page
8va
(or thereabouts)
mf
mp
2:00



strings

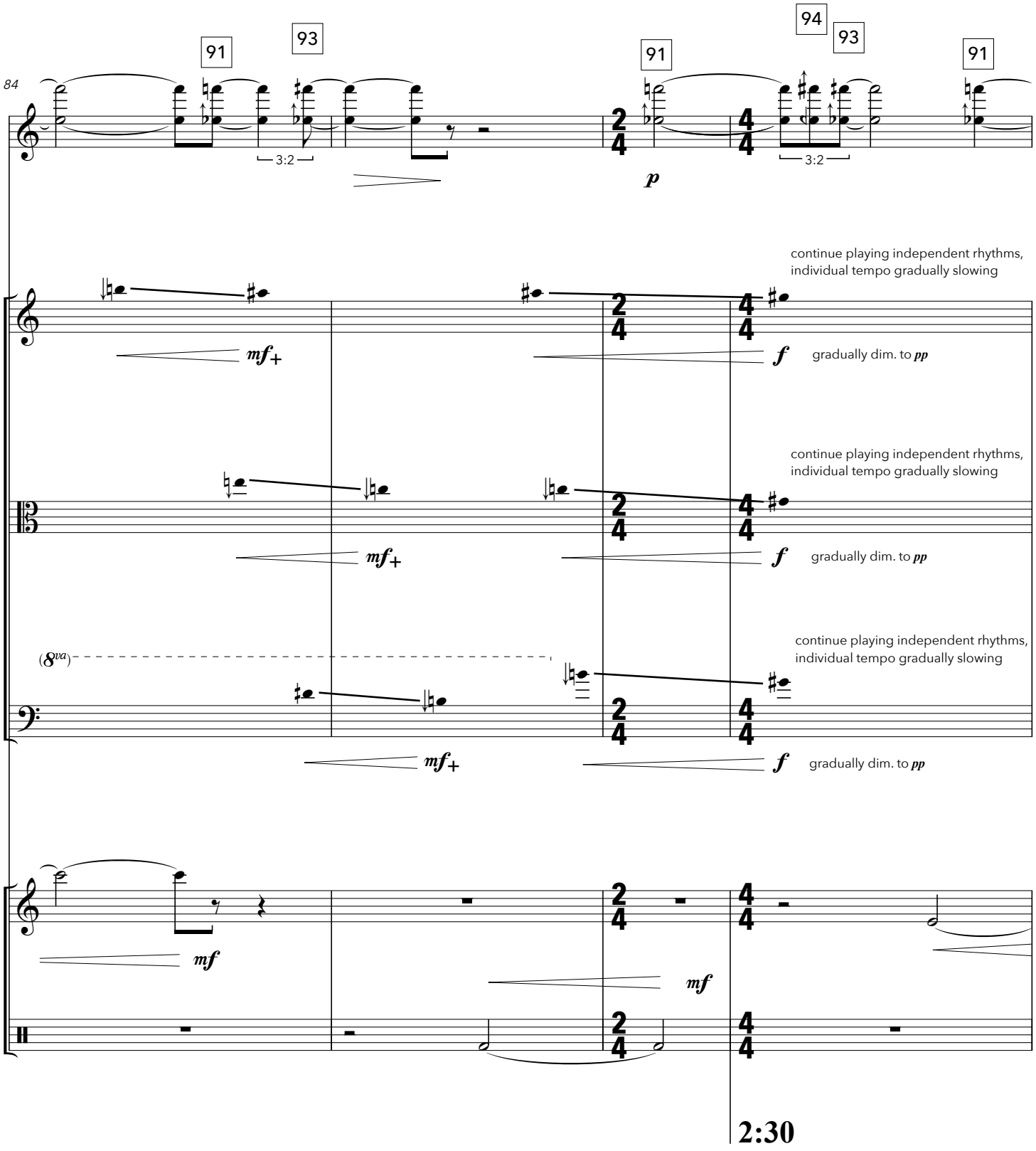


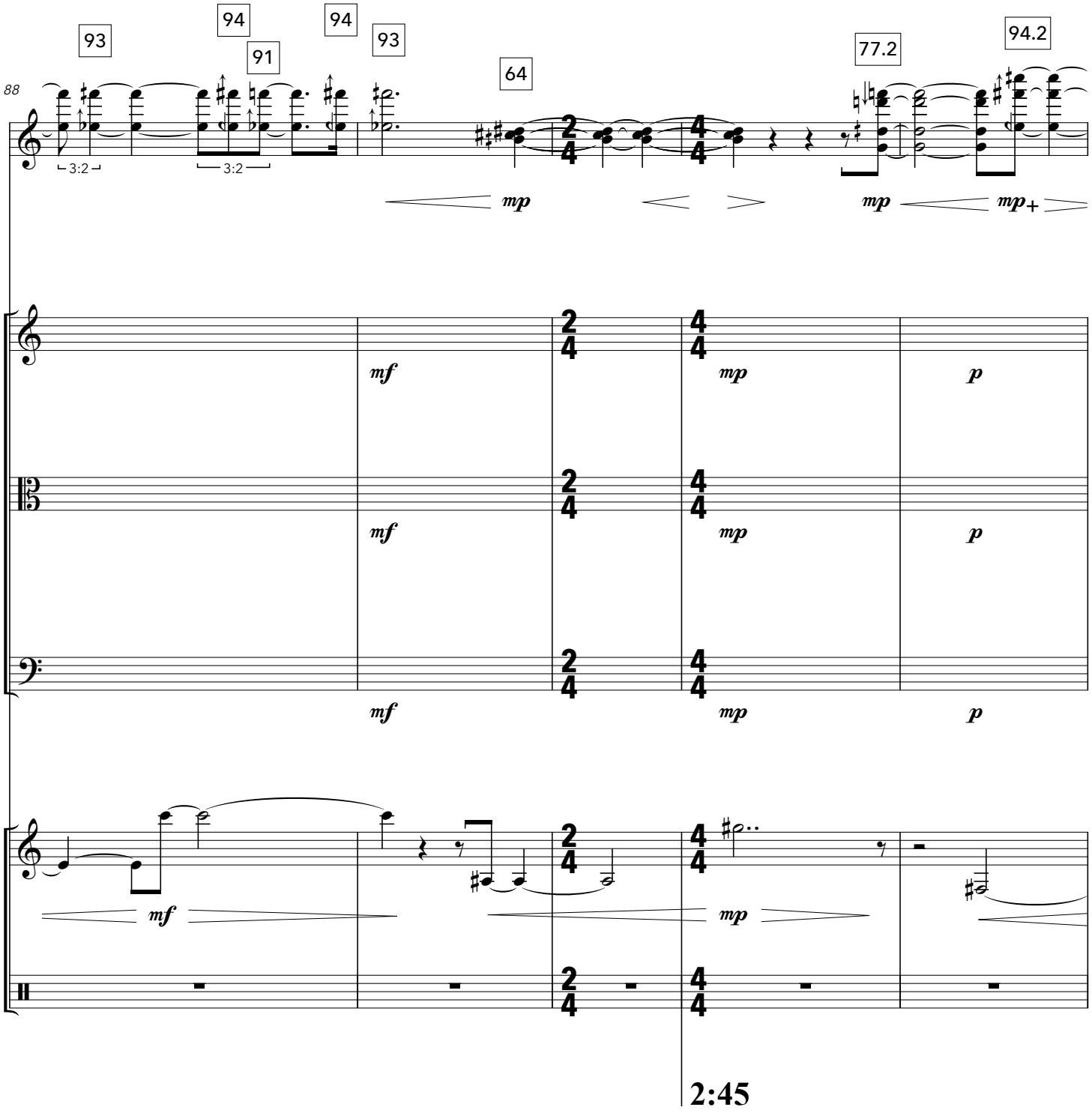
Through m. 56: choose one of these four rhythms, play it 1-3x, choose another, repeat.

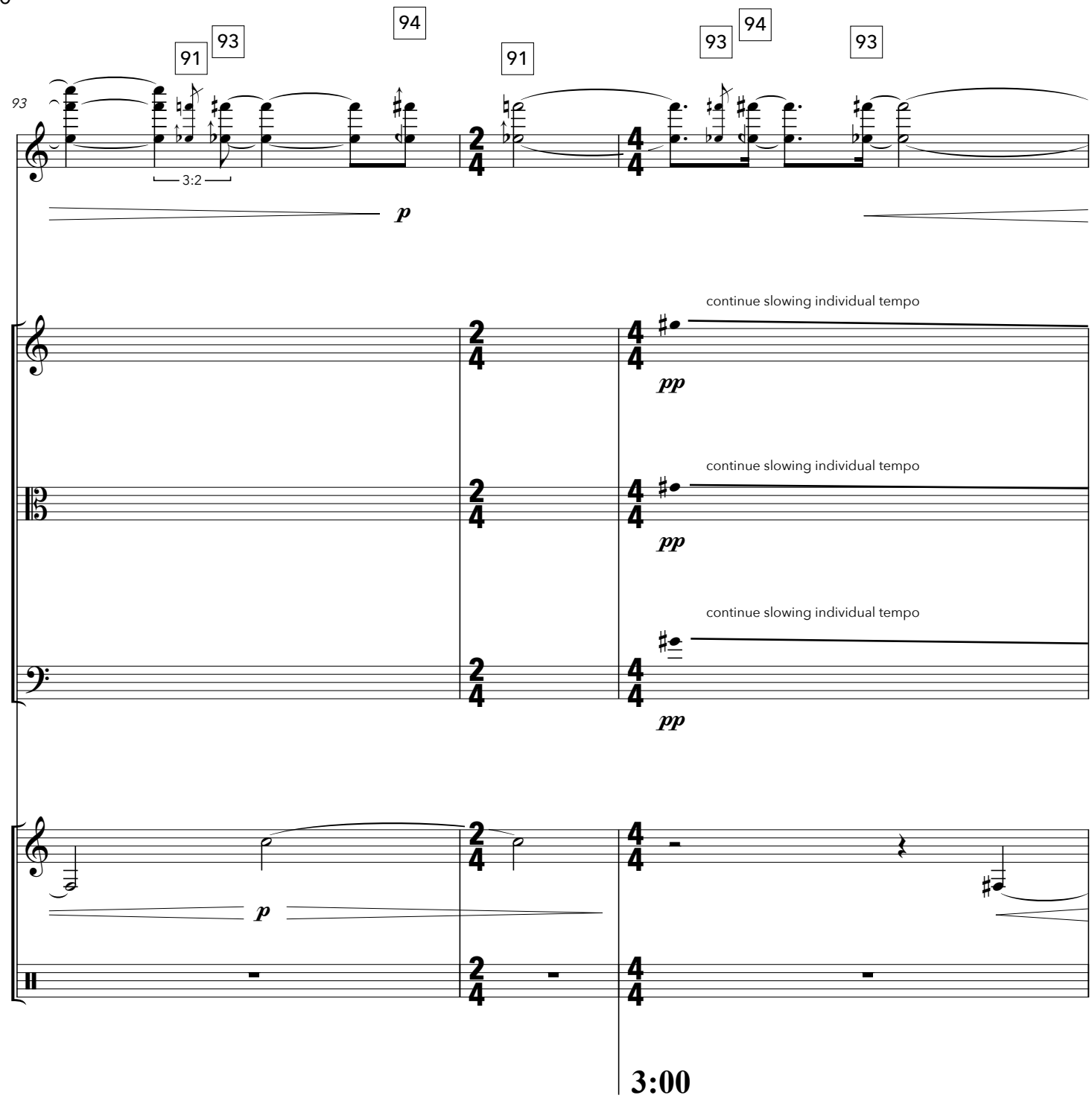
Begin on the first pitch indicated in the box in your part. When you come upon glissandi down to new pitches written in your part, follow them (as close as is reasonable, at least roughly) however they fit into the rhythm you are playing. Then continue the pattern on the new pitch until the next glissando.

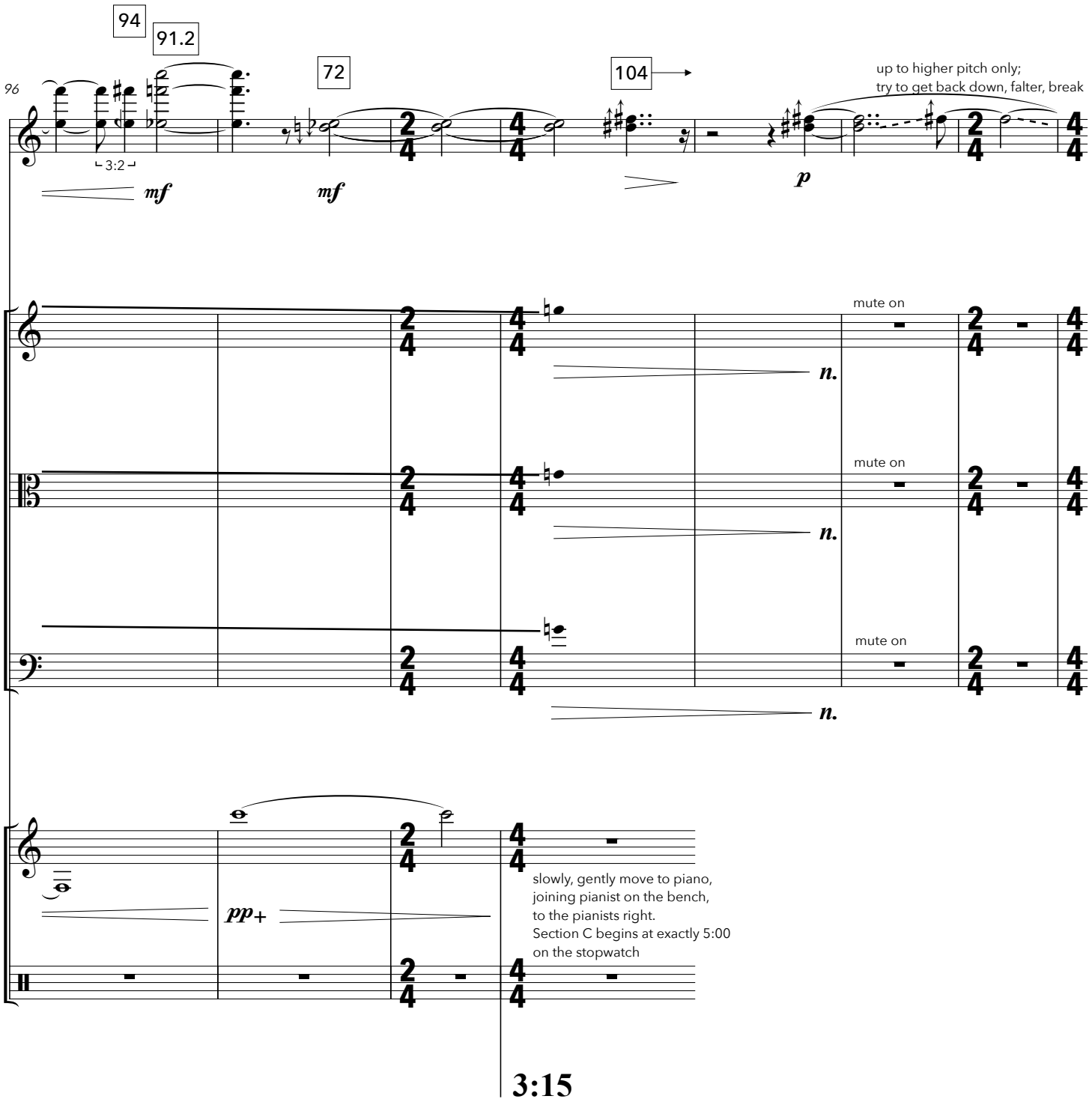
Do not try to adhere to the ensemble's overall pulse or the clicktrack. Feel free to remove your earbud before beginning this section if it's too distracting. The locations of the glissandi in time can be approximated.

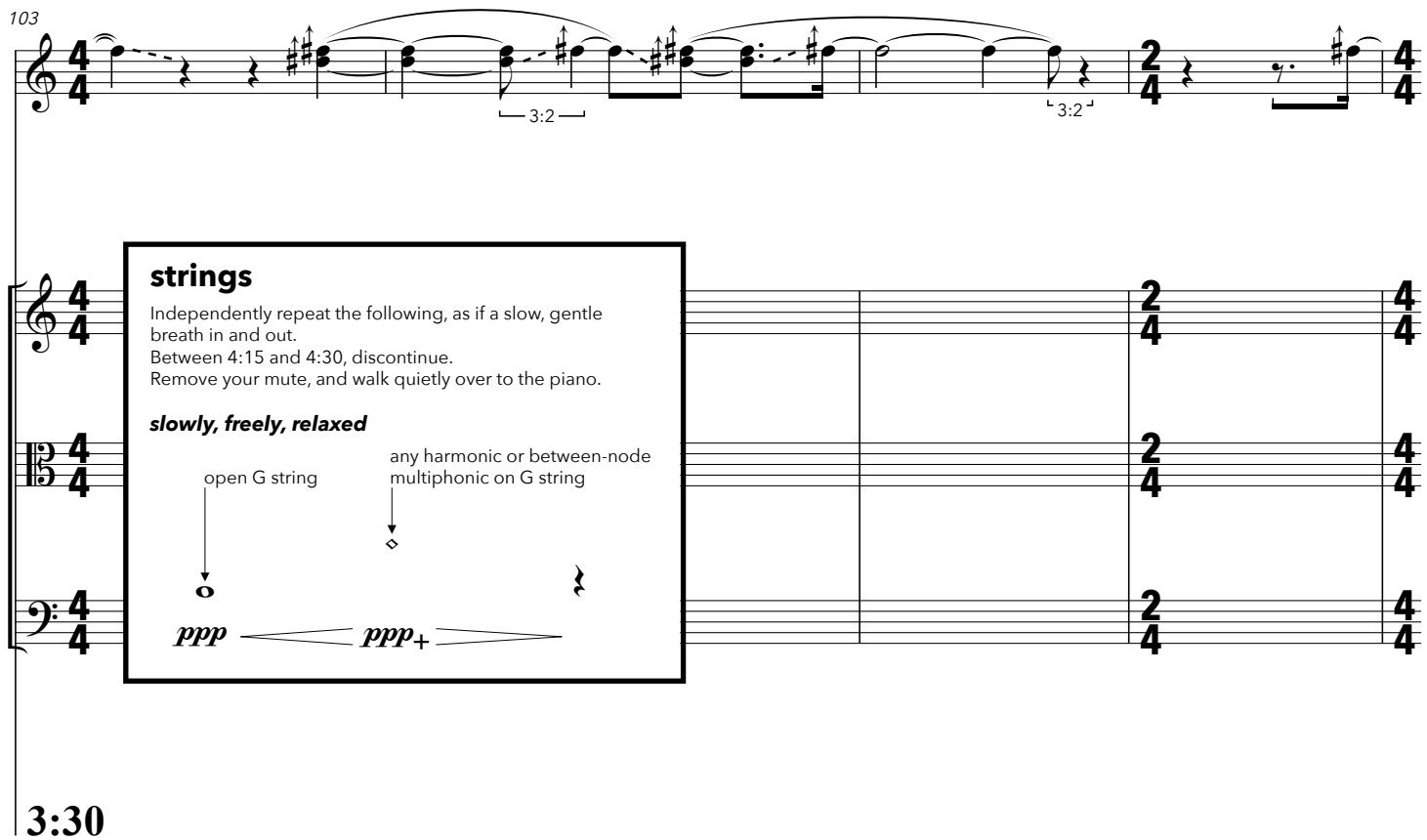
Eventually, your "personal" tempo should slow. Again, do not try to coordinate your pulse with others during this section. Follow your own part as well as possible, relying on the stopwatch and let your rhythm diverge from those around you.


84
bs
91
93
3:2
91
94
93
3:2
91
p
vln
mf+
f
gradually dim. to pp
continue playing independent rhythms, individual tempo gradually slowing
vla
mf+
f
gradually dim. to pp
continue playing independent rhythms, individual tempo gradually slowing
(8va)
cb
mf+
f
gradually dim. to pp
continue playing independent rhythms, individual tempo gradually slowing
pc
mf
mf
2:30

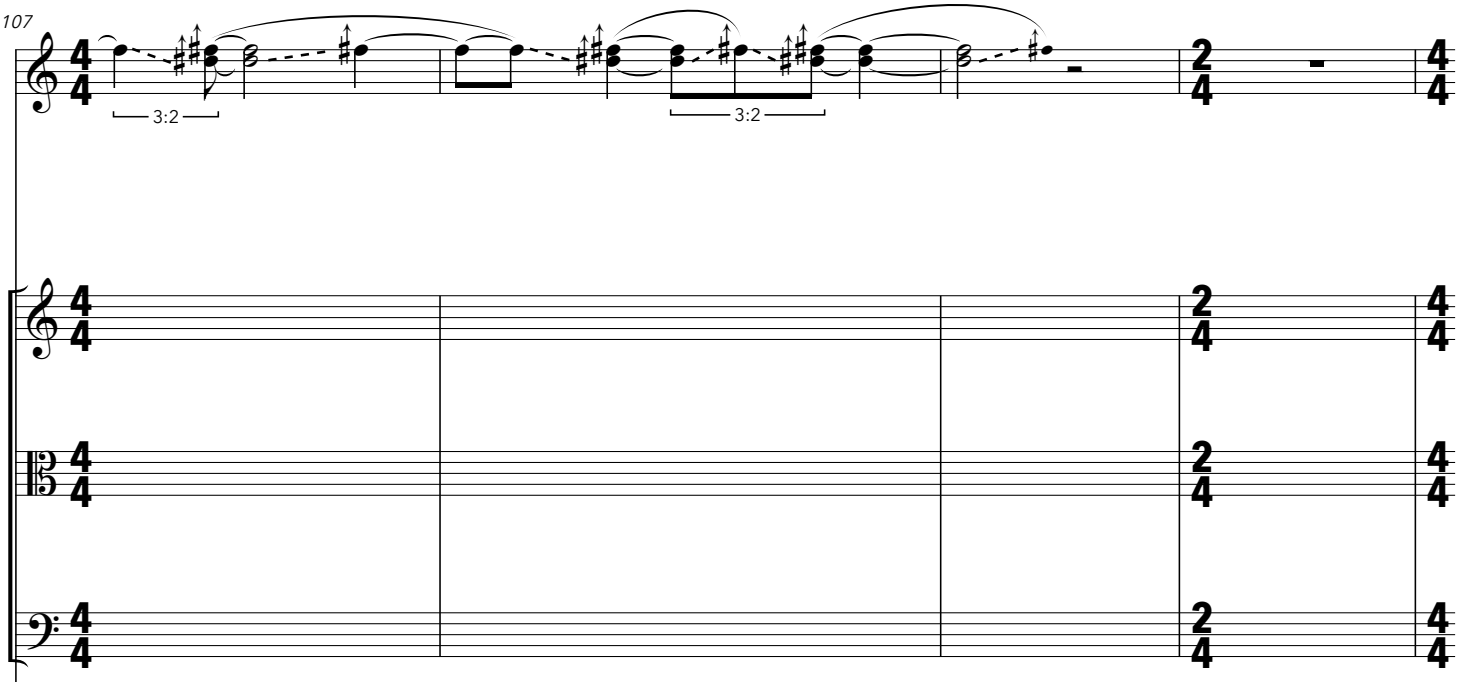

93
94
91
94
93
64
77.2
94.2
88
bs
3:2
3:2
mp
mp
mp+
vln
mf
mp
p
vla
mf
mp
p
cb
mf
mp
p
pc
mf
mp
2:45


91
93
94
91
93
94
93
93
bs
3:2
p
vln
continue slowing individual tempo
pp
vla
continue slowing individual tempo
pp
cb
continue slowing individual tempo
pp
pc
p
3:00

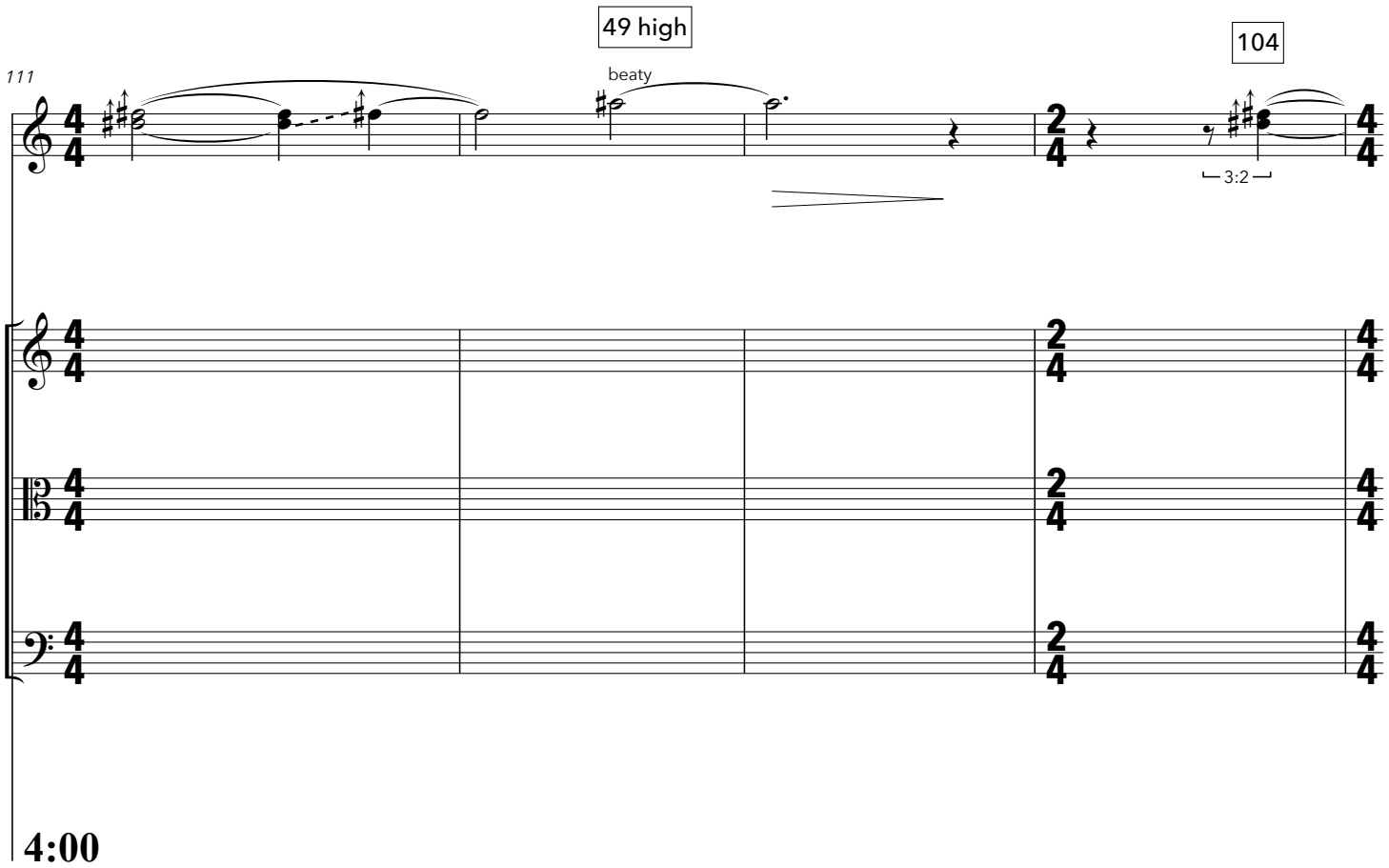

94
91.2
72
104
96
bs
3:2
mf
mf
p
up to higher pitch only;
try to get back down, falter, break
vln
vla
cb
mute on
mute on
mute on
n.
n.
n.
pc
pp+
slowly, gently move to piano,
joining pianist on the bench,
to the pianists right.
Section C begins at exactly 5:00
on the stopwatch
3:15

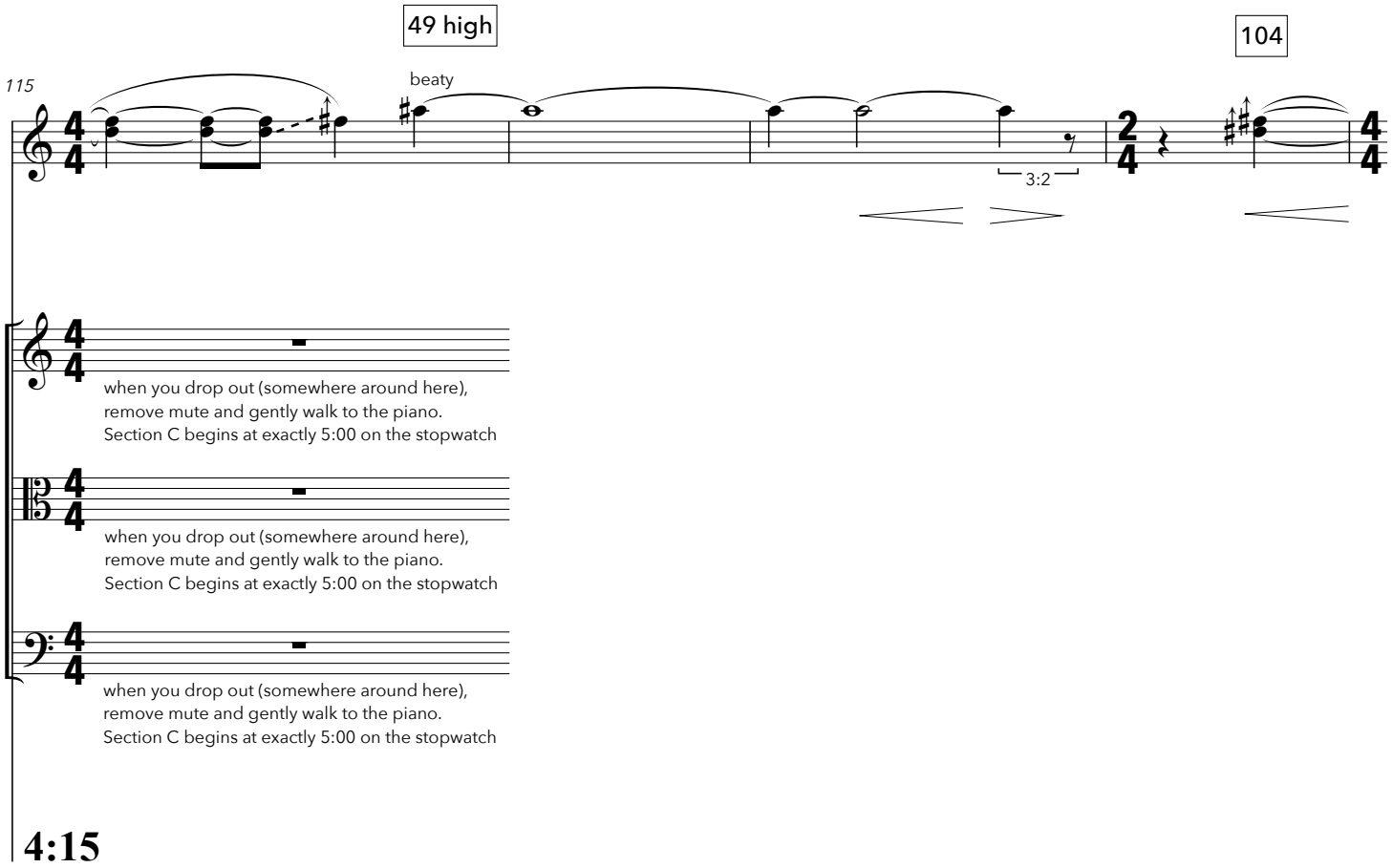

103
bs
3:2
3:2
vln
vla
cb
strings
Independently repeat the following, as if a slow, gentle breath in and out.
Between 4:15 and 4:30, discontinue.
Remove your mute, and walk quietly over to the piano.
slowly, freely, relaxed
open G string
any harmonic or between-node multiphonic on G string
ppp
ppp+

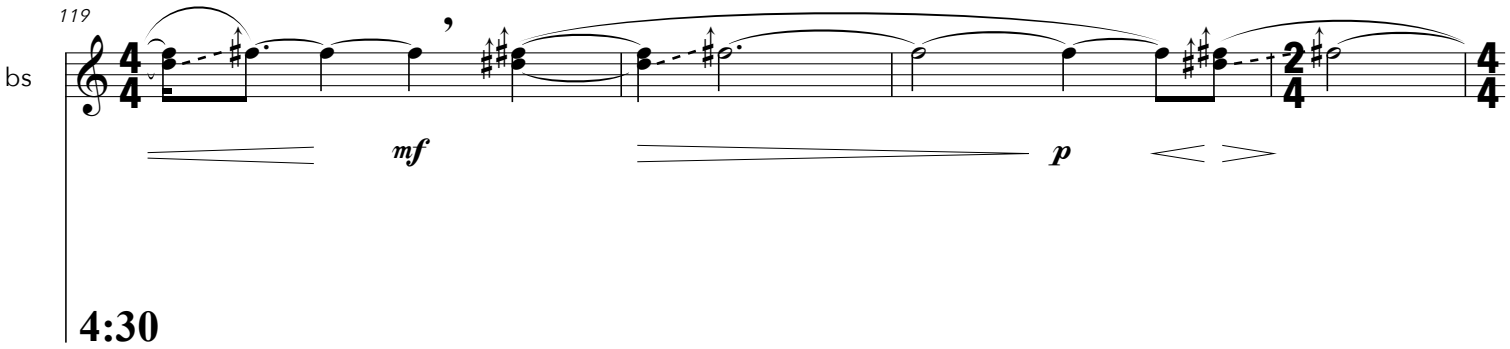
3:30

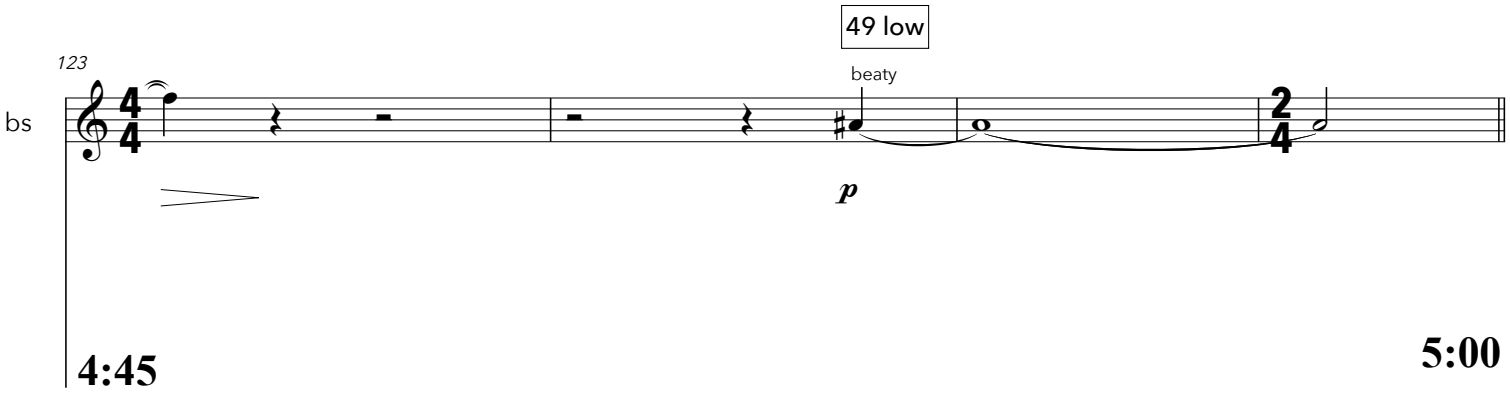

107
bs
3:2
3:2
vln
vla
cb

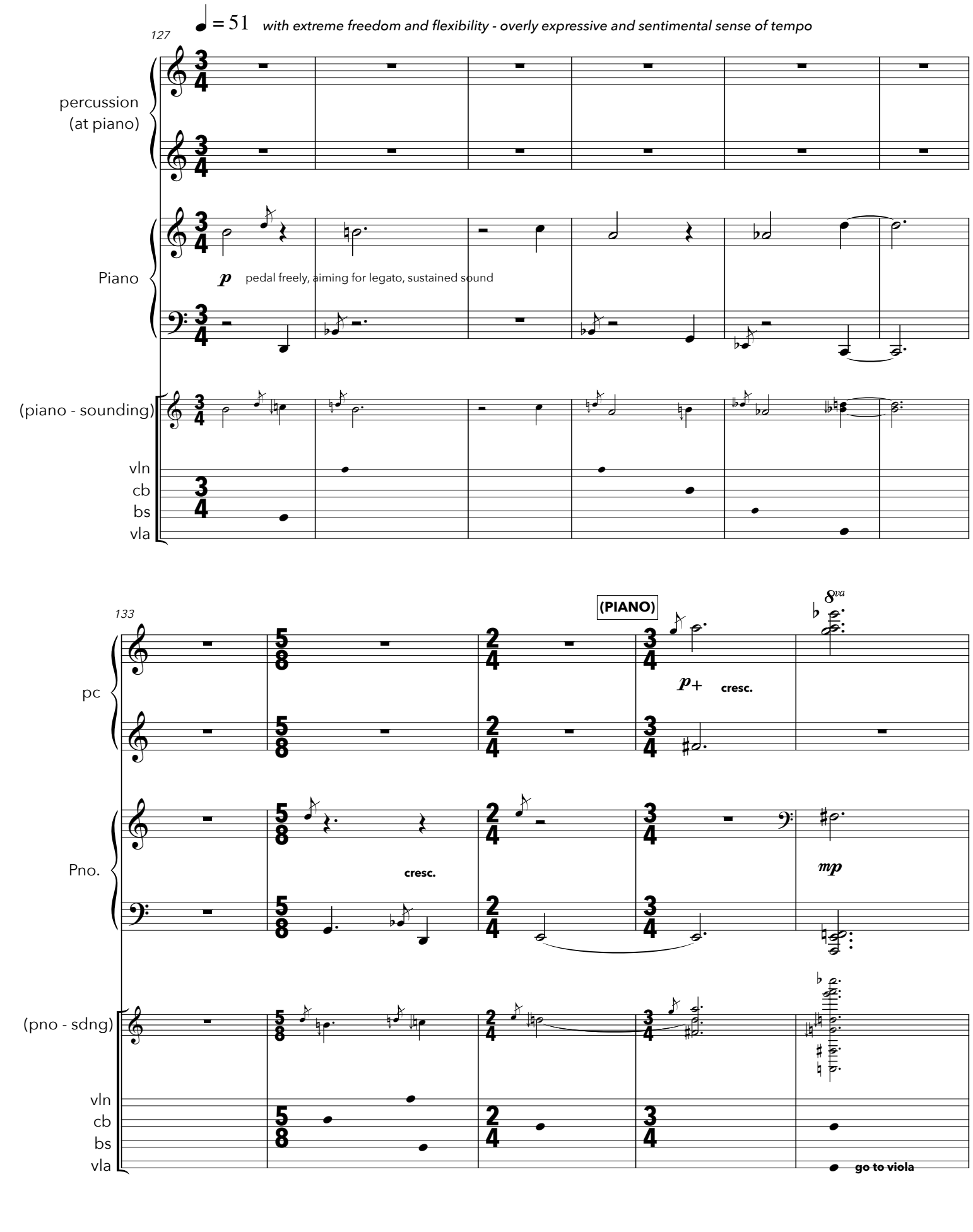
3:45

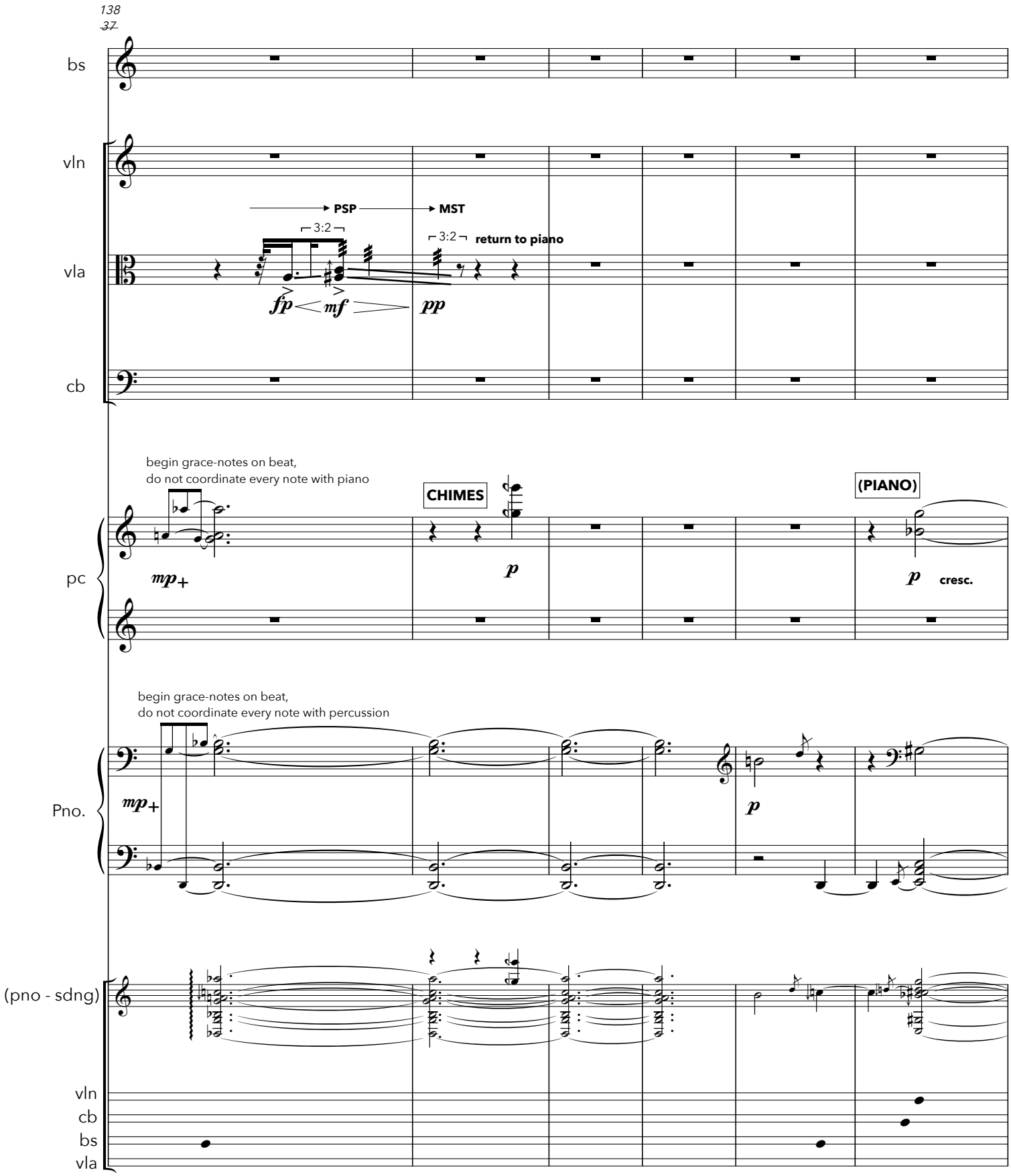

49 high
104
111
beaty
bs
3:2
vln
vla
cb
4:00

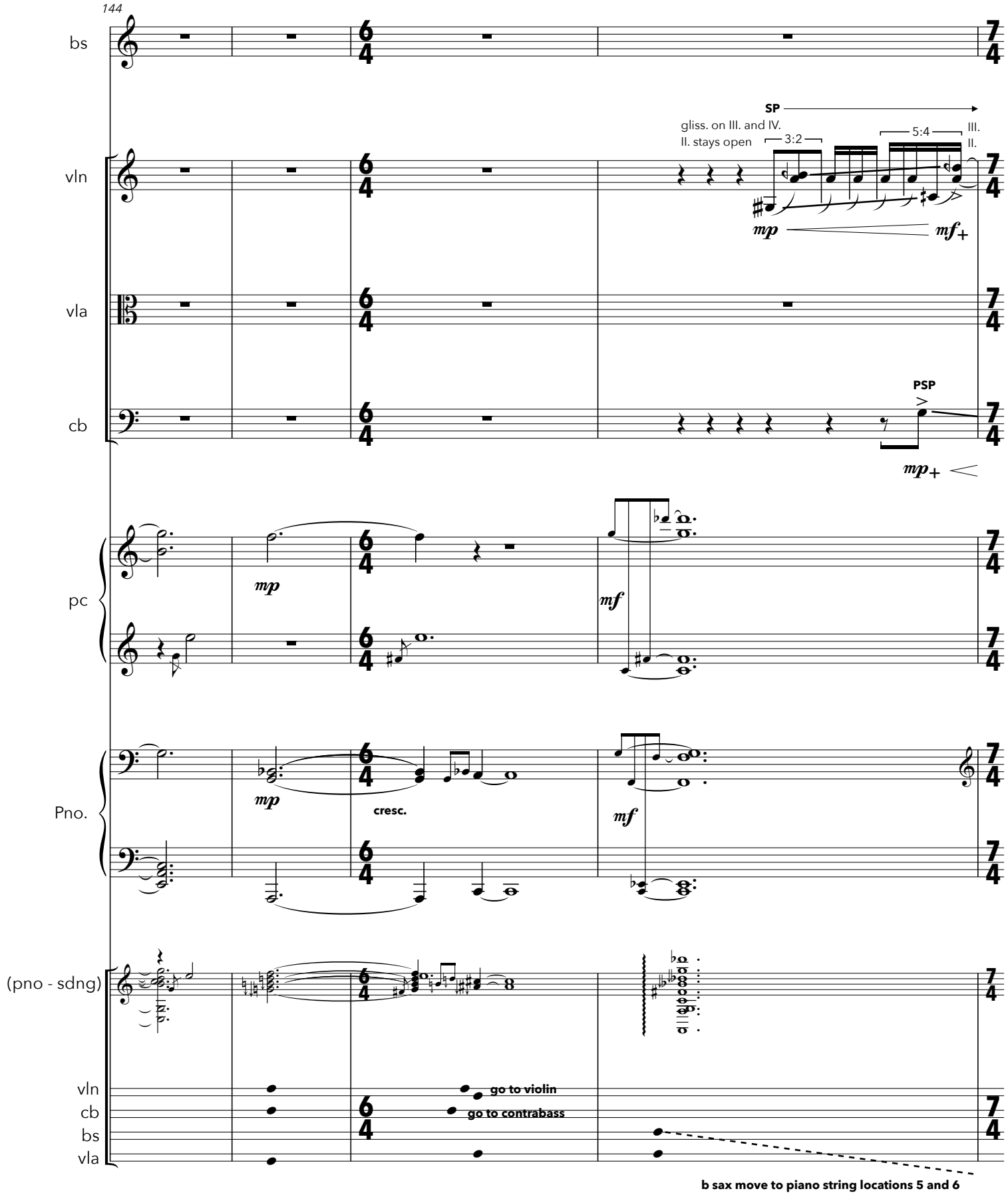

49 high
104
115
beaty
bs
3:2
vln
when you drop out (somewhere around here),
remove mute and gently walk to the piano.
Section C begins at exactly 5:00 on the stopwatch
vla
when you drop out (somewhere around here),
remove mute and gently walk to the piano.
Section C begins at exactly 5:00 on the stopwatch
cb
when you drop out (somewhere around here),
remove mute and gently walk to the piano.
Section C begins at exactly 5:00 on the stopwatch
4:15

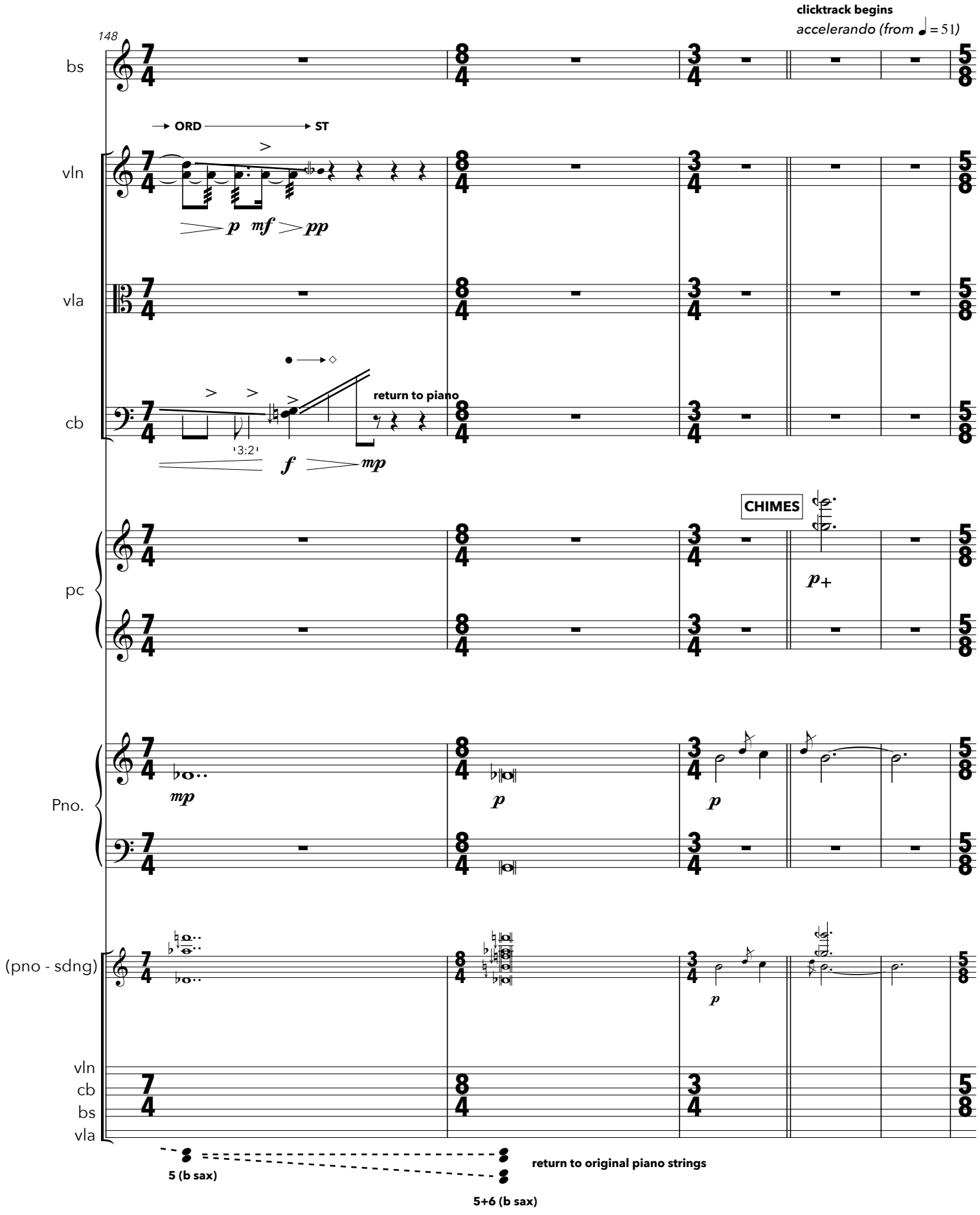

119
bs
mf
p
4:30

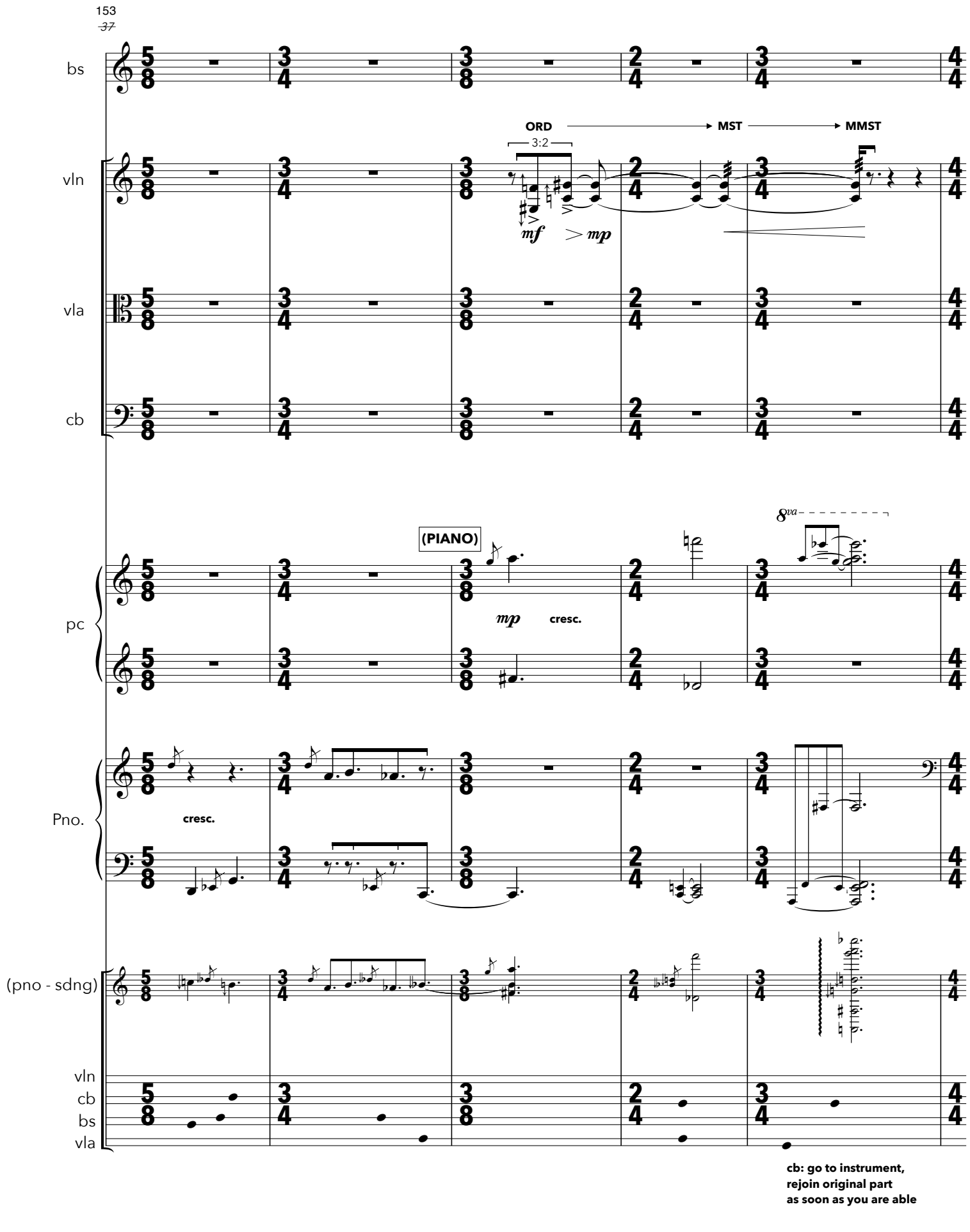

49 low
beaty
123
bs
p
4:45
5:00

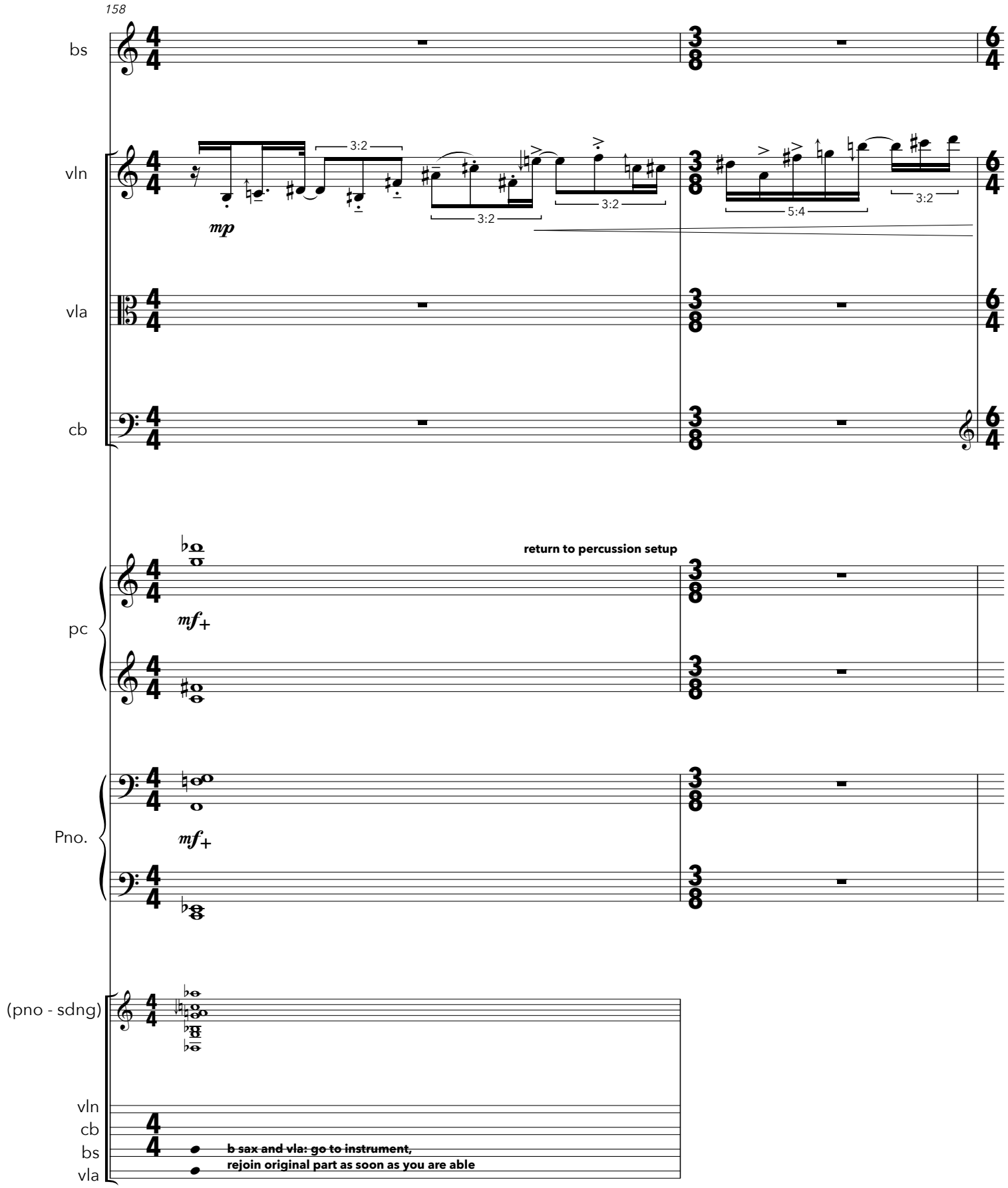

127
♩ = 51
with extreme freedom and flexibility - overly expressive and sentimental sense of tempo
percussion
(at piano)
Piano
p
pedal freely, aiming for legato, sustained sound
(piano - sounding)
vln
cb
bs
vla
133
(PIANO)
8va
pc
p+
cresc.
Pno.
cresc.
mp
(pno - sdng)
vln
cb
bs
vla
go to viola

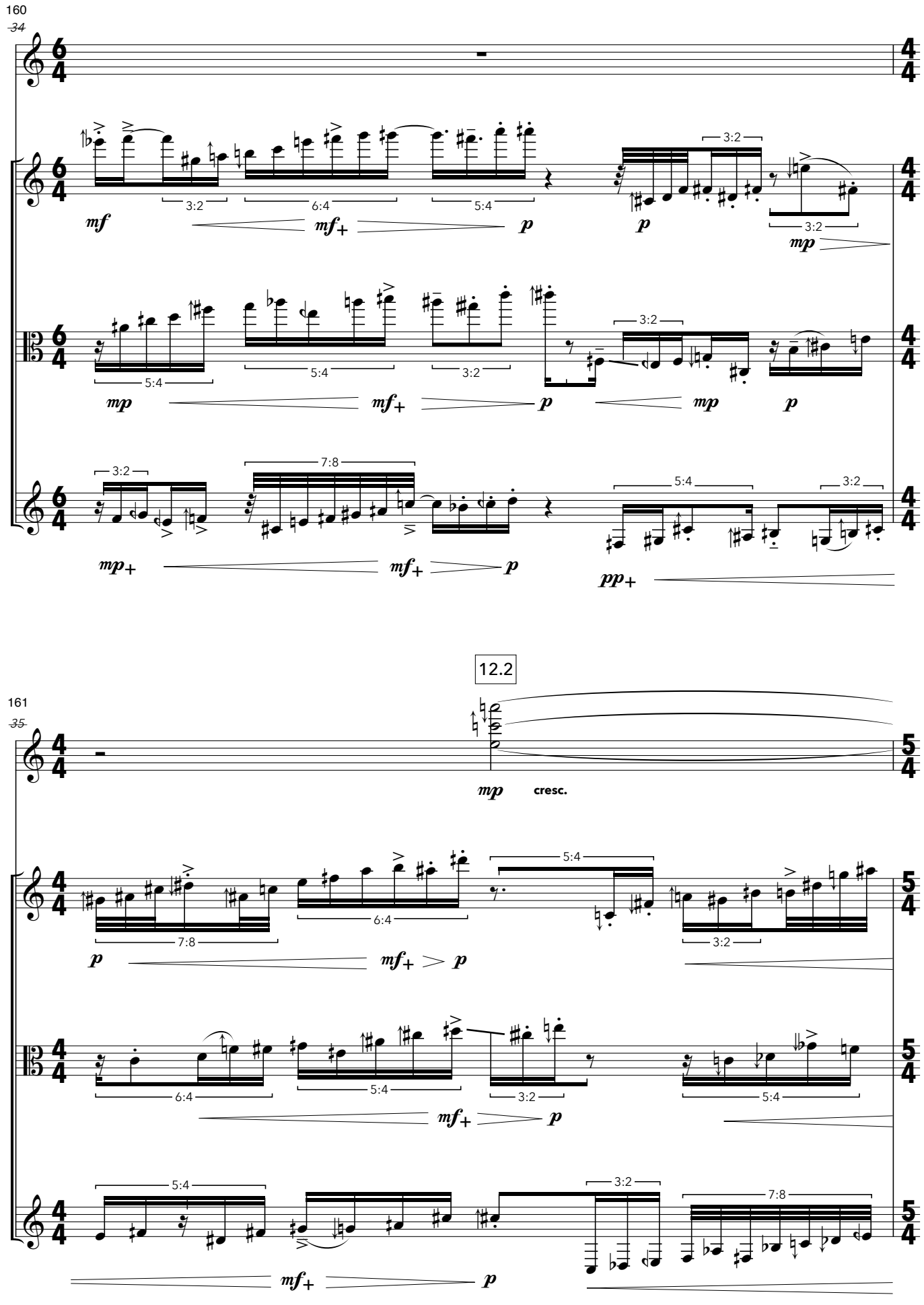

138
37
bs
vln
vla
cb
PSP
MST
3:2
3:2
return to piano
fp
mf
pp
begin grace-notes on beat,
do not coordinate every note with piano
CHIMES
(PIANO)
pc
mp+
p
p
cresc.
begin grace-notes on beat,
do not coordinate every note with percussion
Pno.
mp+
p
(pno - sdng)
vln
cb
bs
vla

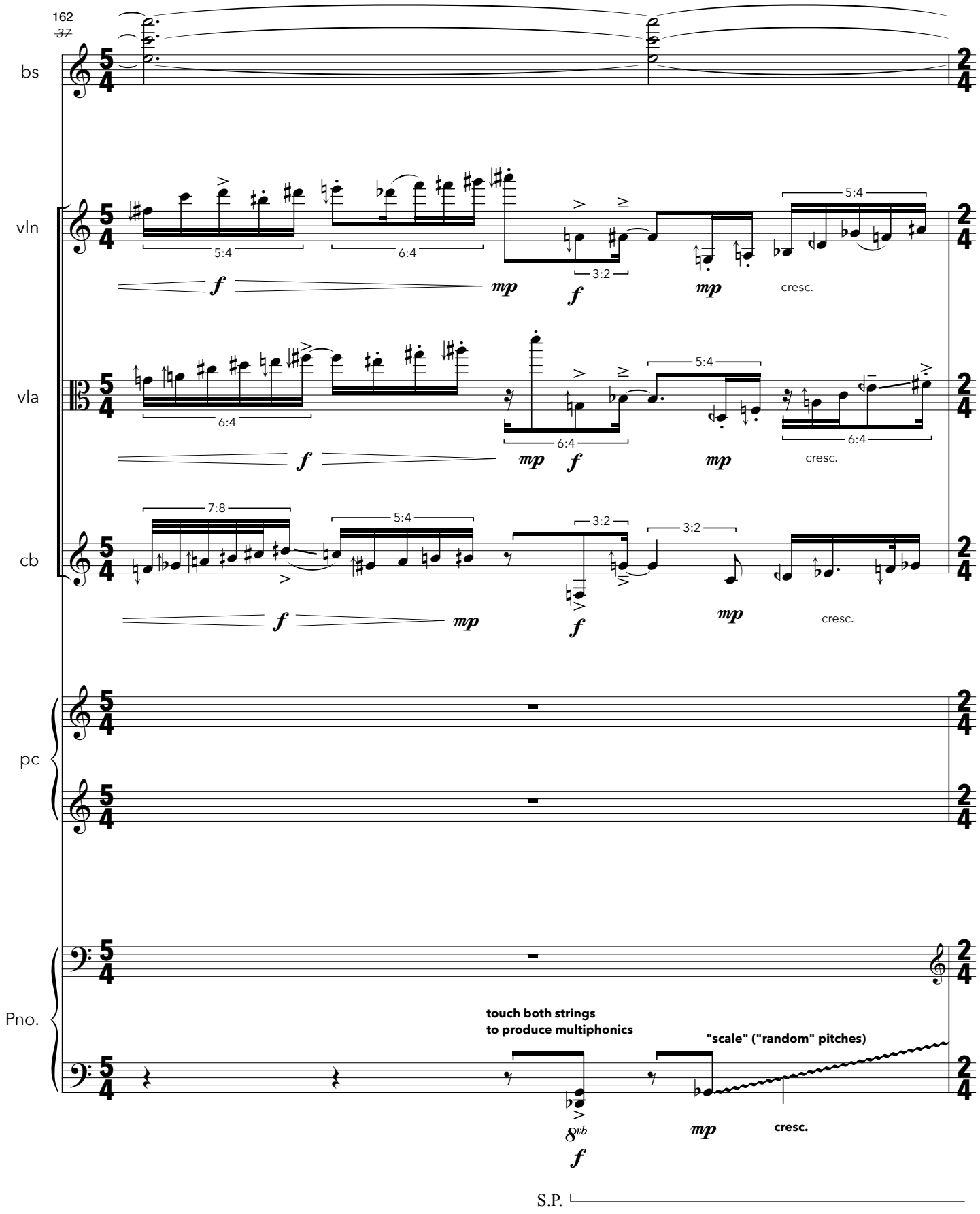

144
bs
vln
vla
cb
pc
Pno.
(pno - sdng)
vln
cb
bs
vla
SP
gliss. on III. and IV.
II. stays open
3:2
5:4
III.
II.
mp
mf+
PSP
mp+
mp
mf
mp
cresc.
mf
go to violin
go to contrabass
b sax move to piano string locations 5 and 6

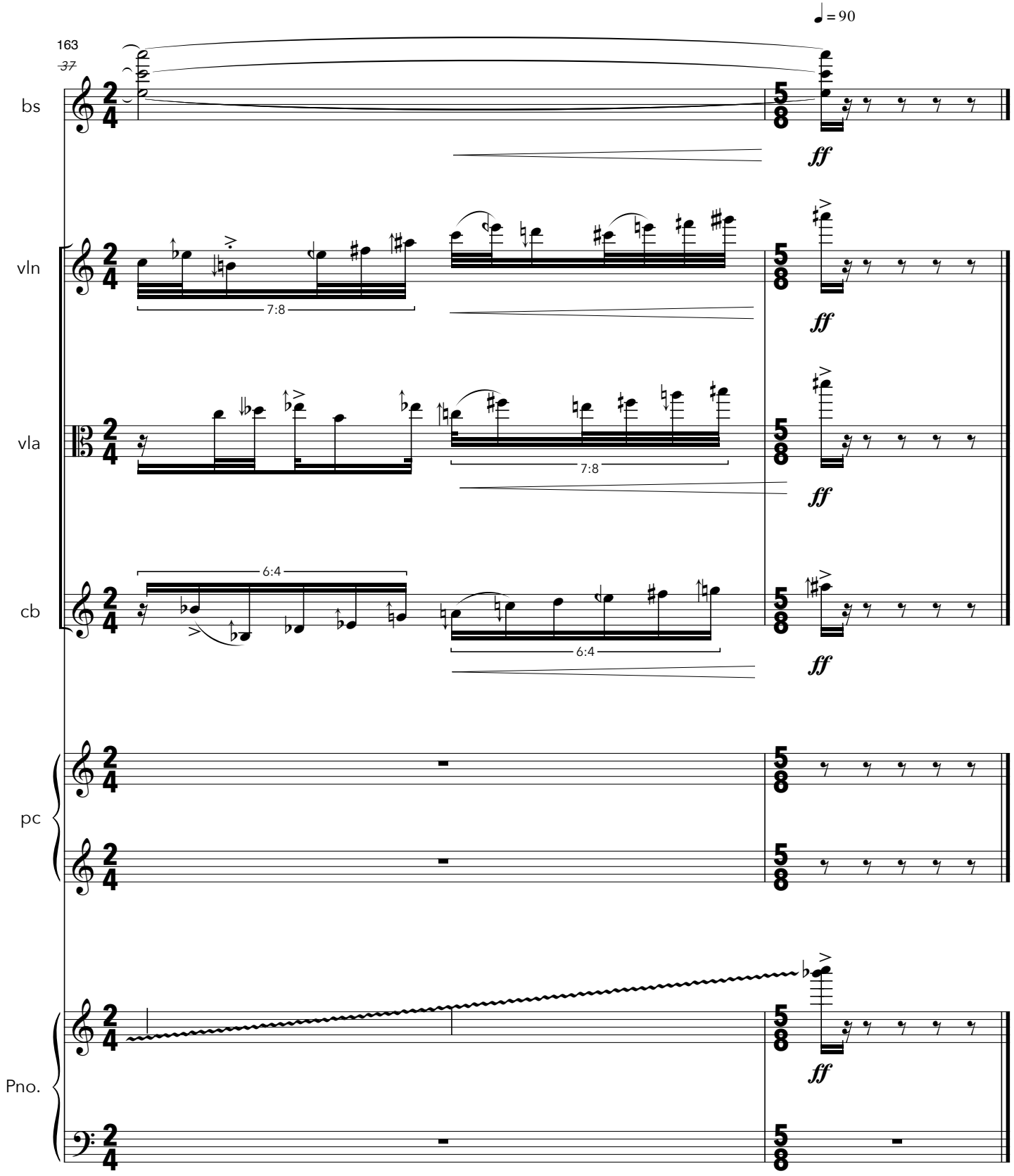

148
clicktrack begins
accelerando (from ♩ = 51)
bs
vln
ORD
ST
p mf pp
vla
cb
return to piano
3:2
f mp
pc
CHIMES
p+
Pno.
mp
p
p
(pno - sdng)
p
vln
cb
bs
vla
5 (b sax)
return to original piano strings
5+6 (b sax)

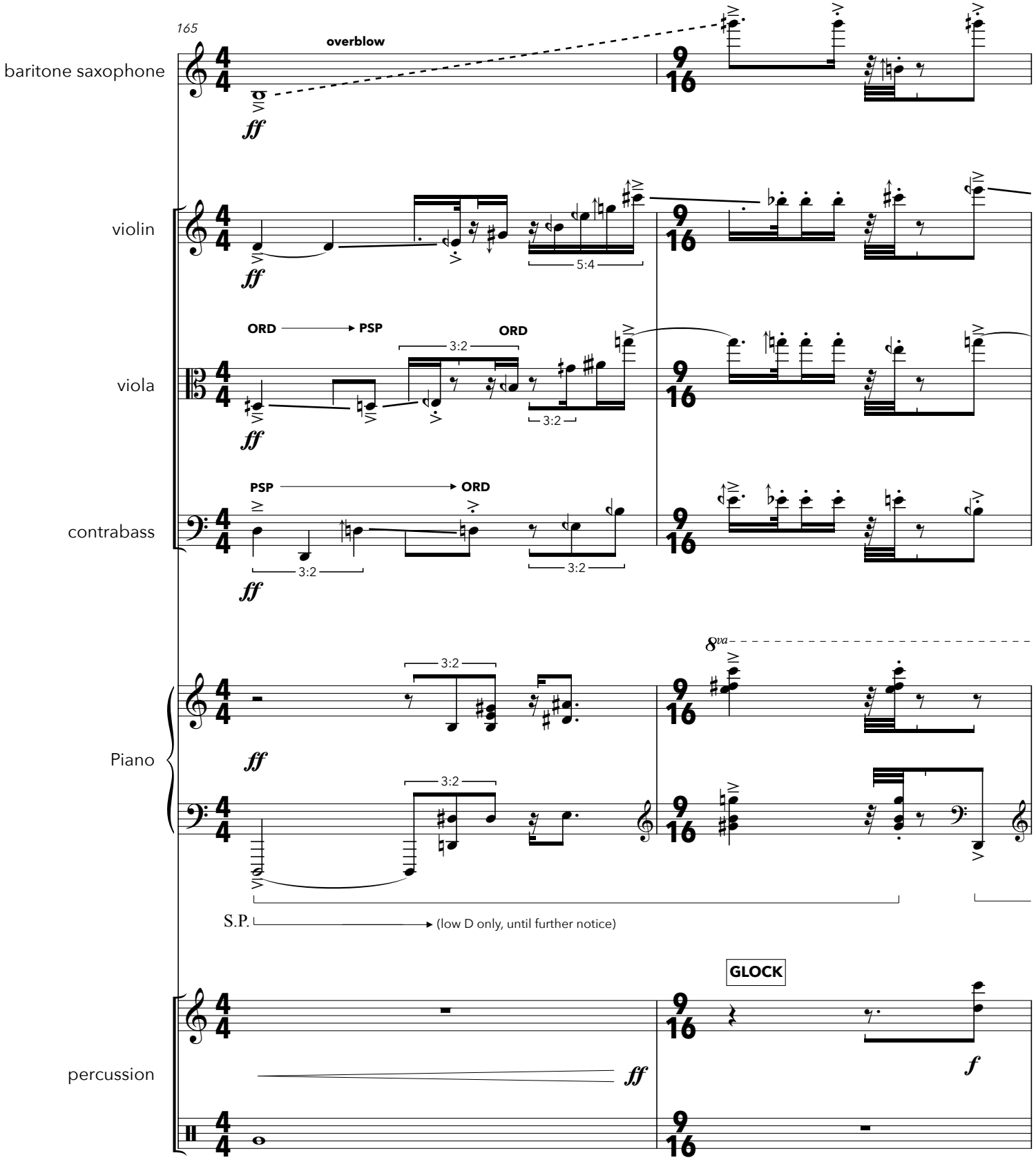

153
37
bs
vln
ORD
MST
MMST
3:2
mf
mp
vla
cb
(PIANO)
8va
mp
cresc.
pc
Pno.
cresc.
(pno - sdng)
vln
cb
bs
vla
cb: go to instrument,
rejoin original part
as soon as you are able

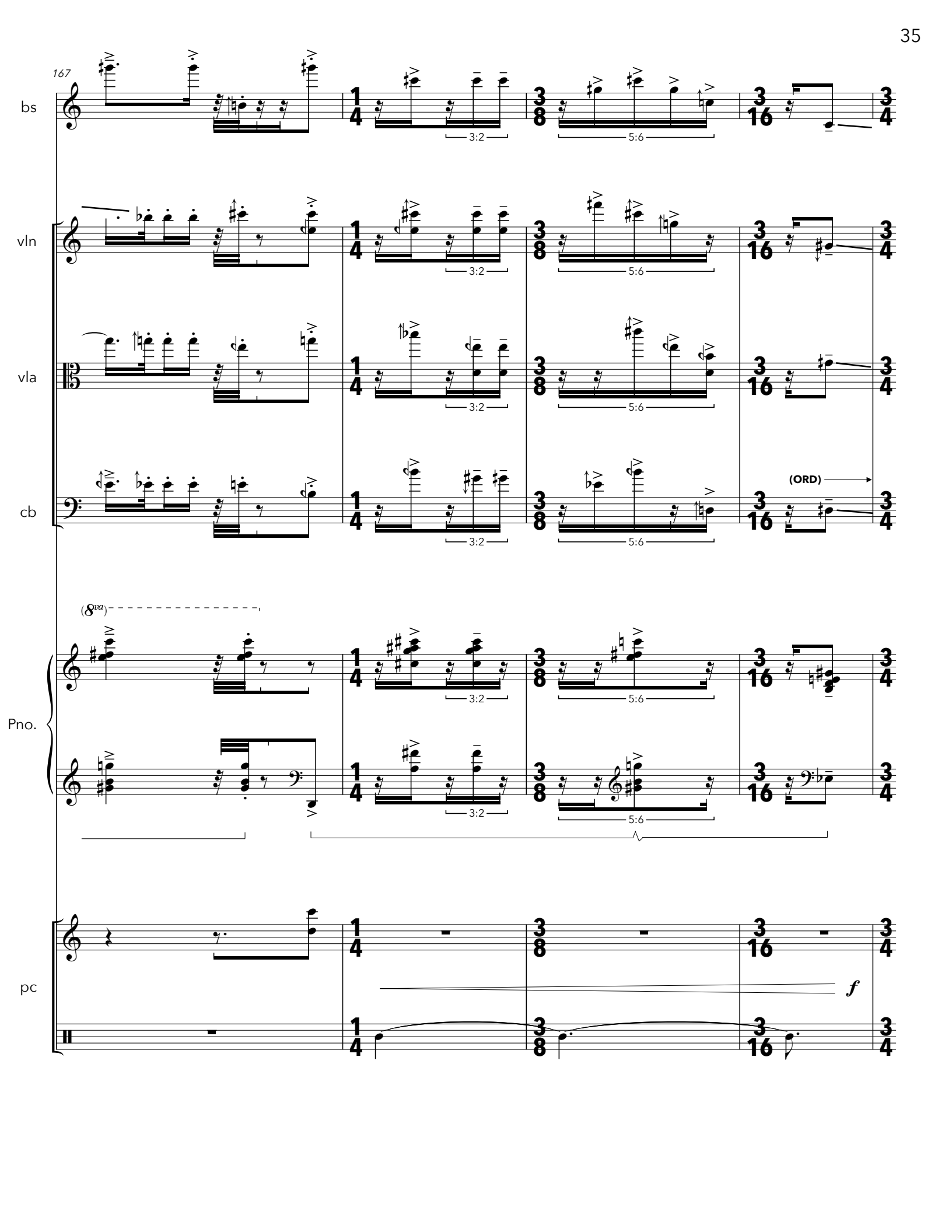

158
bs
vln
mp
3:2
3:2
3:2
5:4
3:2
vla
cb
return to percussion setup
pc
mf+
Pno.
mf+
(pno - sdng)
vln
cb
bs
vla
b sax and vla: go to instrument,
rejoin original part as soon as you are able

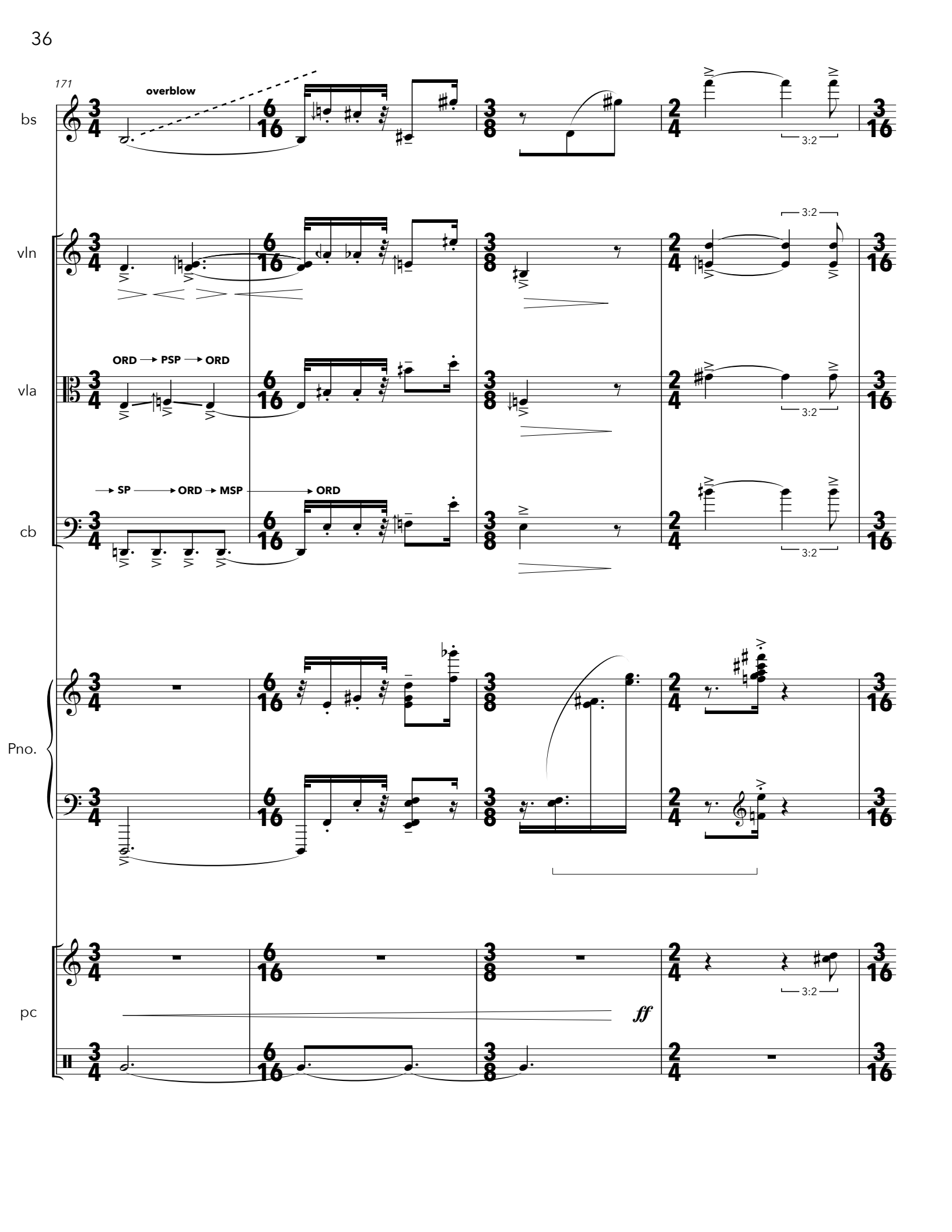

160
34
bs
vln
vla
cb
mf
mf+
p
mp
pp+
3:2
5:4
6:4
7:8
12.2
161
35
cresc.

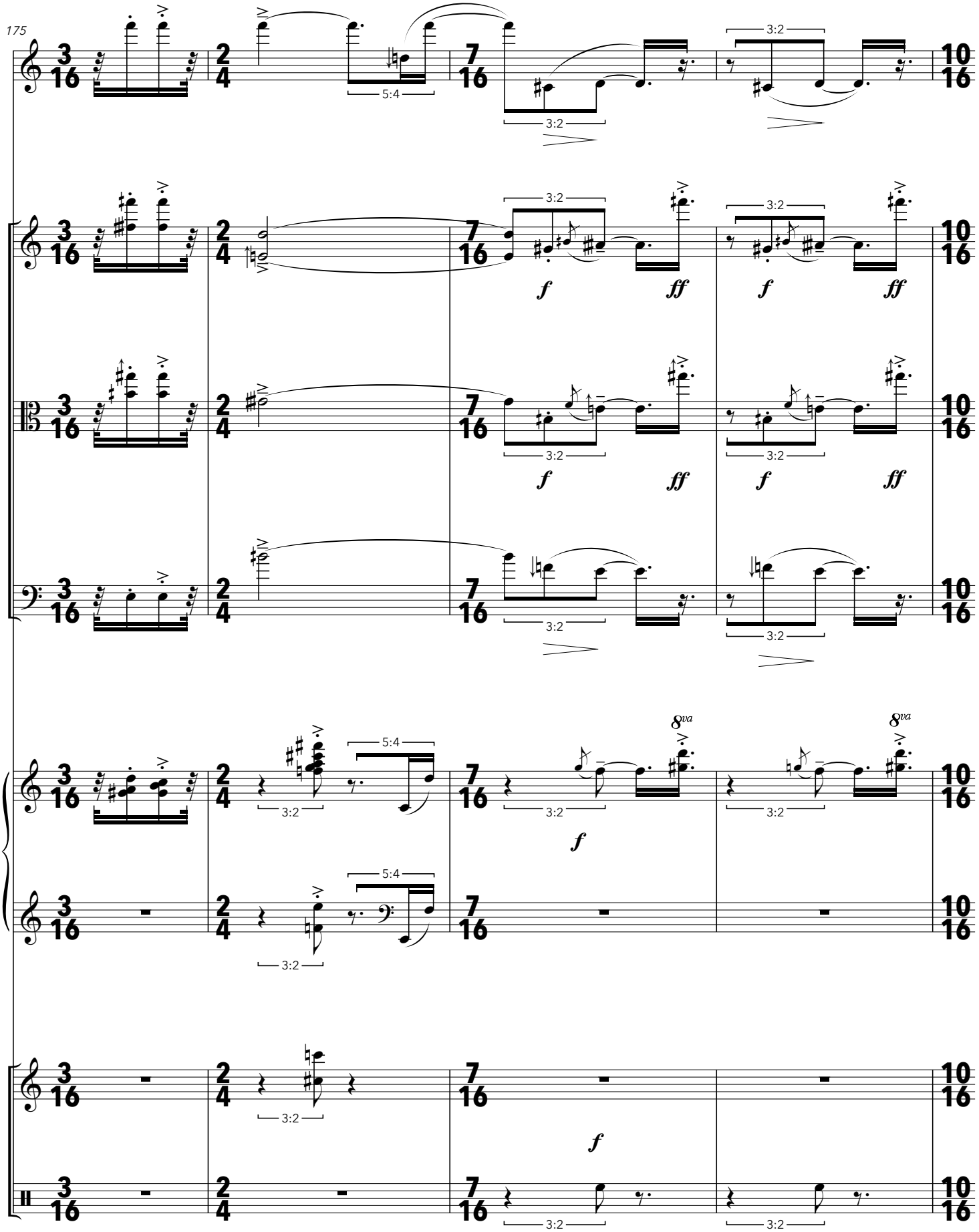

162
37
bs
vln
vla
cb
pc
Pno.
5:4
6:4
3:2
7:8
f
mp
cresc.
touch both strings
to produce multiphonics
"scale" ("random" pitches)
8vb
cresc.
S.P.

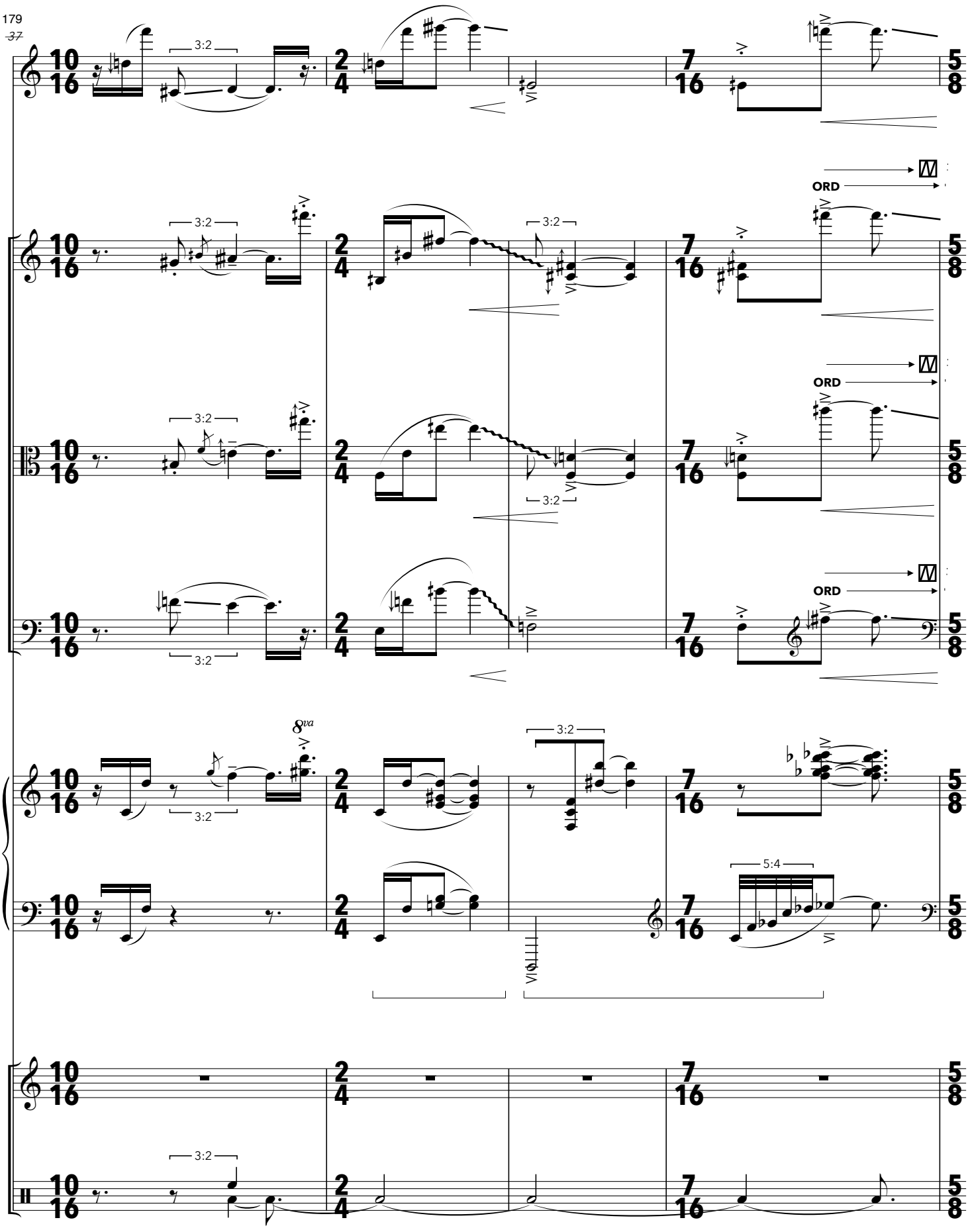

♩ = 90
163
37
bs
vln
vla
cb
pc
Pno.
2/4
5/8
ff
7:8
6:4

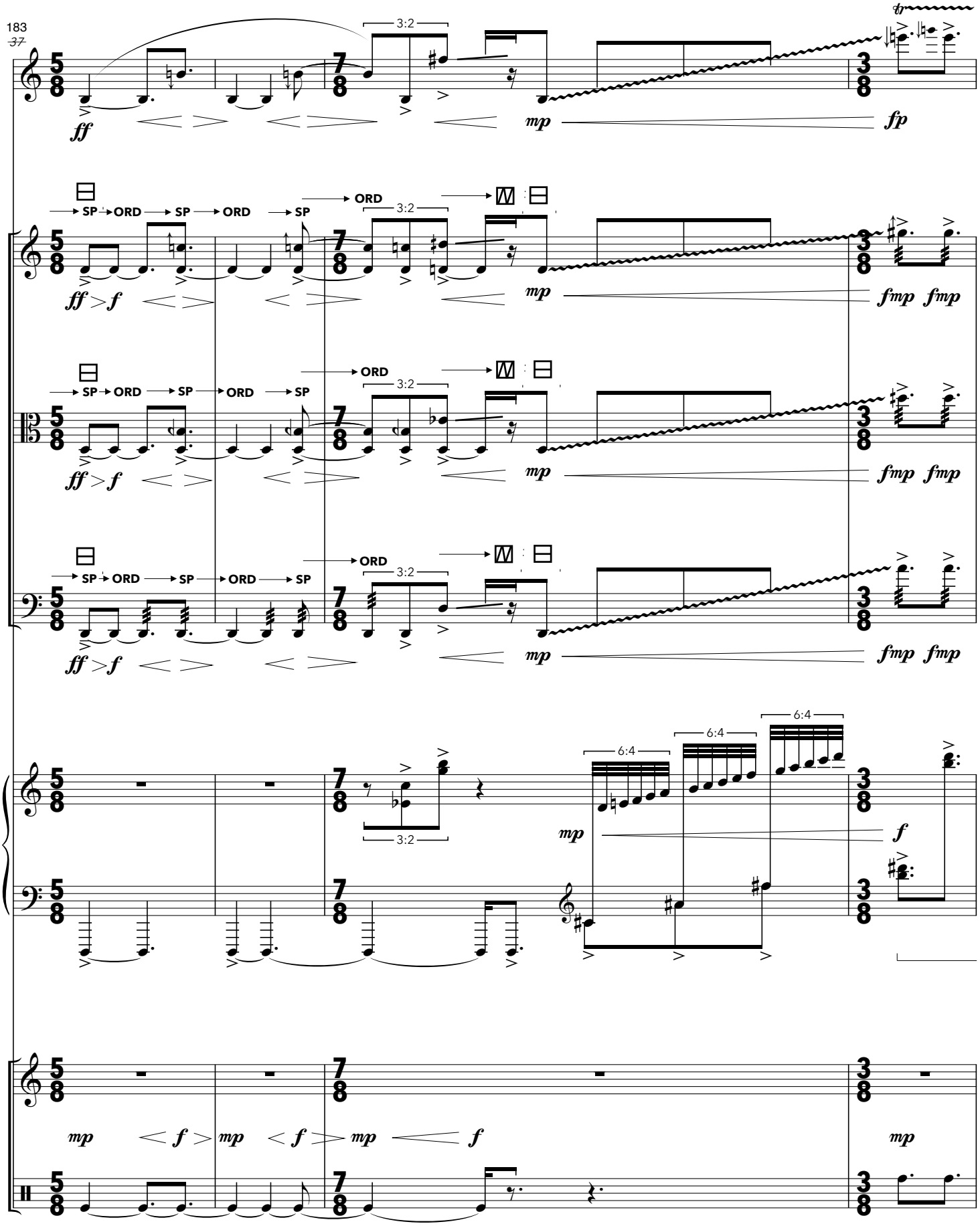

165
baritone saxophone
overblow
ff
violin
5:4
ORD
PSP
ORD
3:2
viola
PSP
ORD
contrabass
8va
Piano
S.P.
(low D only, until further notice)
GLOCK
percussion
f

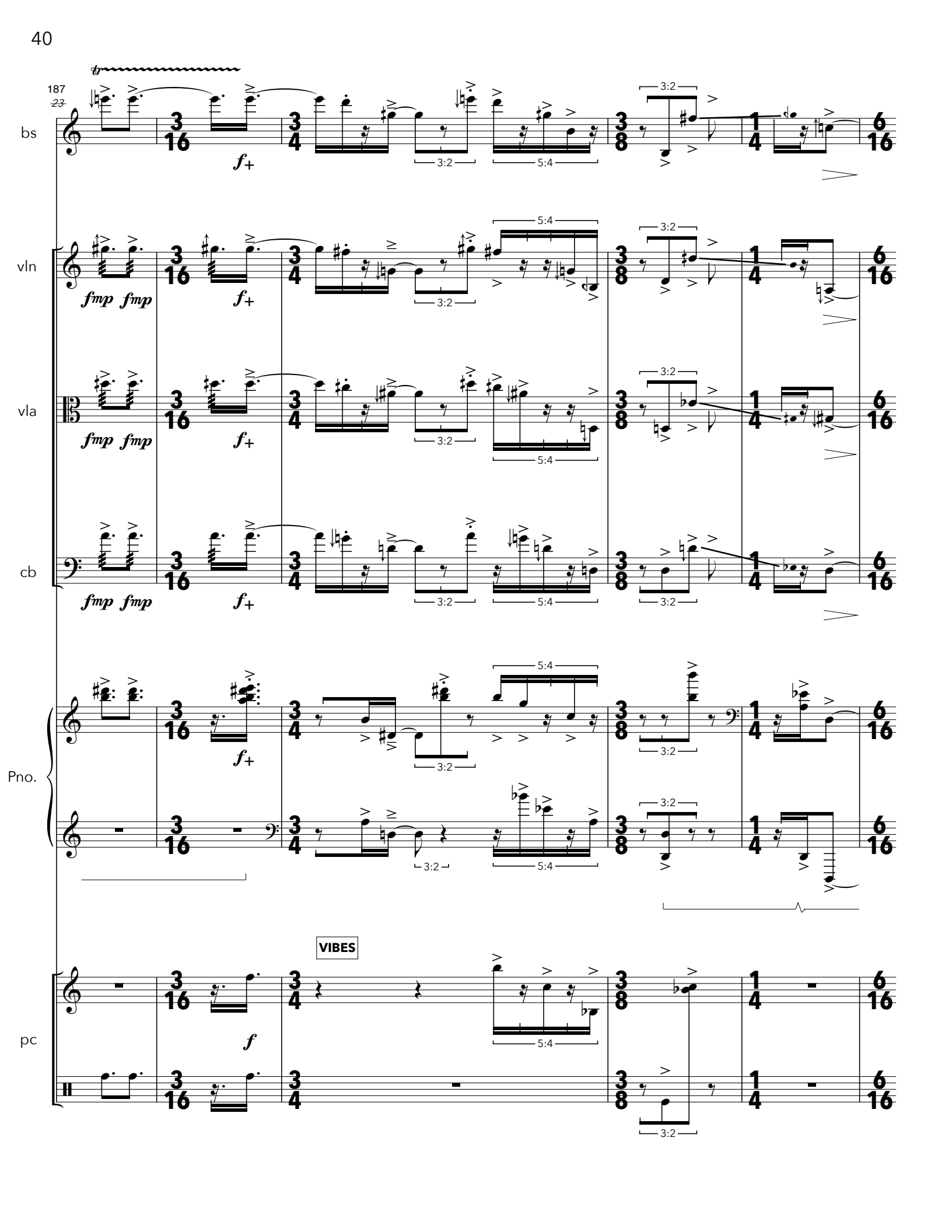

167
bs
vln
vla
cb
Pno.
pc
3:2
5:6
(ORD)
(8va)
f

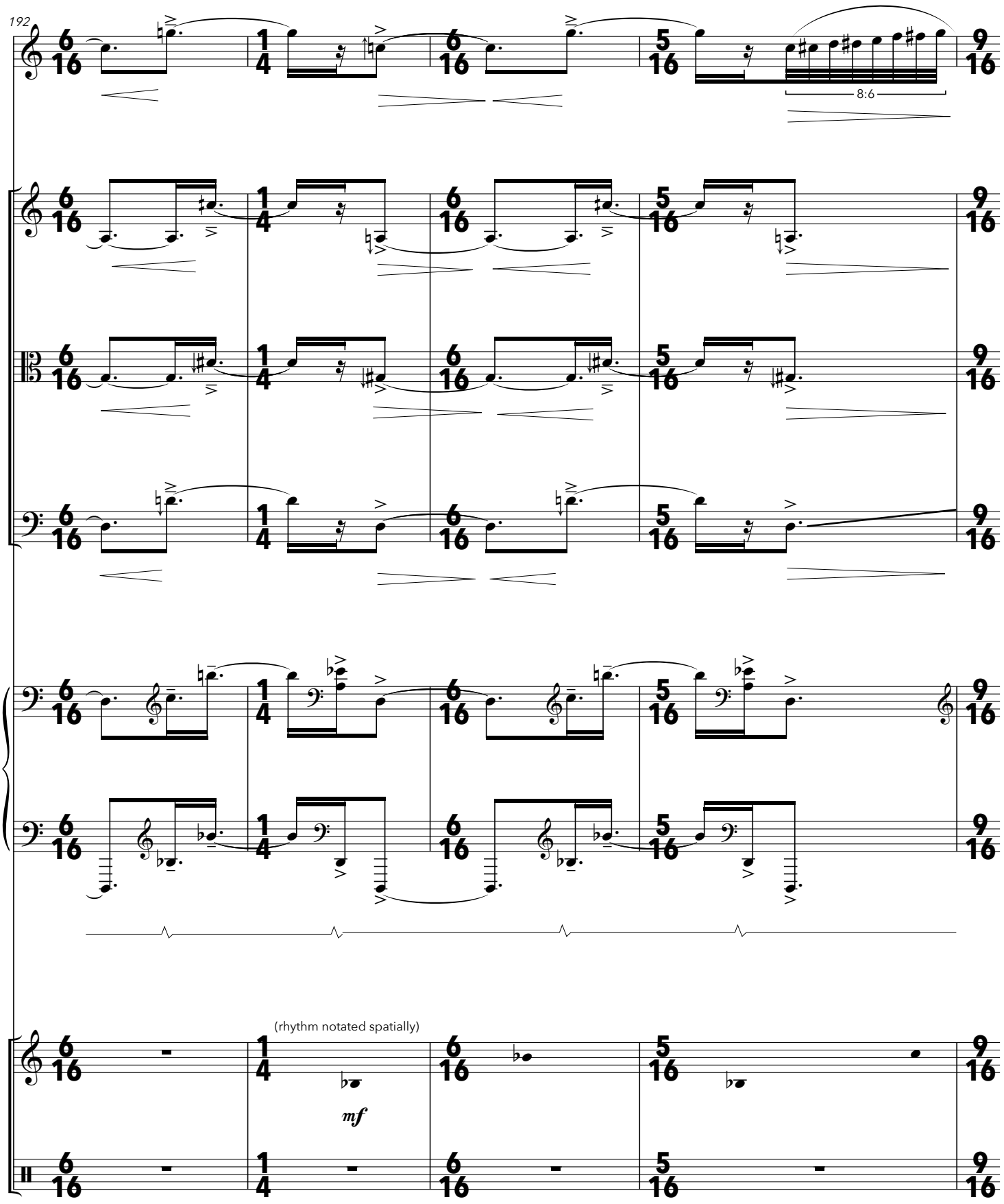

171
overblow
bs
vln
ORD → PSP → ORD
vla
→ SP → ORD → MSP → ORD
cb
3:2
Pno.
pc
ff

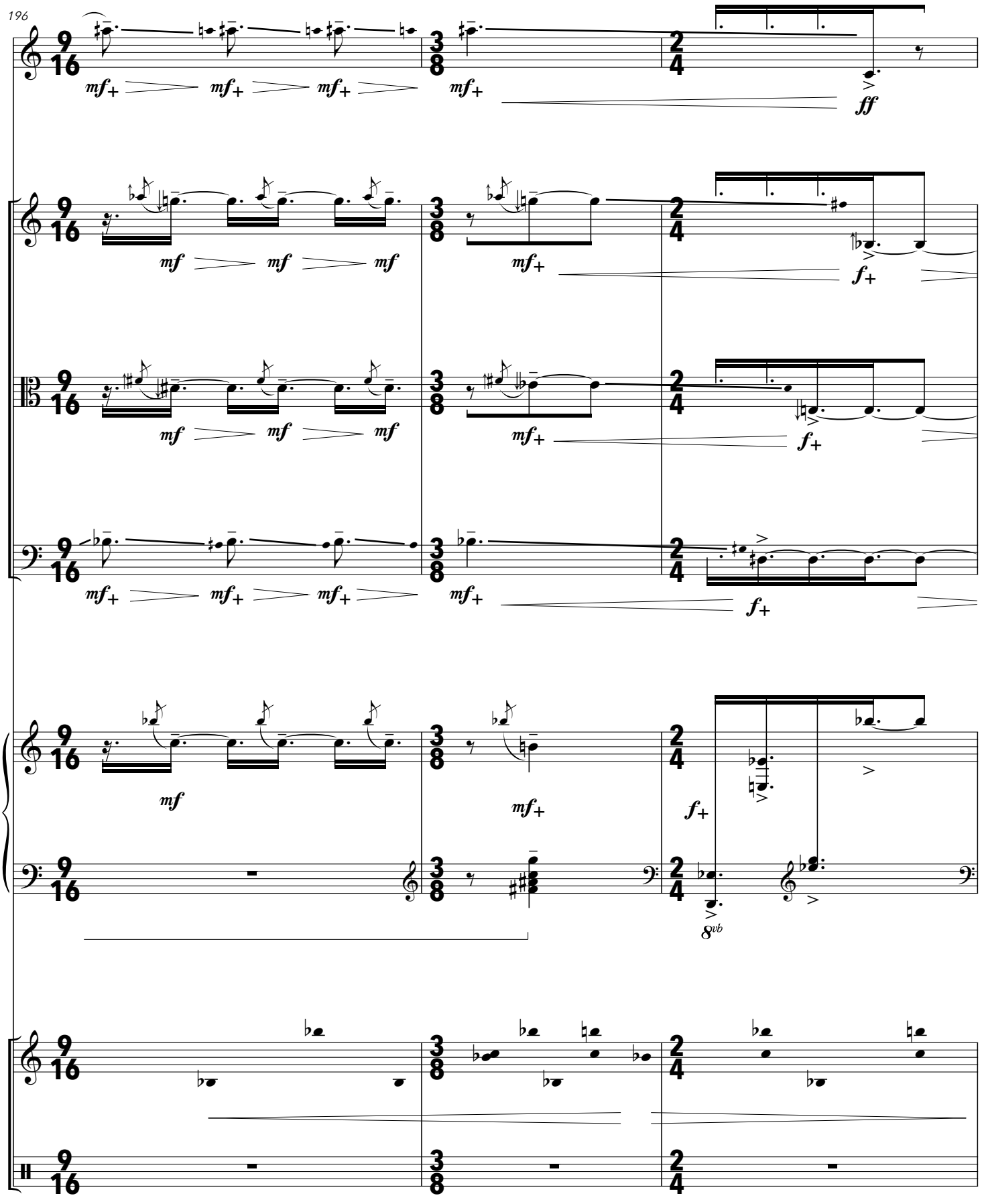

175
bs
vln
vla
cb
Pno.
pc
3:2
5:4
f
ff
8va

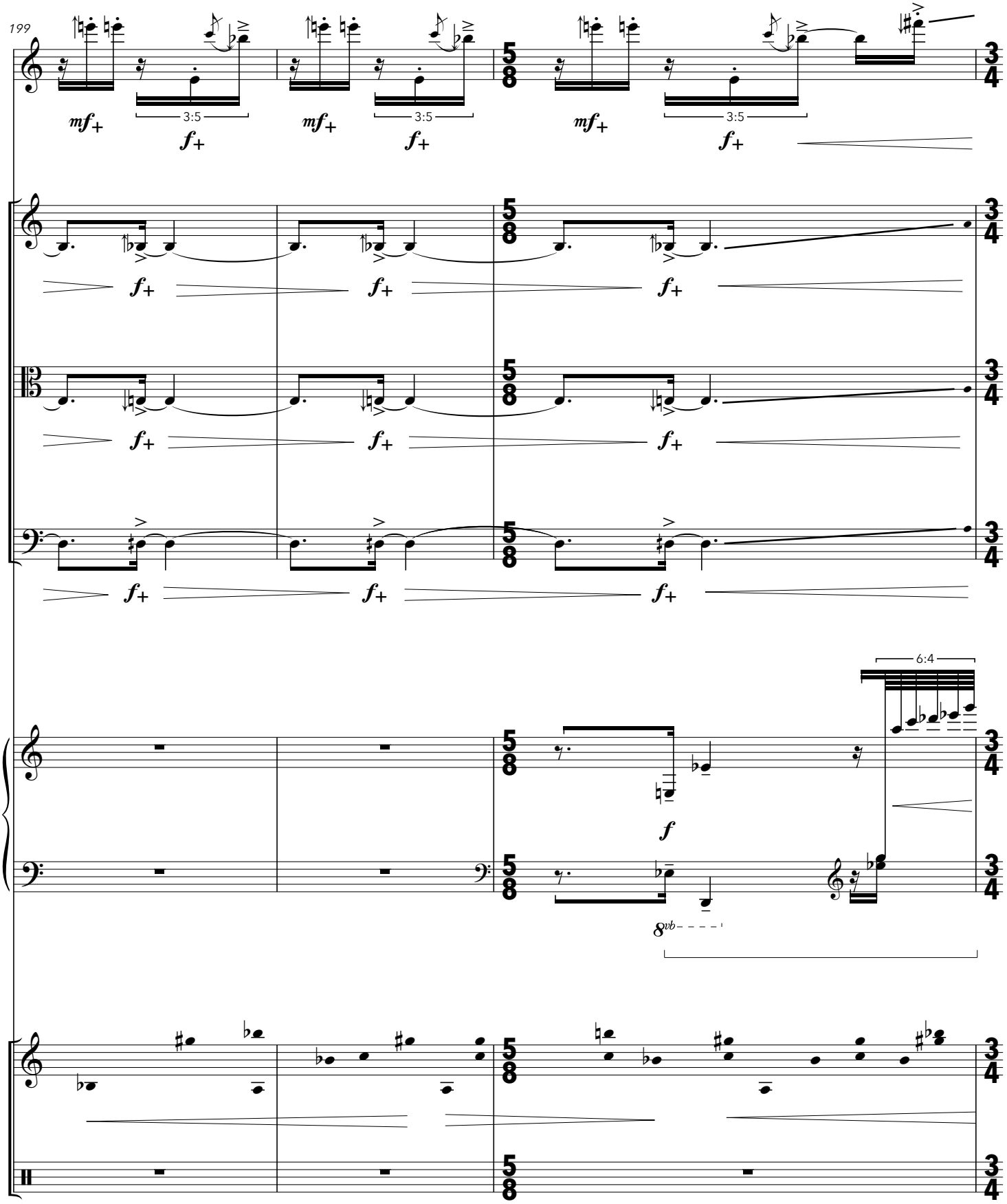

179
37
bs
vln
vla
cb
Pno.
pc
ORD
3:2
5:4
8va

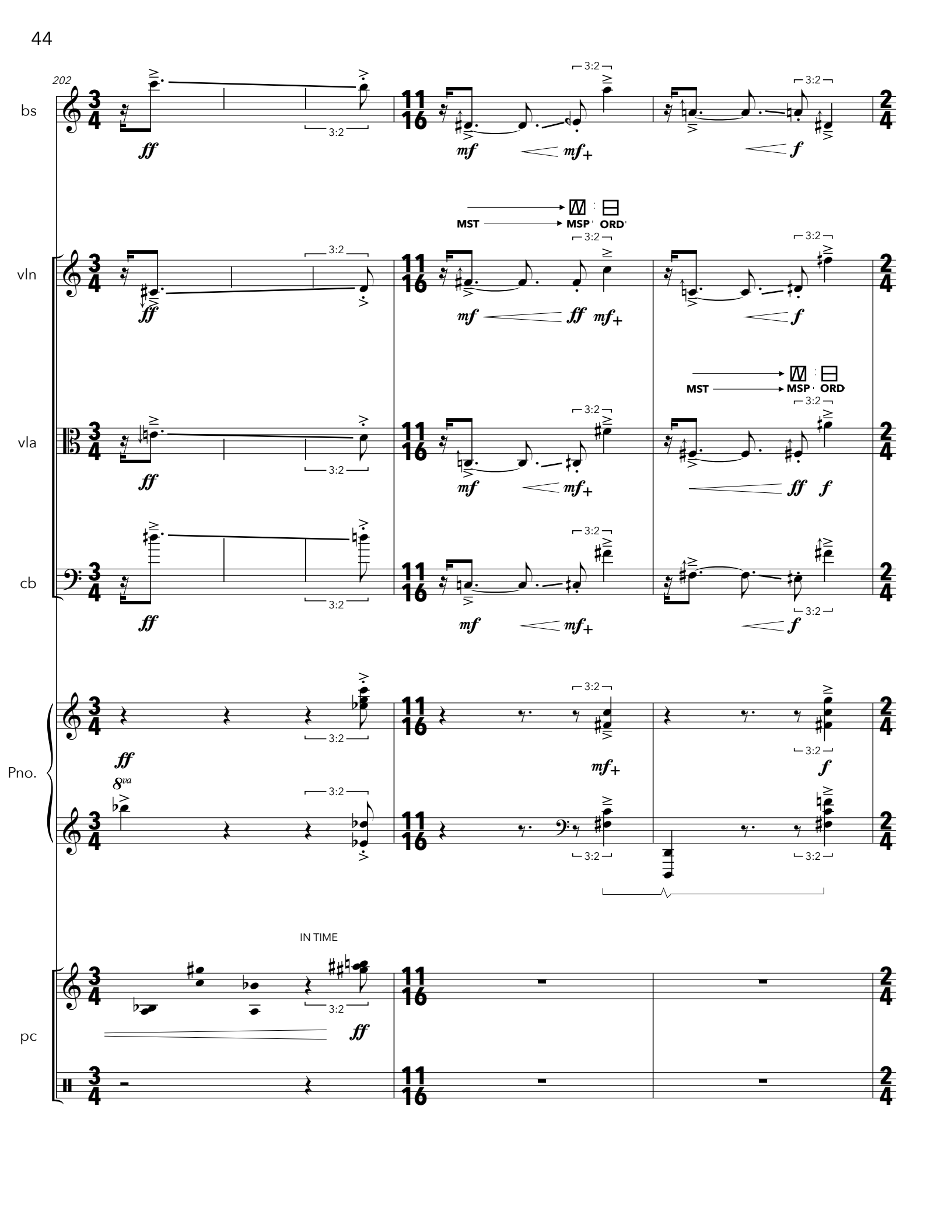

183
37
bs
vln
vla
cb
Pno.
pc
SP
ORD
3:2
6:4
ff
f
mp
fp
fmp

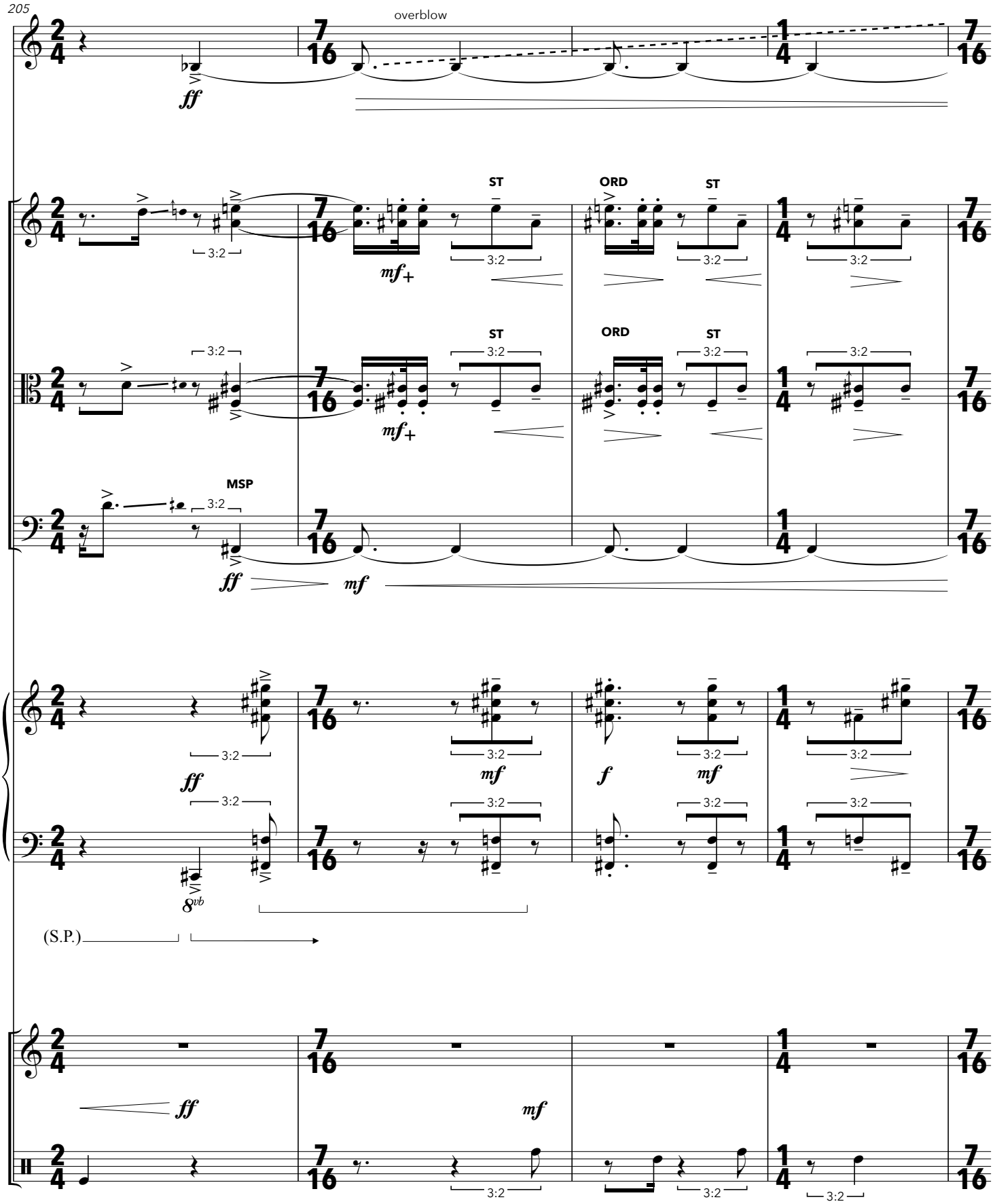

187
23
bs
vln
vla
cb
Pno.
pc
VIBES
fmp fmp
f+
f
3:2
5:4

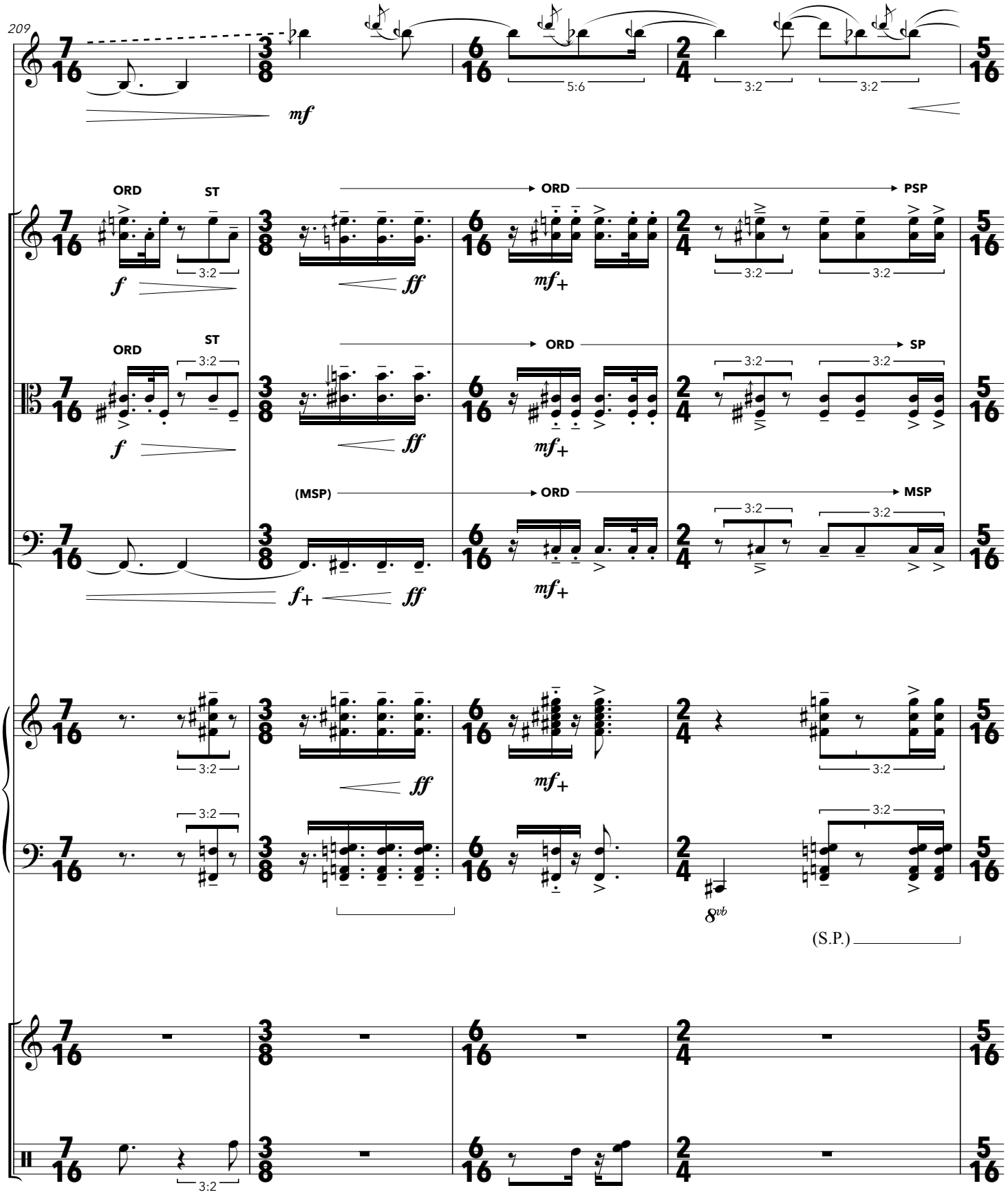

192
bs
vln
vla
cb
Pno.
pc
8:6
(rhythm notated spatially)
mf

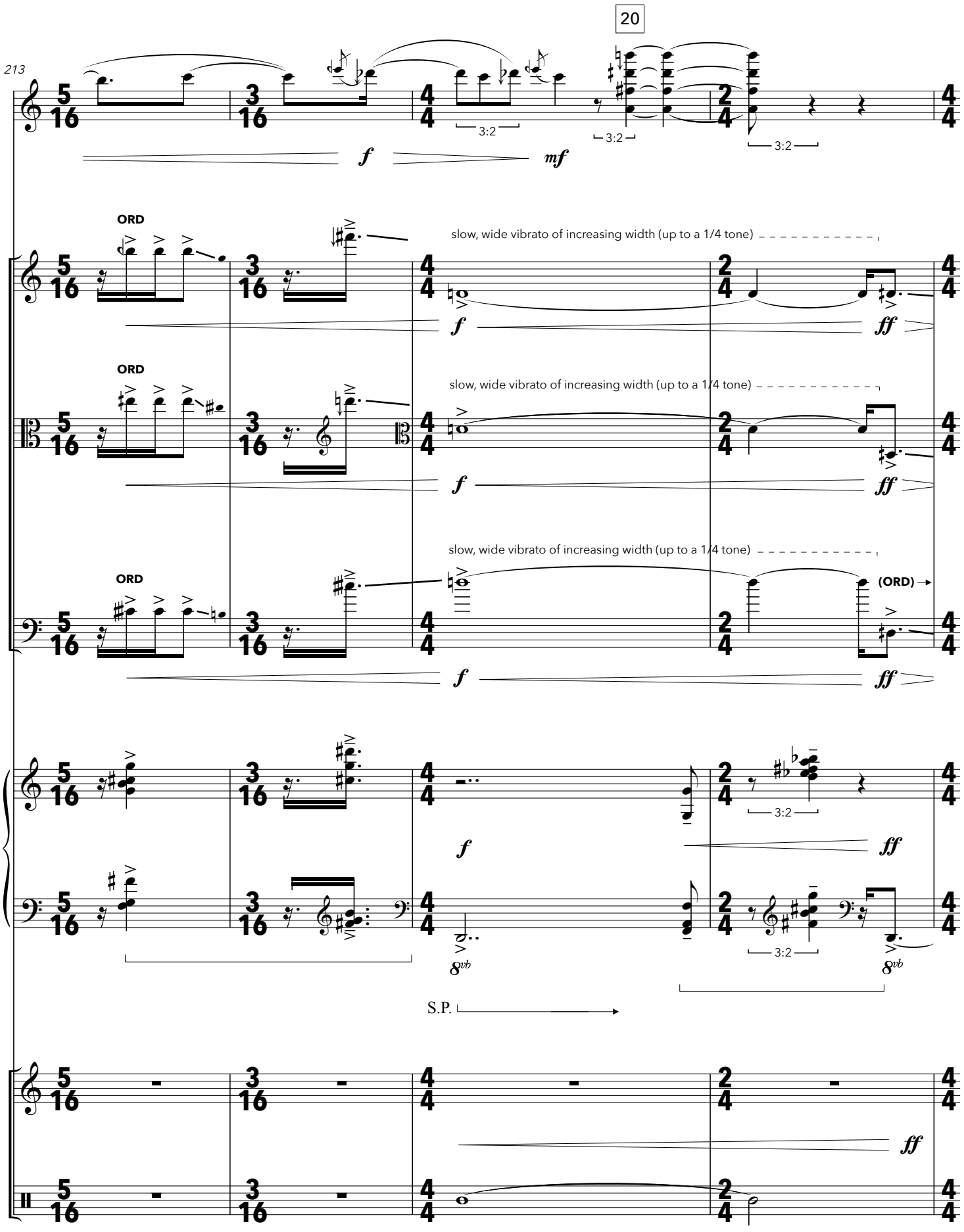

196
bs
vln
vla
cb
Pno.
pc
mf+
mf
ff
f+
8vb

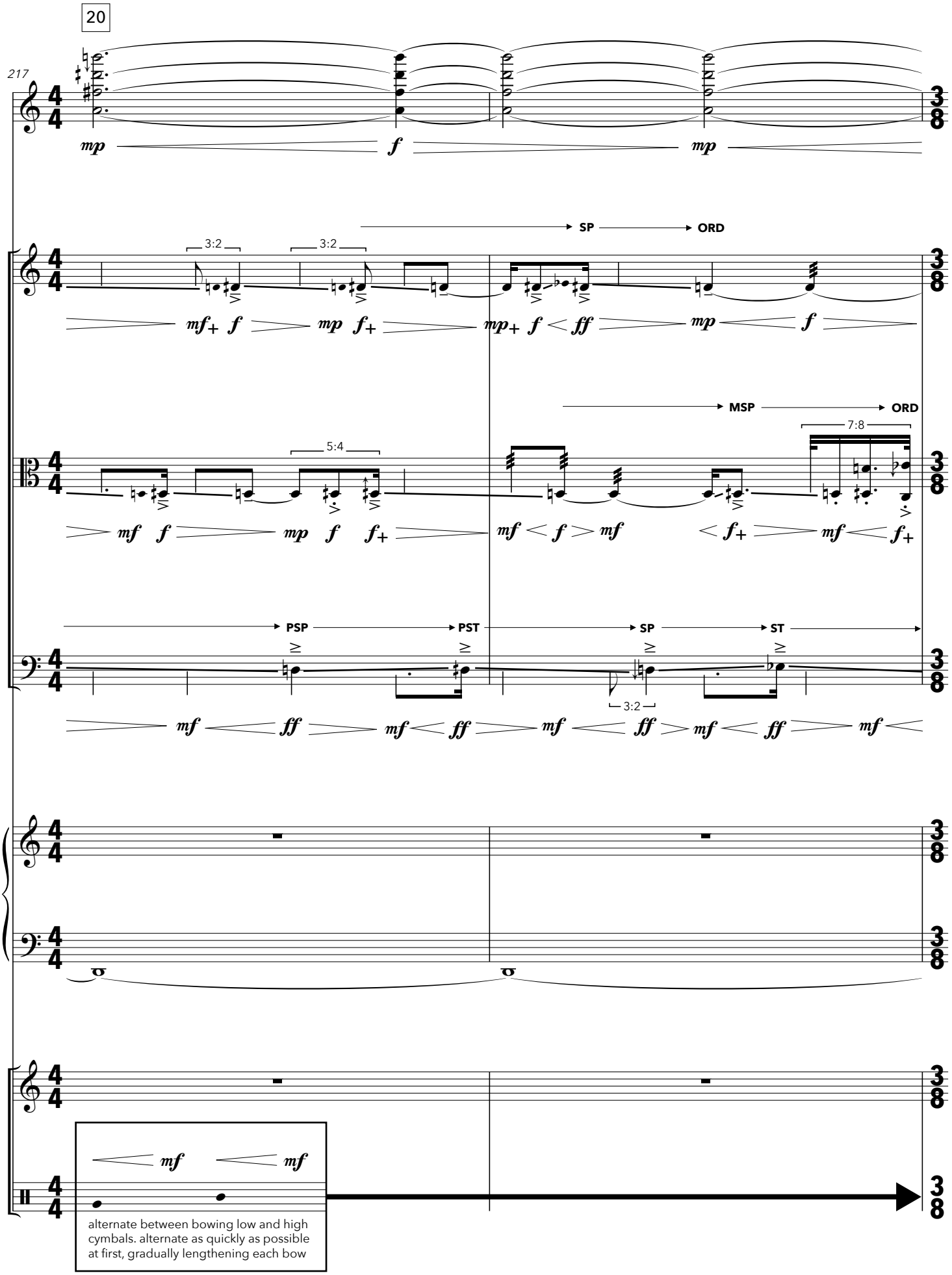

199
bs
vln
vla
cb
Pno.
pc
mf+
f+
3:5
6:4
8vb

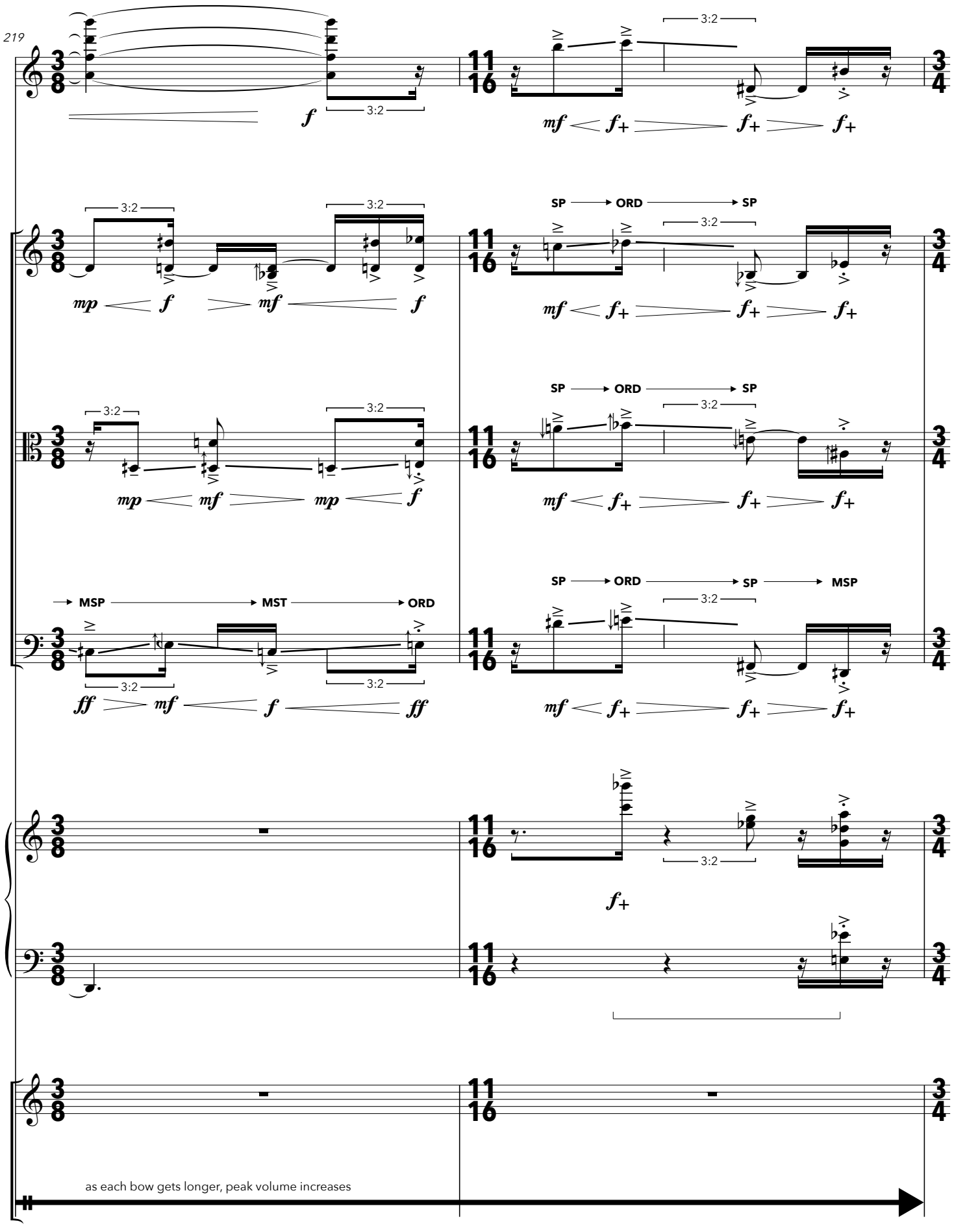

202
bs
vln
vla
cb
Pno.
pc
MST
MSP
ORD
3:2
IN TIME

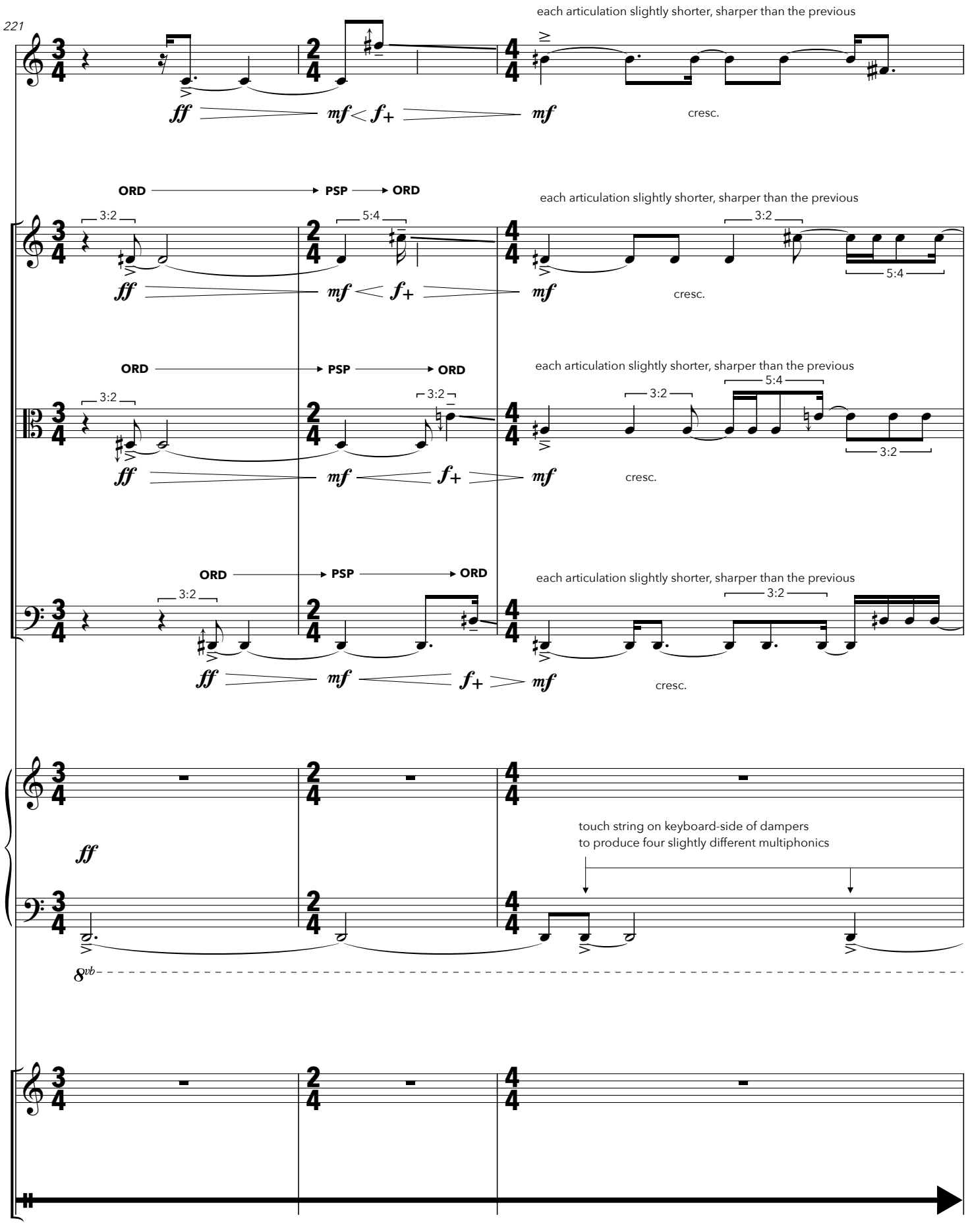

205
bs
overblow
ff
vln
ST
ORD
ST
mf+
vla
ST
ORD
ST
mf+
cb
MSP
ff
mf
Pno.
ff
mf
f
mf
8vb
(S.P.)
pc
ff
mf
3:2

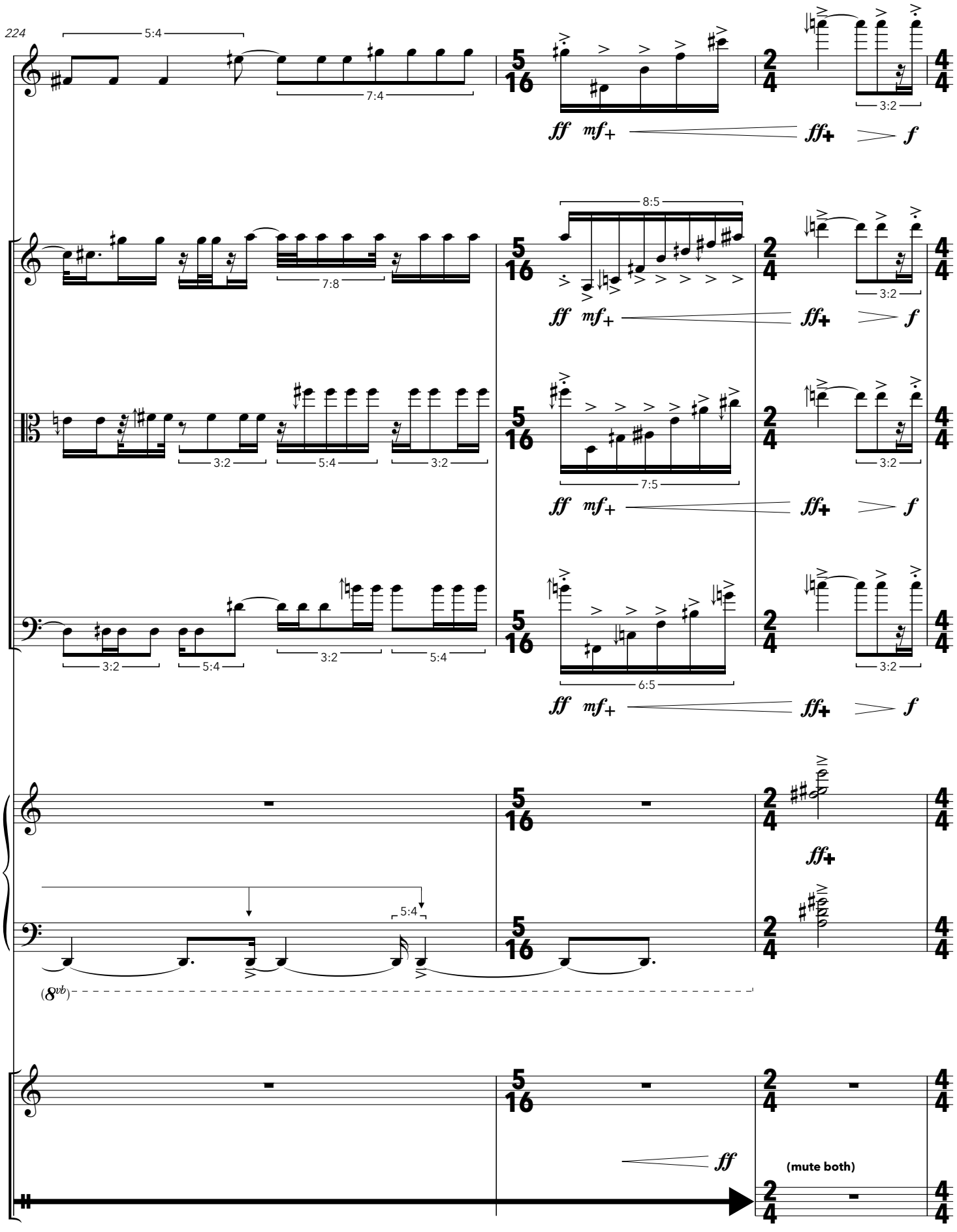

209
bs
vln
vla
cb
Pno.
pc
mf
ORD
ST
PSP
SP
(MSP)
MSP
f
ff
mf+
f+
5:6
3:2
8vb
(S.P.)

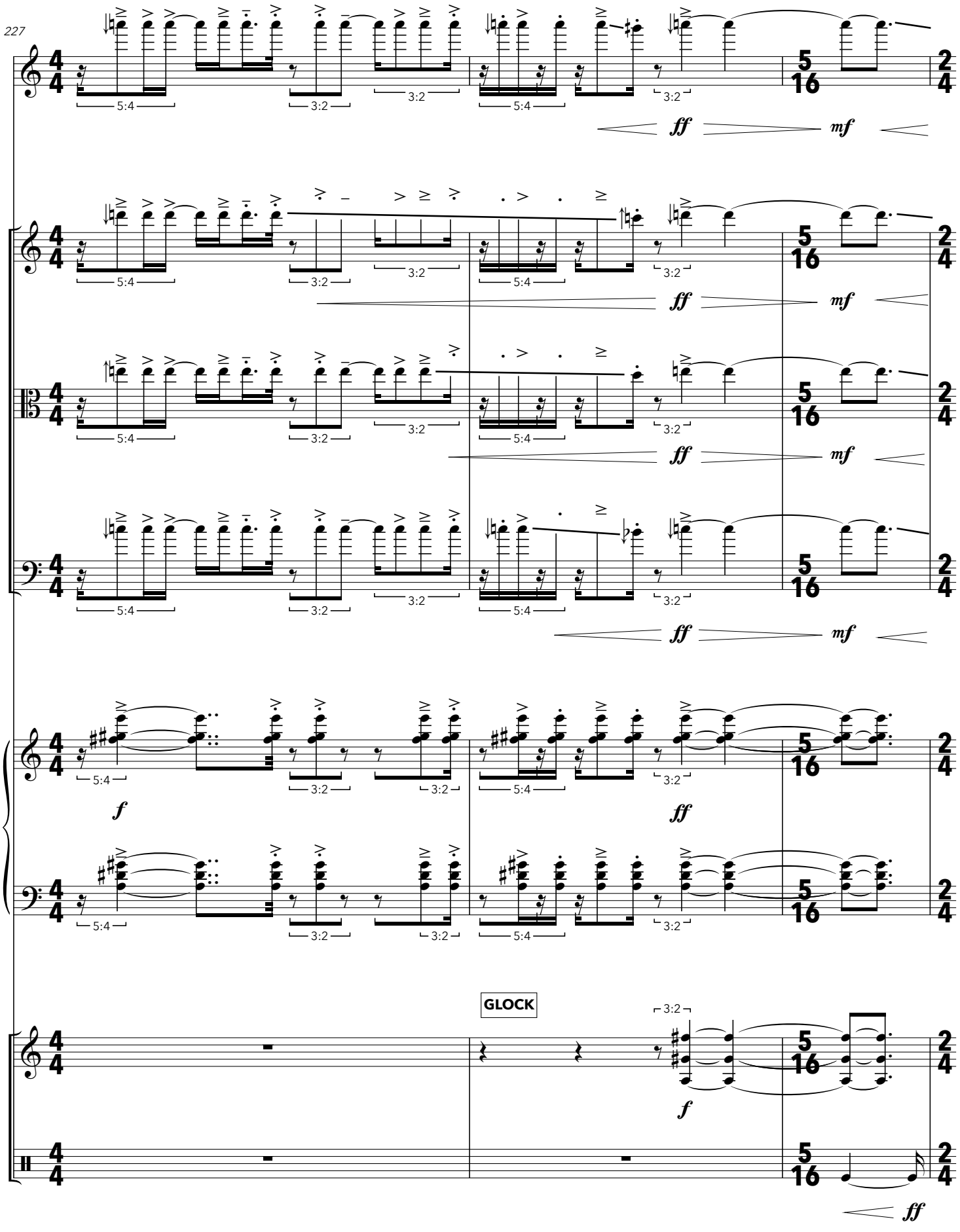

20
213
bs
vln
vla
cb
Pno.
pc
ORD
slow, wide vibrato of increasing width (up to a 1/4 tone)
(ORD)
3:2
f
mf
ff
8vb
S.P.

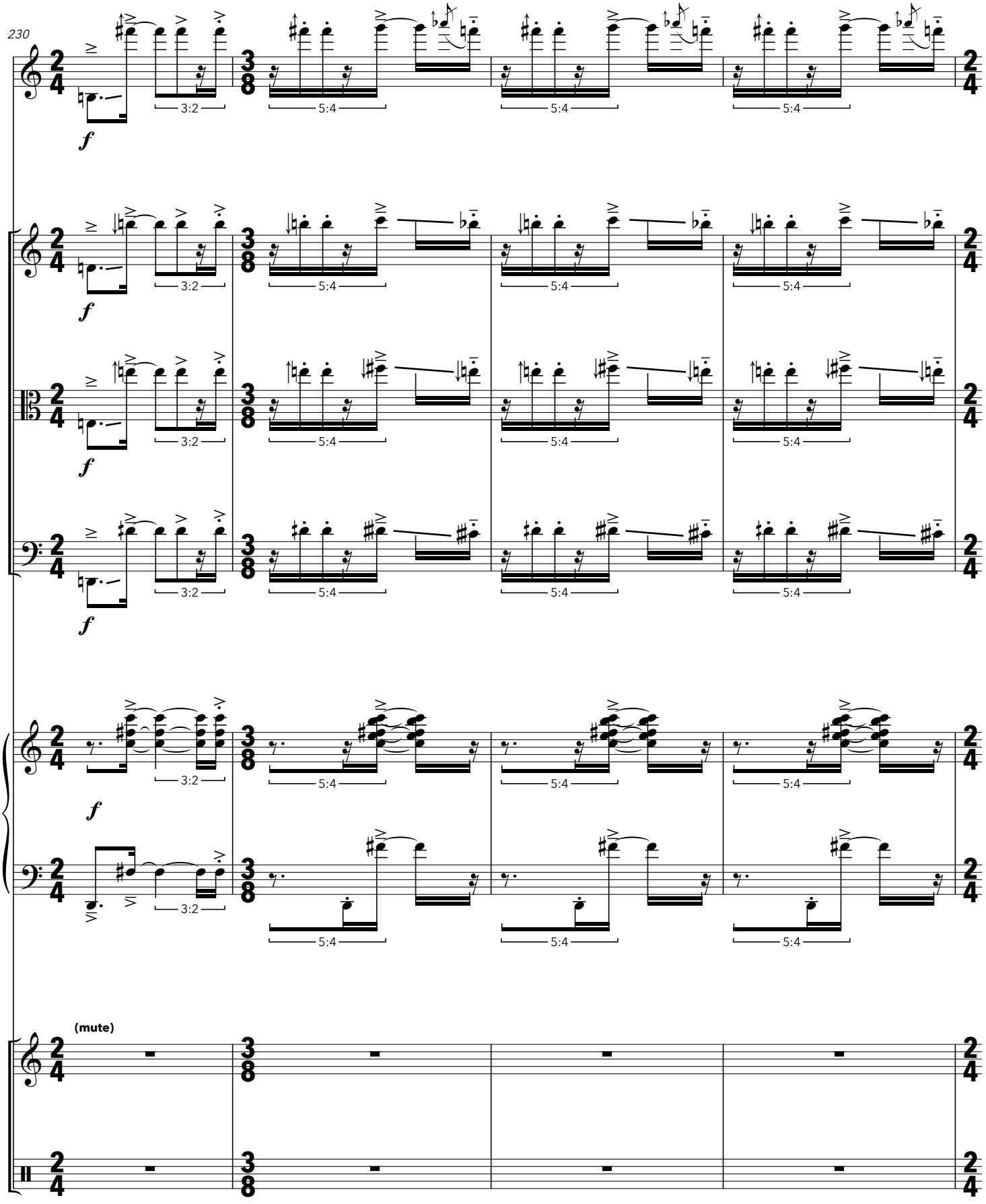

20
217
bs
mp
f
mp
SP
ORD
vln
3:2
3:2
mf+ f
mp f+
mp+ f
ff
mp
f
MSP
ORD
vla
5:4
7:8
mf f
mp f f+
mf f mf
f+
mf
f+
PSP
PST
SP
ST
cb
3:2
mf
ff
mf
ff
mf
ff
mf
ff
mf
Pno.
pc
mf
mf
alternate between bowing low and high cymbals. alternate as quickly as possible at first, gradually lengthening each bow

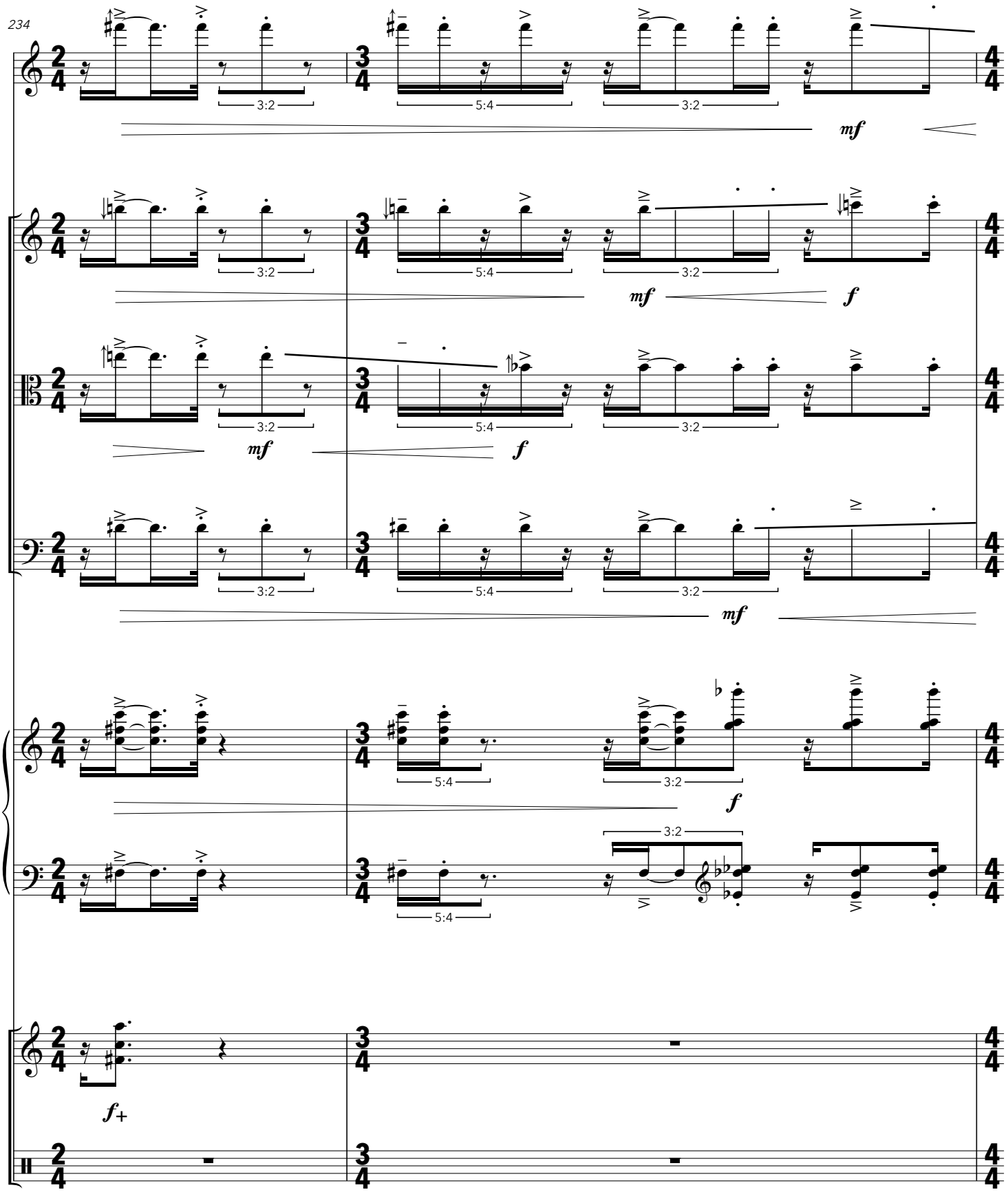

219
bs
vln
vla
cb
Pno.
pc
3:2
SP → ORD → SP
→ MSP → MST → ORD
→ MSP
as each bow gets longer, peak volume increases

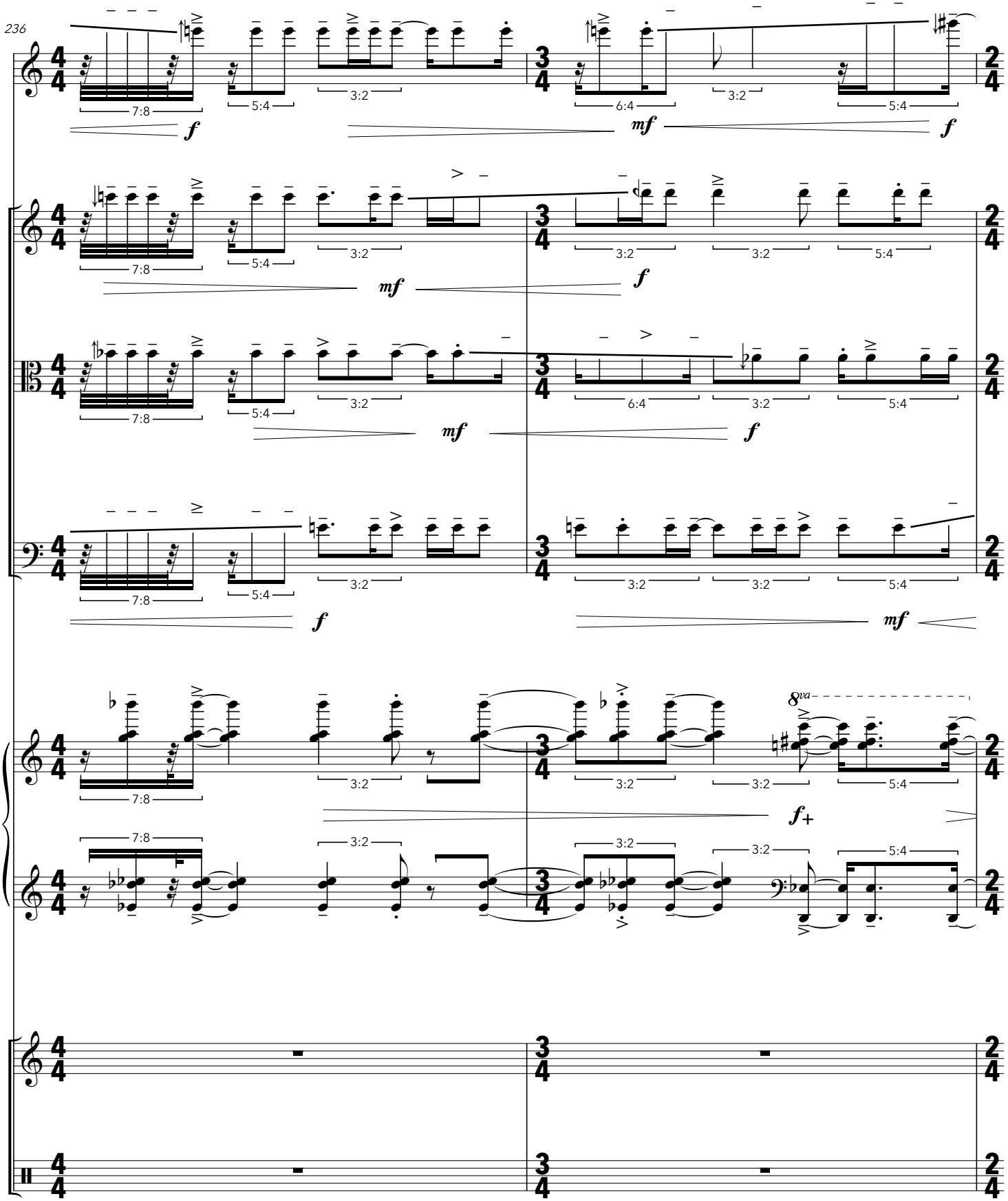

221
bs
each articulation slightly shorter, sharper than the previous
ff
mf < f+
mf
cresc.
vln
ORD
PSP
ORD
3:2
5:4
each articulation slightly shorter, sharper than the previous
cresc.
vla
cresc.
cb
cresc.
Pno.
touch string on keyboard-side of dampers
to produce four slightly different multiphonics
8vb
pc

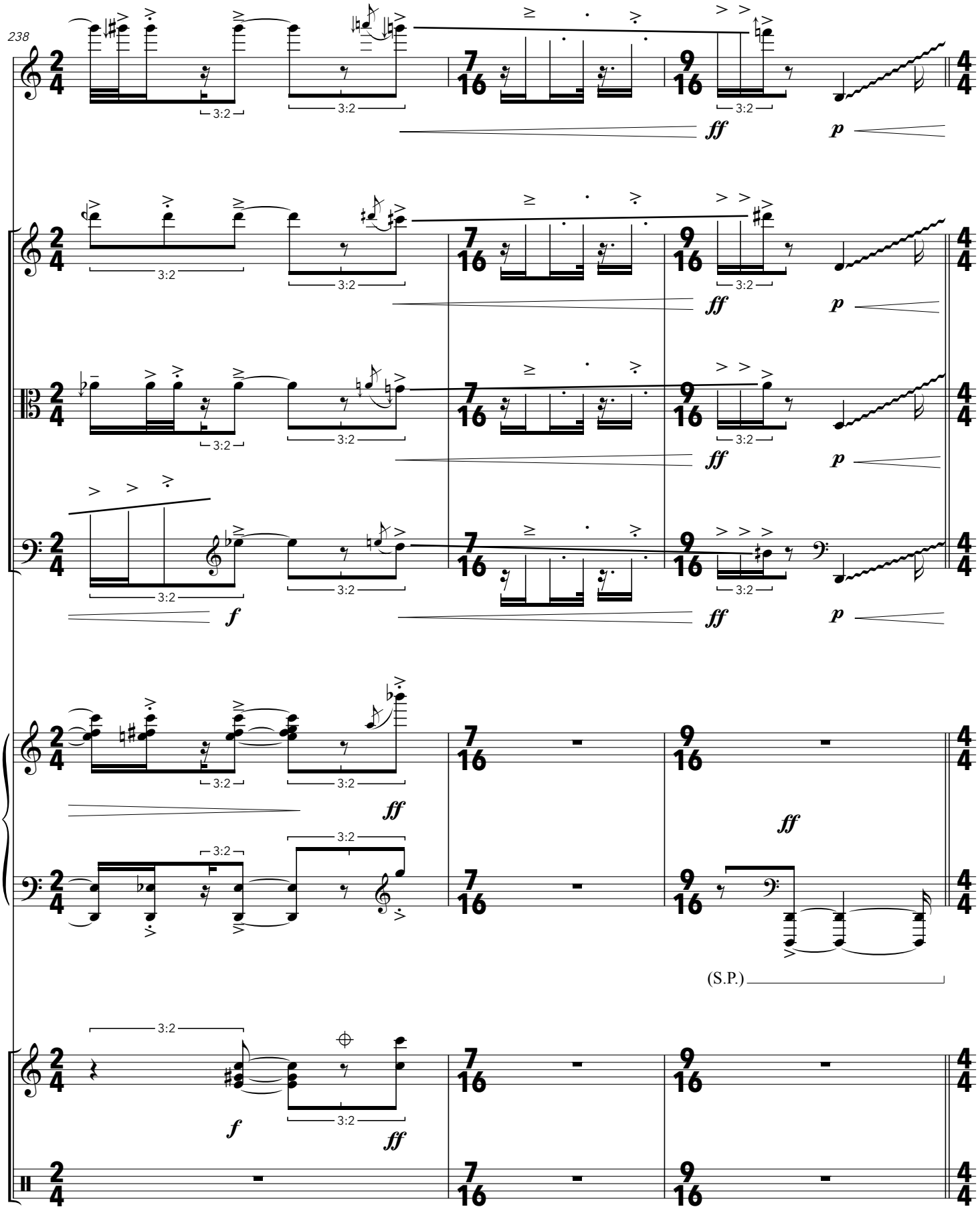

224
bs
vln
vla
cb
Pno.
pc
5:4
7:4
3:2
ff
mf+
ff+
f
8:5
7:8
7:5
6:5
(8vb)
(mute both)

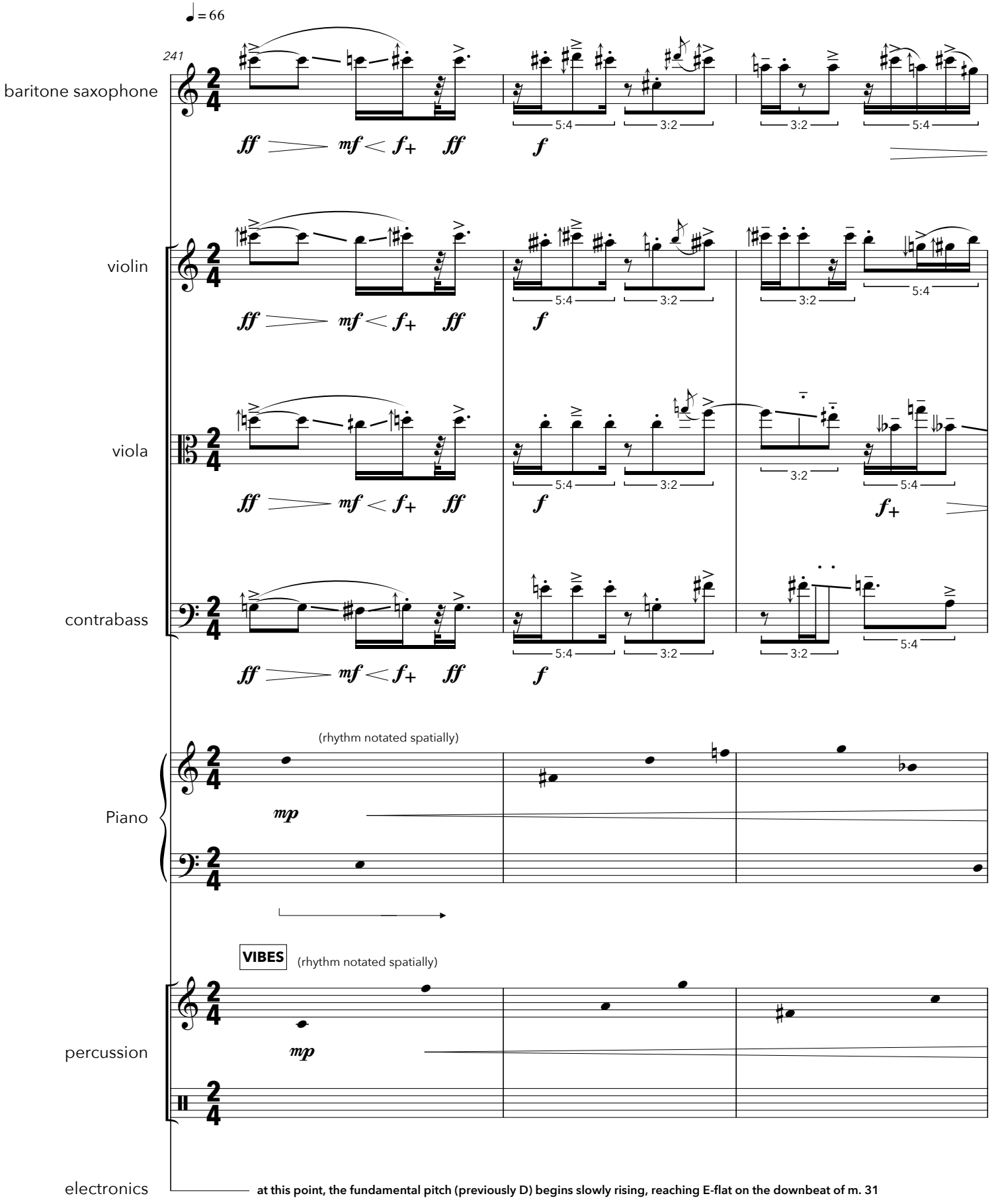

227
bs
vln
vla
cb
Pno.
pc
GLOCK
5:4
3:2
5
16
2
4
ff
mf
f

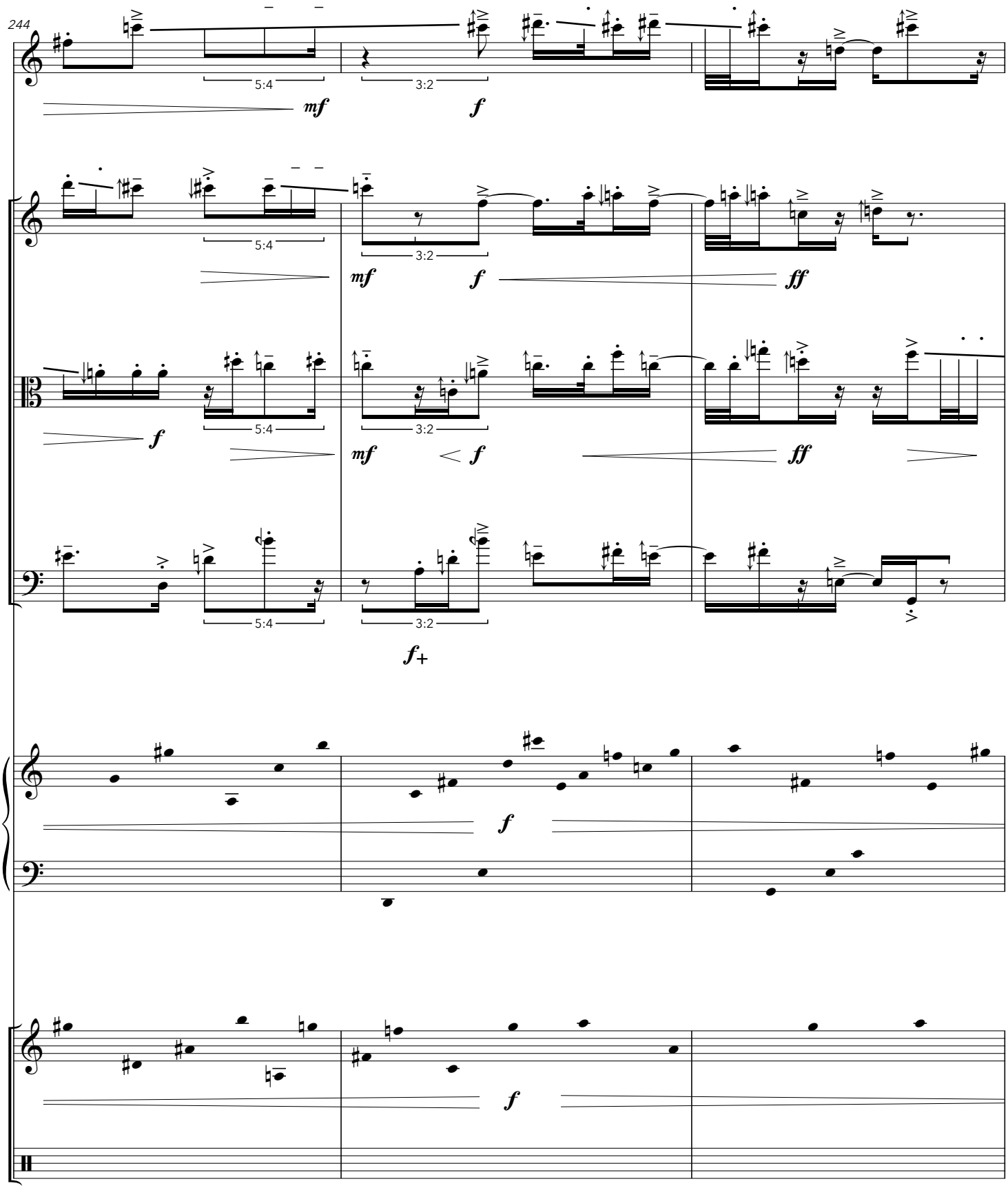

230
bs
vln
vla
cb
Pno.
pc
(mute)
f
3:2
5:4

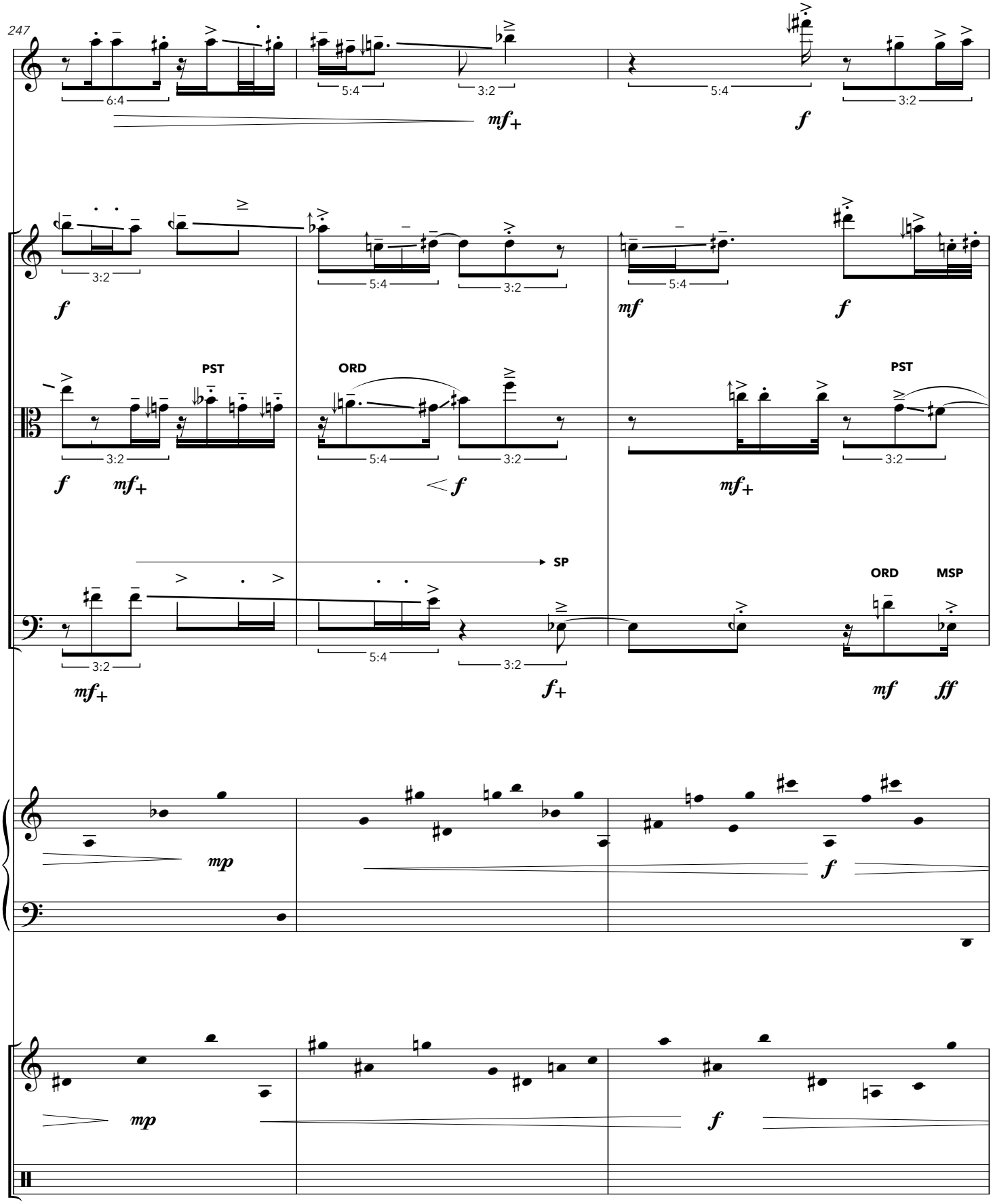

234
bs
vln
vla
cb
Pno.
pc
3:2
5:4
mf
f
f+

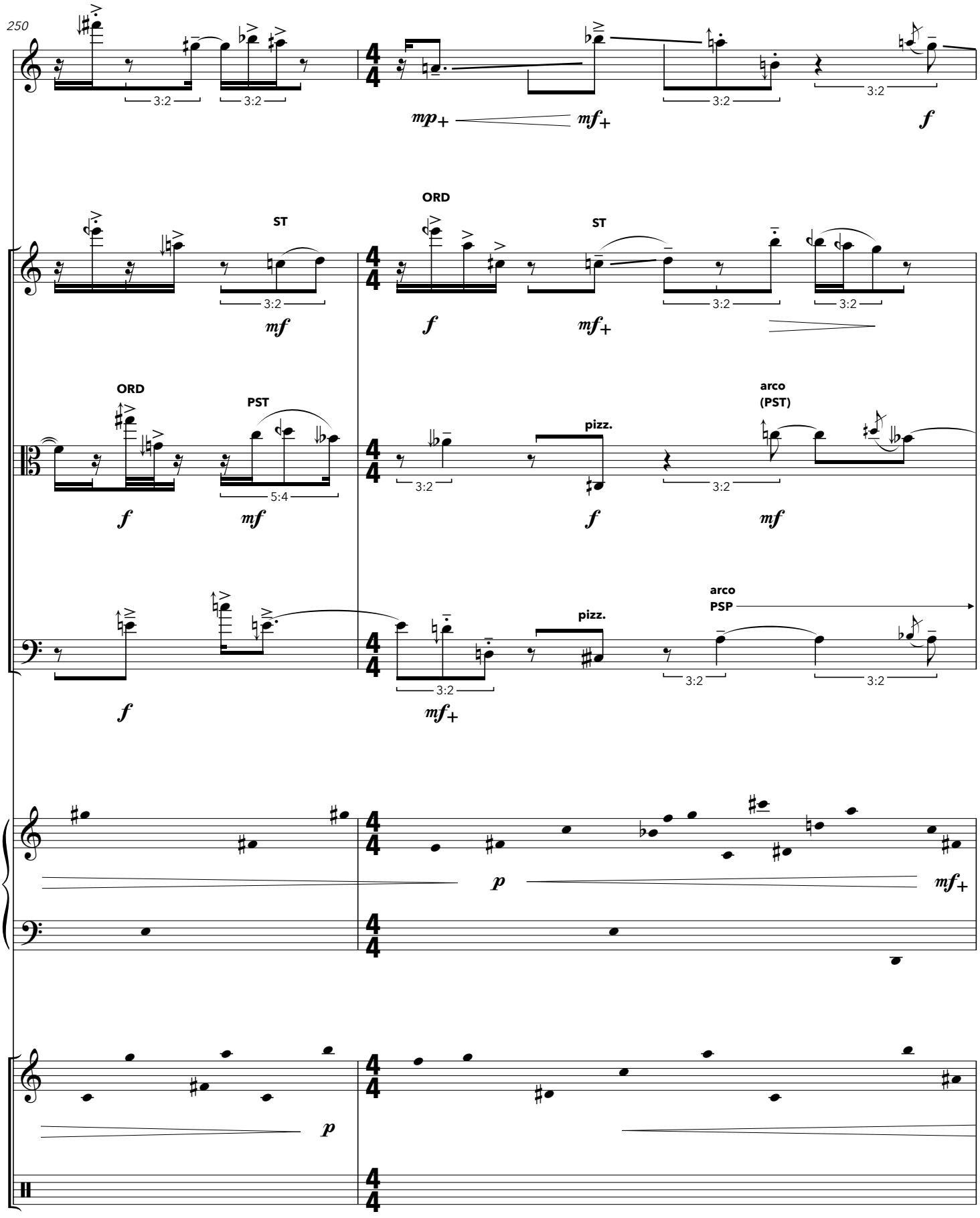

236
bs
vln
vla
cb
Pno.
pc
7:8
5:4
3:2
6:4
f
mf
f+
8va

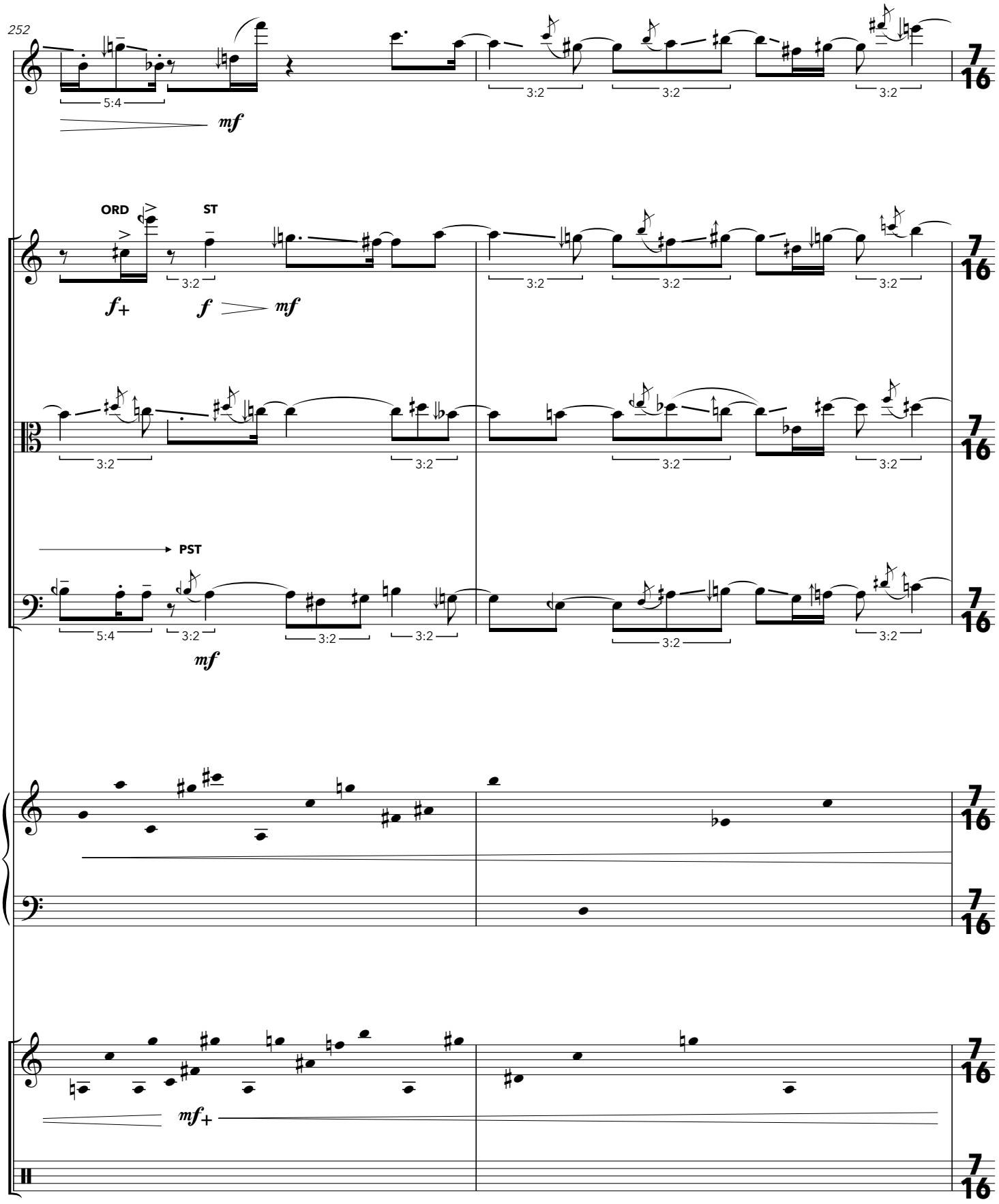

238
bs
vln
vla
cb
Pno.
pc
3:2
ff
f
p
(S.P.)

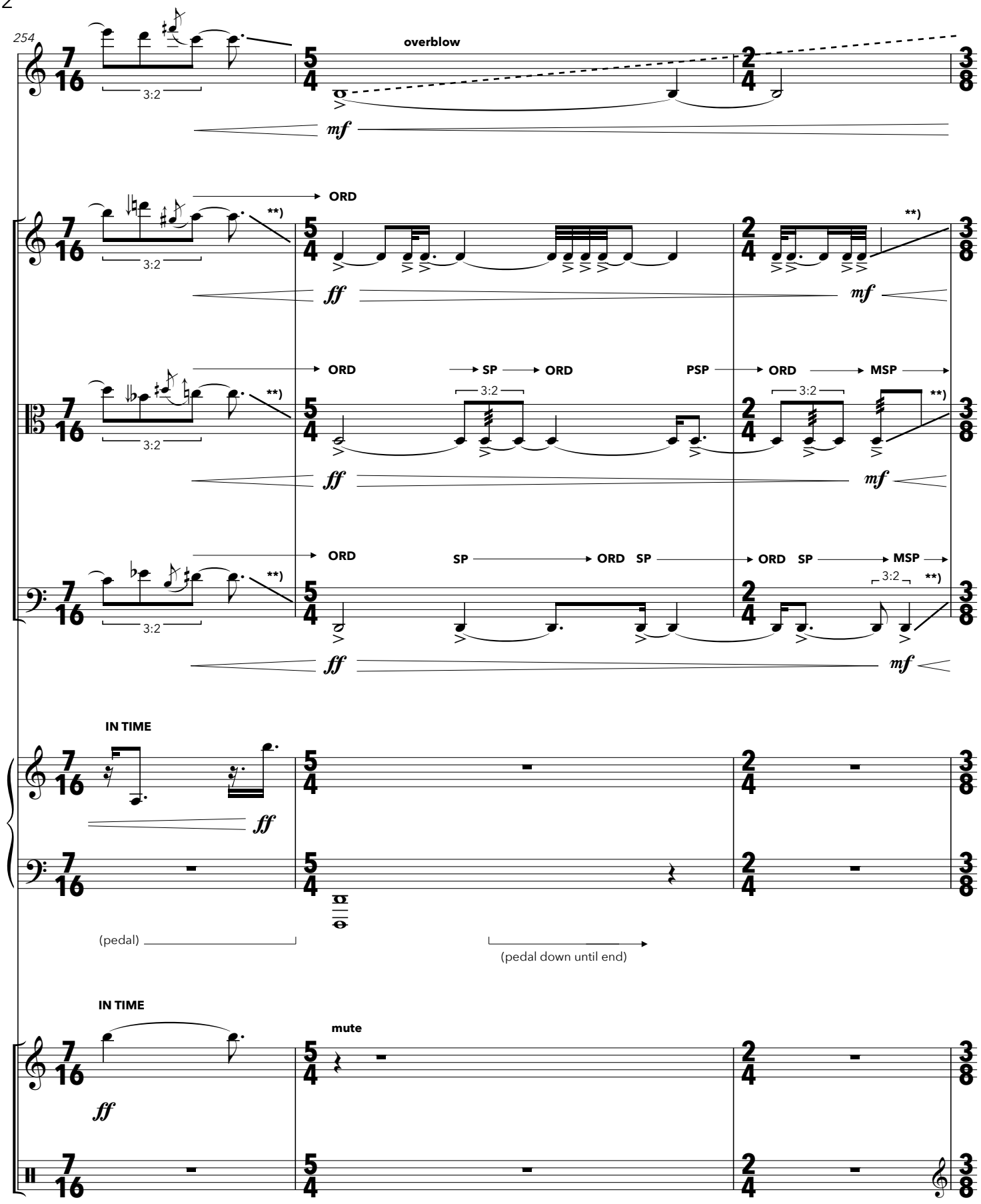

♩ = 66
241
baritone saxophone
violin
viola
contrabass
Piano
percussion
electronics
ff mf < f+ ff
f
f+
5:4
3:2
(rhythm notated spatially)
mp
VIBES
(rhythm notated spatially)
mp
at this point, the fundamental pitch (previously D) begins slowly rising, reaching E-flat on the downbeat of m. 31


244
bs
vln
vla
cb
Pno.
pc
5:4
3:2
mf
f
ff
f+

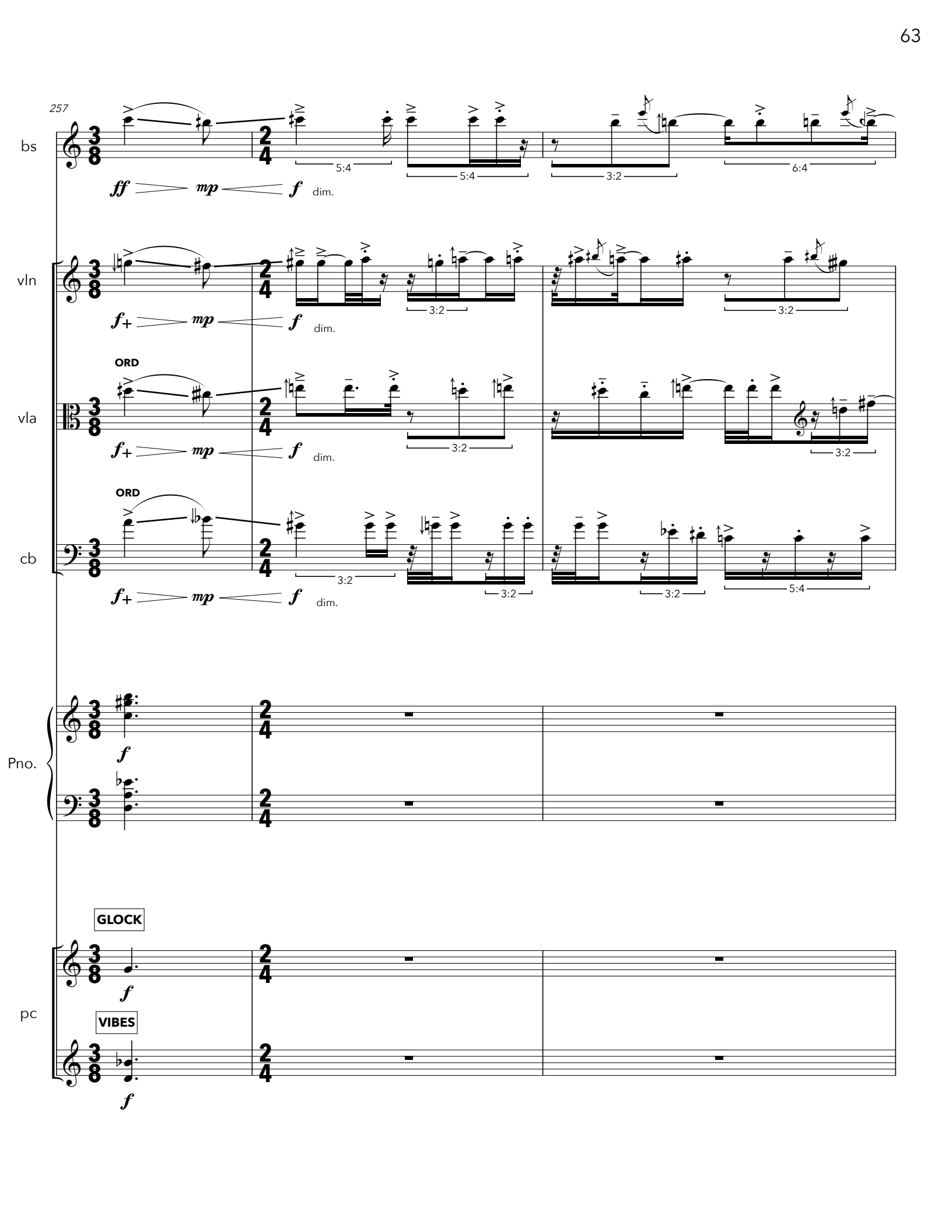

247
bs
vln
vla
cb
Pno.
pc
PST
ORD
SP
MSP
6:4
5:4
3:2
mf+
f
mf
mp
ff

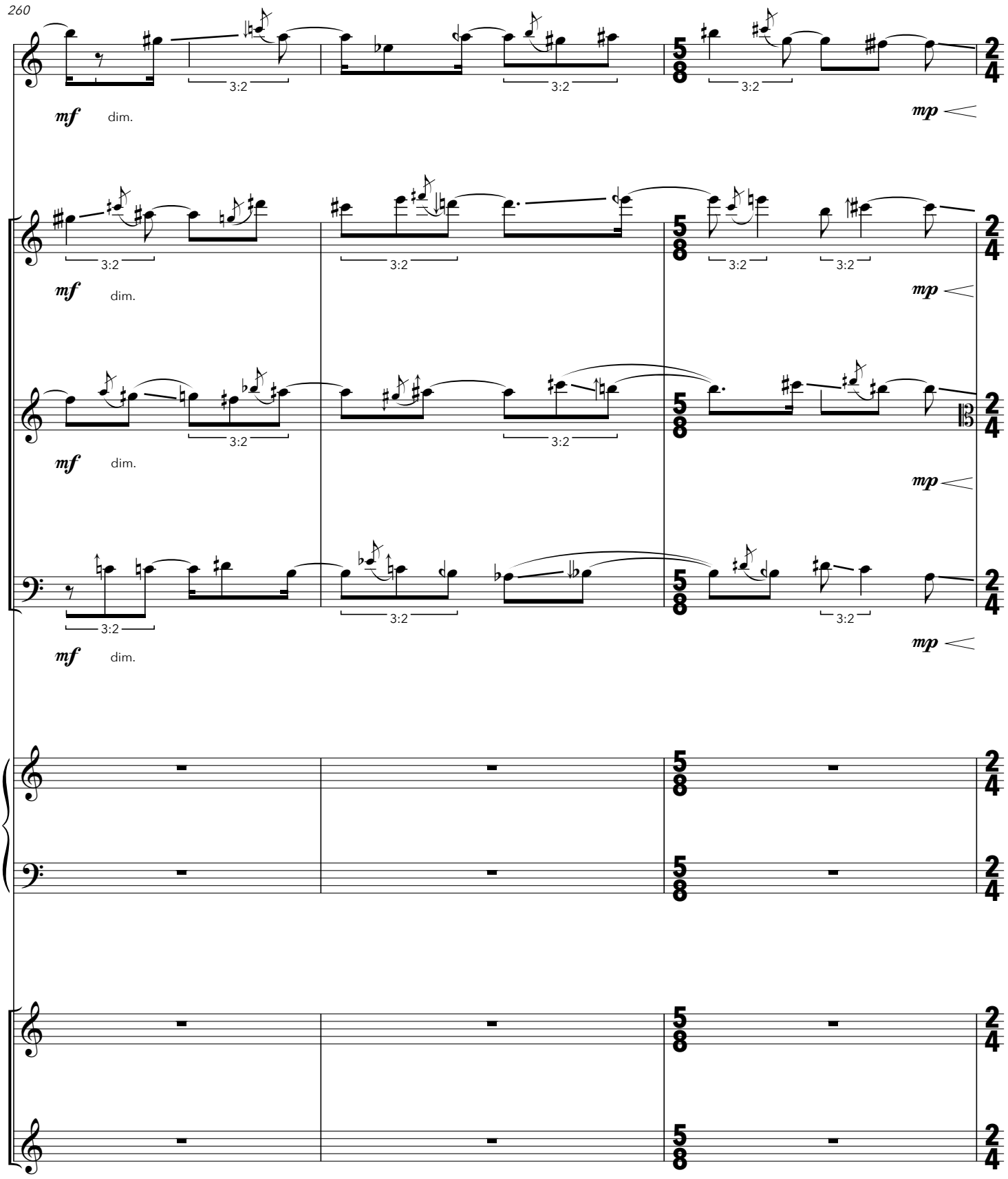

250
bs
vln
vla
cb
Pno.
pc
ORD
ST
PST
pizz.
arco
(PST)
PSP
3:2
5:4
mp+
mf+
mf
f
p

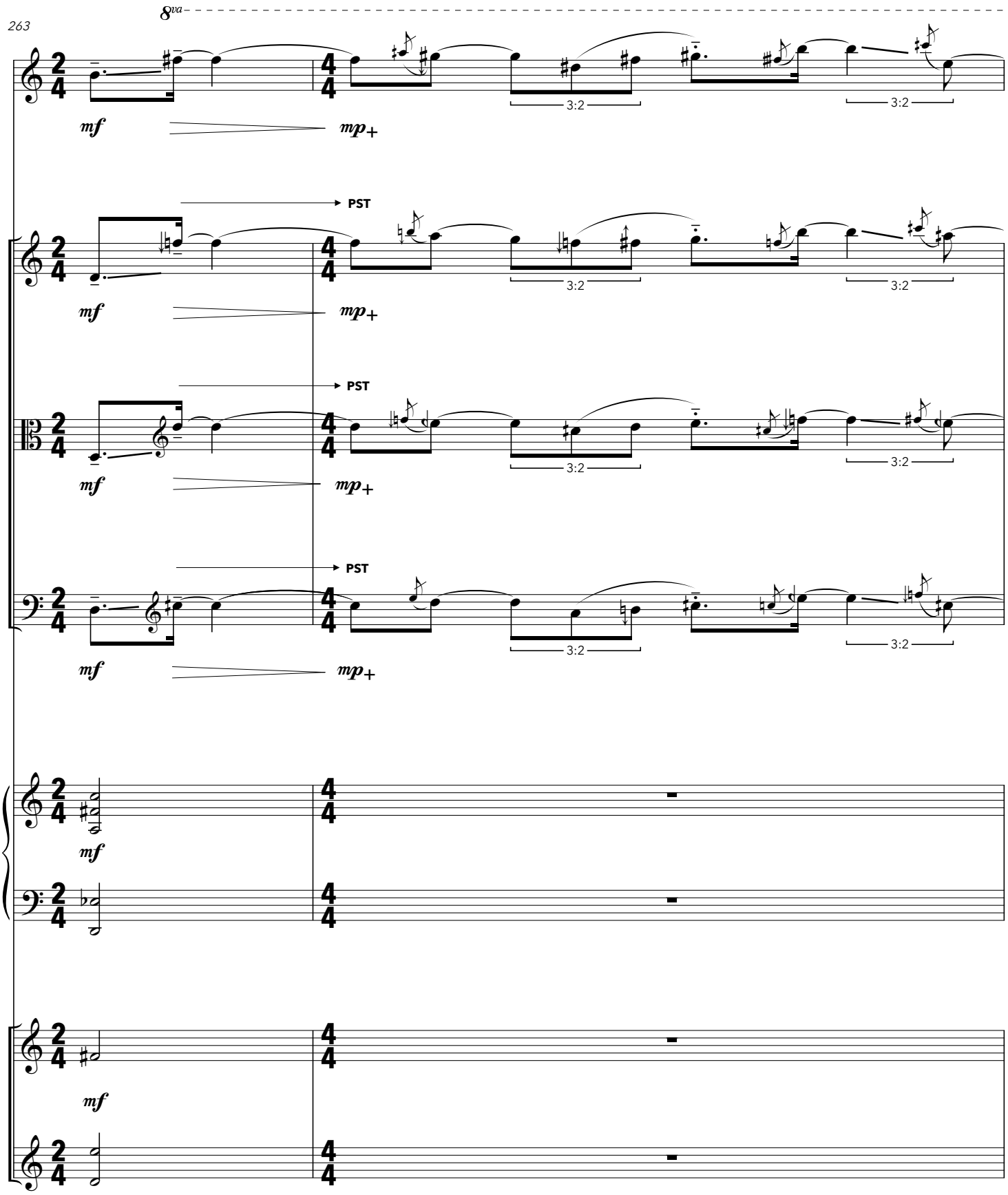

252
bs
vln
vla
cb
Pno.
pc
ORD
ST
PST
5:4
3:2
mf
f+
f
mf+
7
16

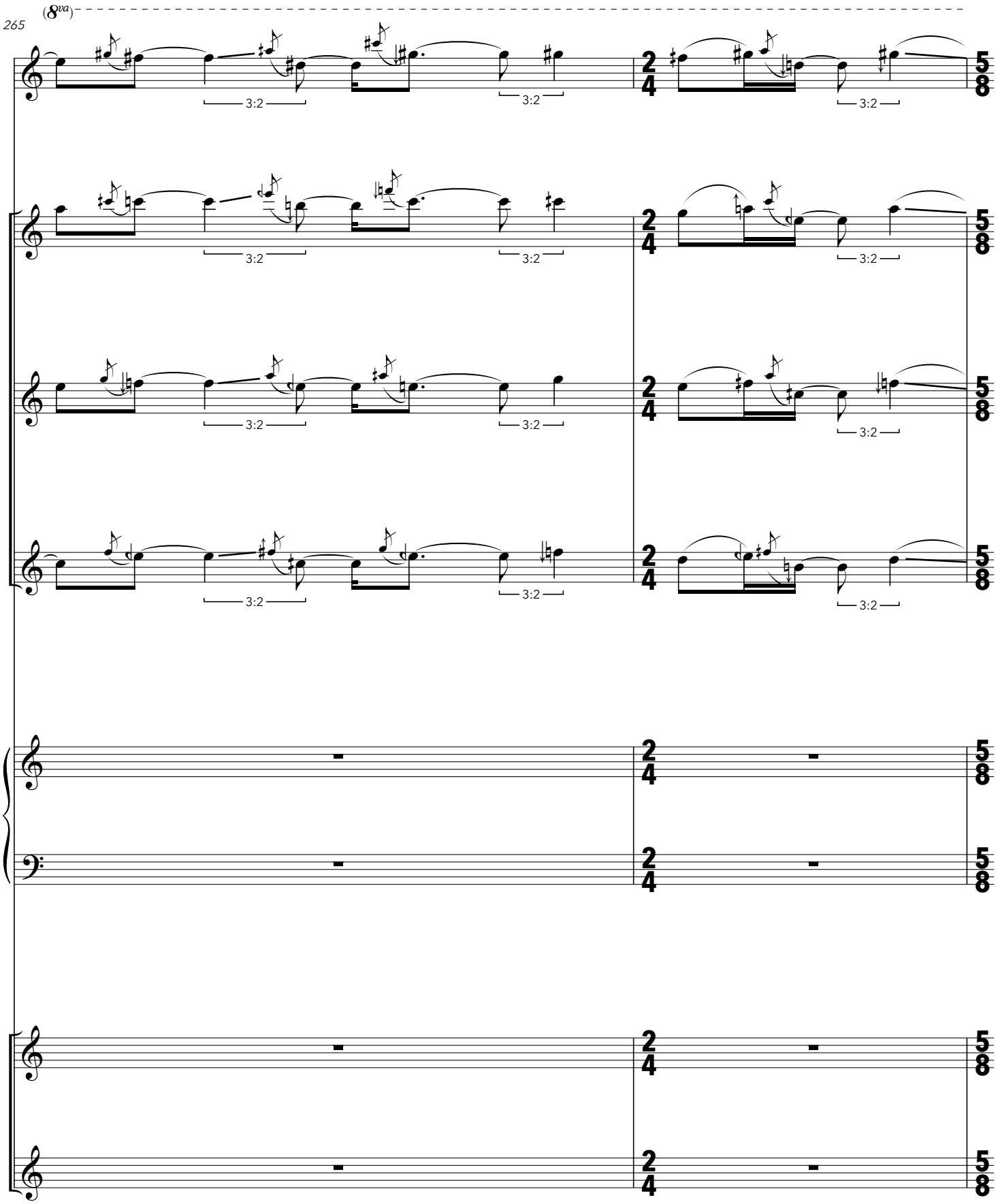


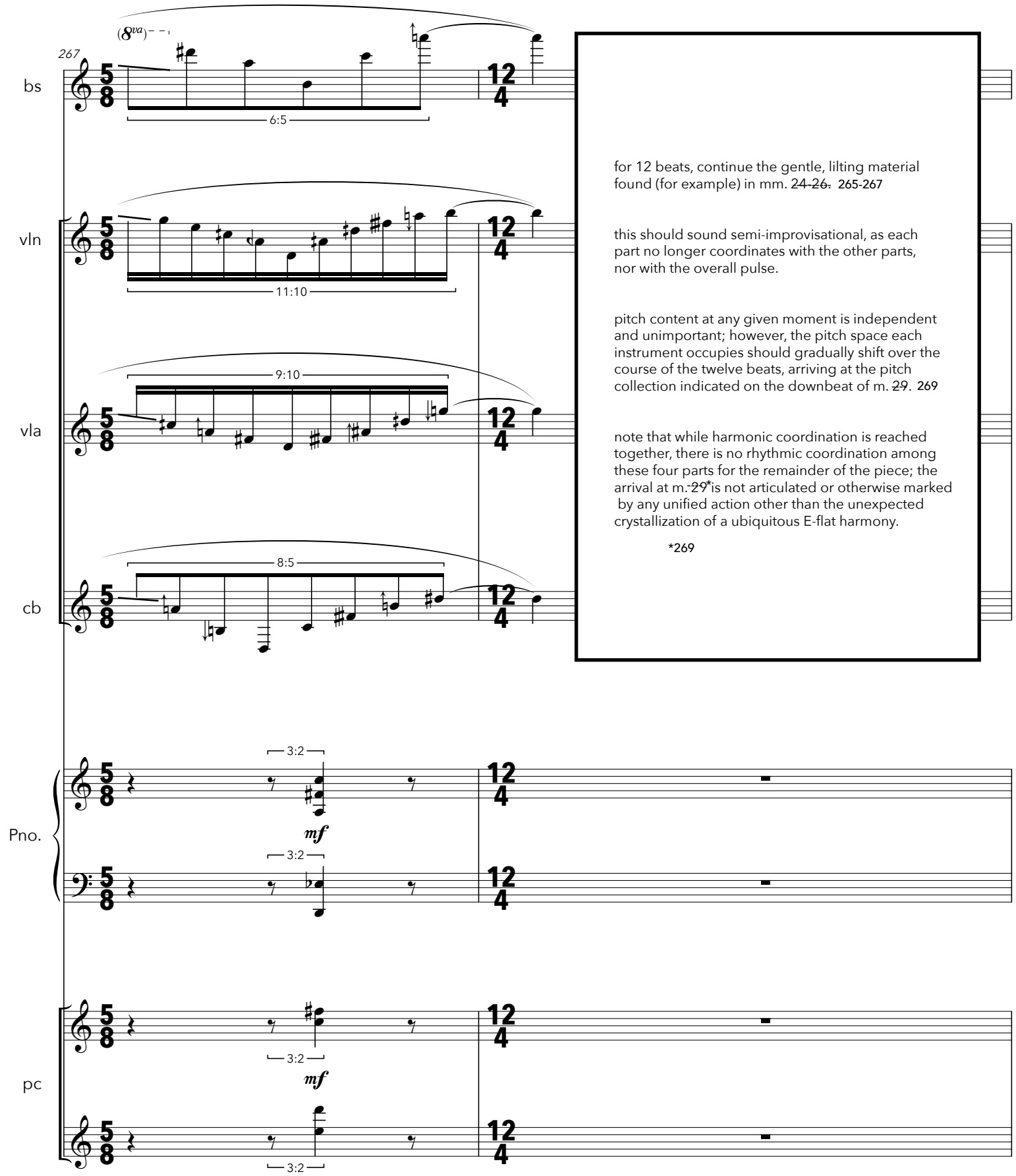
**) glissando as far as reasonably possible - no need to travel the whole distance, but cover as much as you can before leaping to destination pitch


257
bs
vln
vla
cb
Pno.
pc
ff
mp
f
dim.
f+
ORD
5:4
3:2
6:4
GLOCK
VIBES


260
bs
vln
vla
cb
Pno.
pc
mf
dim.
mp
3:2
5/8
2/4


263
8va
bs
vln
vla
cb
Pno.
pc
mf
mp+
PST
3:2


(8va)
265
bs
vln
vla
cb
Pno.
pc
3:2
2
4
5
8



for 12 beats, continue the gentle, lilting material found (for example) in mm. ~~24-26.~~ 265-267

this should sound semi-improvisational, as each part no longer coordinates with the other parts, nor with the overall pulse.

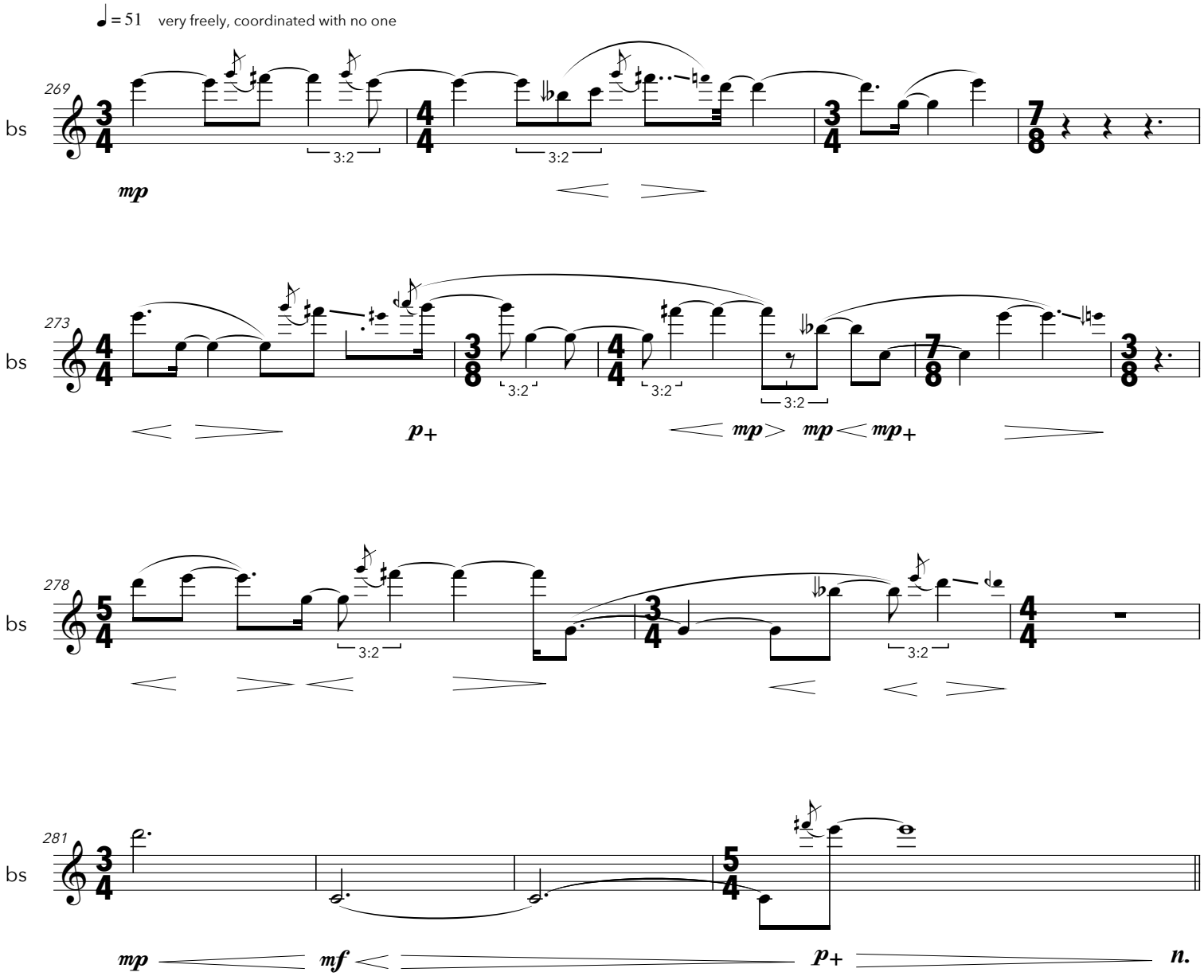
pitch content at any given moment is independent and unimportant; however, the pitch space each instrument occupies should gradually shift over the course of the twelve beats, arriving at the pitch collection indicated on the downbeat of m. ~~29~~. 269

note that while harmonic coordination is reached together, there is no rhythmic coordination among these four parts for the remainder of the piece; the arrival at m. ~~29~~*is not articulated or otherwise marked by any unified action other than the unexpected crystallization of a ubiquitous E-flat harmony.

*269

baritone saxophone: measure ~~29~~* to end of piece

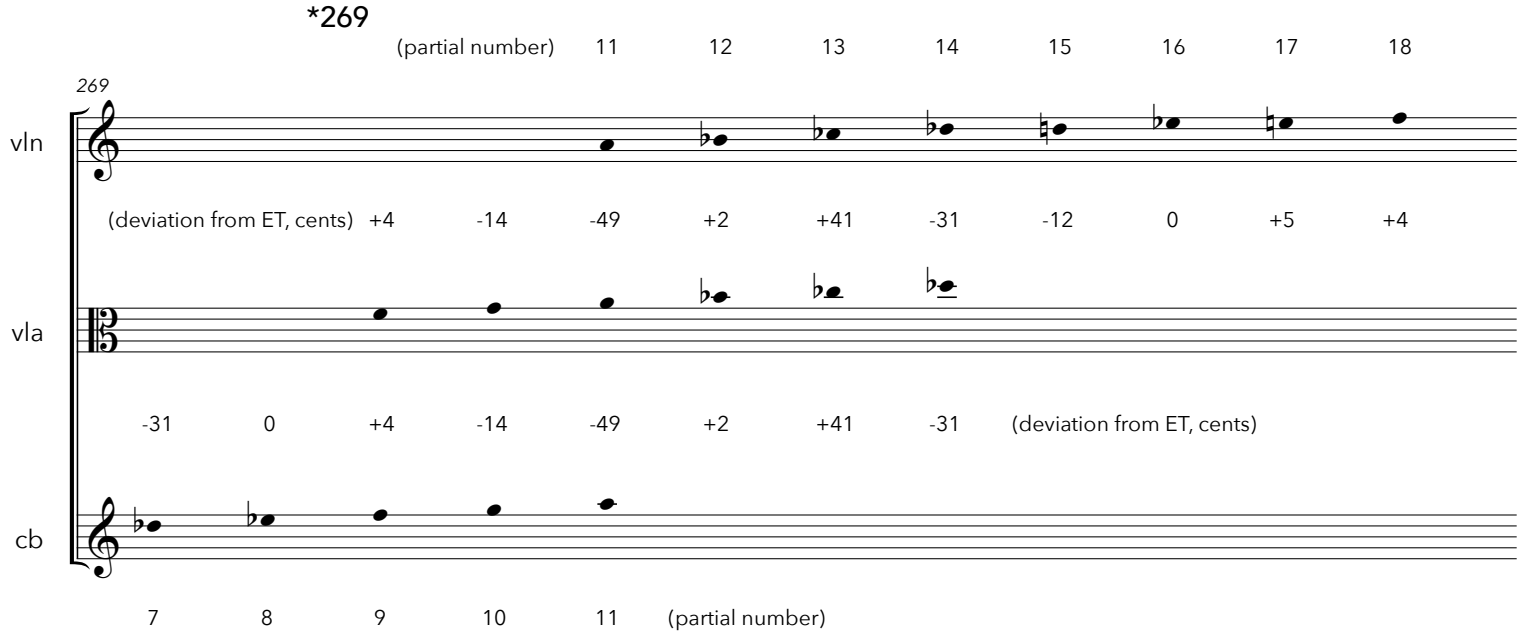
*269



After completing m. ~~44~~*, slowly and gently set down your instrument, then walk to windchime 3.

284*

strings: measure ~~29~~* to end of piece



269

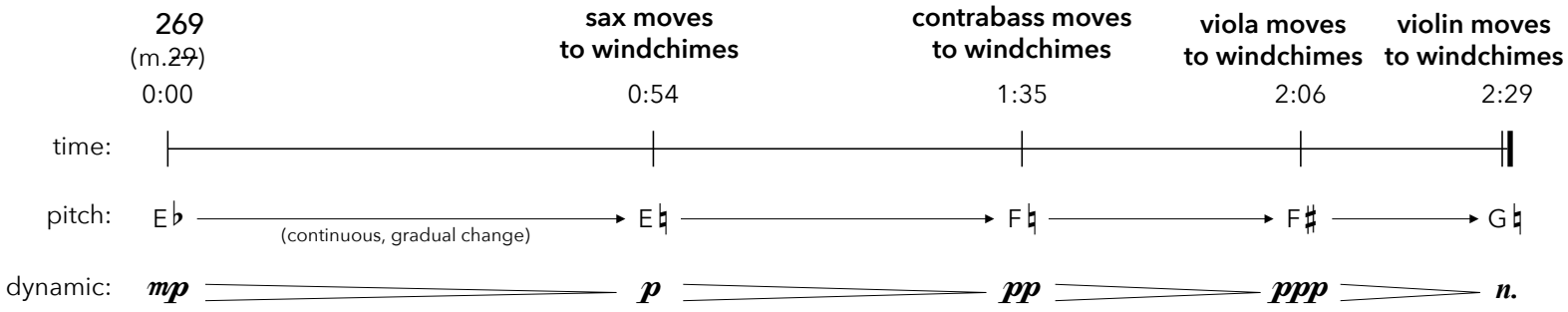
At the downbeat of m. ~~29~~, **continue improvising on the previous lilting melodic material**, restricting yourself (with the excpetion of narrow, brief glissandi such as can be found in the written material earlier) to your indicated pitch collection, consisting of 5-8 partials of the harmonic series of E-flat 1. There should be no audible change in technique or playing style upon the arrival at m. ~~29~~; we've simply slipped, slowly and without notice into a unified harmonic spectrum.

269

At this point, the electronics will continue rising in pitch very slowly. Your pitch collection is not stable over time, but should rise in synchronicity with the electronics and each other (detailed below), such that you are always playing (or moving between) carefully tuned partials of the current fundamental pitch.

Play until roughly the point indicated below in the timeline, then gently and quietly set your instrument down and walk to your windchime setup. Start turning the crank, gradually filling the room with sparkling sound.

timeline of rising fundamental pitch



be created or - **end notes**

saxophone, contrabass, viola, violin:
Once you arrive at your windchime, begin gently turning the crank to create a relatively continuous but rhythmically random chime. Let the gentle sonic character of the moment inform your body language - remain poised and reserved, with a delicate intentionality to every movement. Continue cranking until ~30 seconds after the concluding piano/percussion gesture (detailed below), fading to silence as the chimes gradually come to a natural silence. (NOTE: the 30-second timeframe can and should be extended if the room/"vibe" allows. Beyond being sure that the chiming does not end prematurely, allow the performance to tell you the correct length of time to live in this final sonic environment)

piano, percussion:
Once all chimes are active and a relative stasis of texture has been achieved, perform the following, in order:

1. Tacet 15 seconds
2. A single *mezzo-piano* unison bell tone: on the piano, the lowest D-flat; in the percussion, the two chimes tuned to the 11th and 22nd partials of this D-flat
3. Let the resonance of #2 *almost* fade to nothing, then
4. Repeat #2, slightly softer than the first.