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Review of *Swinglines: Rhythm, Timing, and Polymeter in Musical Phrasing*, by Fernando Benadon (Oxford University Press, 2024)

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[1] Fernando Benadon's *Swinglines: Rhythm, Timing, and Polymeter in Musical Phrasing* is in many ways the culmination of nearly twenty years of research by one of the field's most restless writers on musical time. Over the course of his academic career, Benadon has written extensively on aspects of swing, microtiming, metric perception, phrasing, and more.(1) His work frequently puts into dialogue quantitative and qualitative perspectives on musical time in ways that are imaginative yet grounded, rigorous yet approachable. This new book continues in the same vein, compiling dozens of in-depth analyses of recorded performances in order to explore the many ways that rhythms can flow outside of a strict, isochronous grid.

[2] Although Benadon's previous work helped set the trajectory for this new tome, *Swinglines* is not merely a rehashing of existing theories; instead, the author advances several compelling new arguments. Central to these arguments is the idea that "rhythms traditionally framed as 'deviations' have their own identities" (2). For Benadon, the traditional frameworks through which such rhythms are viewed in Western music theory are flawed. "Gridded time" is not a universal by which all rhythms must be measured but rather a subset of the possible ways of structuring and perceiving musical time. Similarly, theorizations of so-called "expressive timing," wherein the actual onsets in a musical utterance are understood to fall before or after an expected, prototypical metric position, are seen by Benadon as a product of music theory's overreliance on isochrony. In response, Benadon advocates for a new approach: generalizing the concept of swing. He asks readers to "experience what it is like to forget the metric hierarchy and instead approach rhythms, even gridded ones, through swing rather than by pointing to where they sit on the isochrony scale" (4).

[3] The book consists of an introduction, ten chapters, and two appendices. It is organized into roughly two halves and a postlude. The introduction and Chapter 1 lay out the core problems the book seeks to tackle and introduce large-scale solutions in the form of "swing theory." Chapters 2 through 5 add nuance to those solutions, focusing on goal-oriented rhythms, vocal phrasing, and

tuplets. Chapter 6 introduces the concept of "onset space," a geometrical space used to visualize a variety of rhythmic, metric, and polymetric relations. The second half of the book then presents and develops a variety of mathematical models revolving around onset space, along with a handful of related tools (discussed in more detail below). Chapter 10 serves as a kind of postlude, reflecting on the relations between music theory, analysis, technology, and the perception and measurement of musical time.

[4] The core claim of *Swinglines* is that there exist many rhythms that do not rely on, and therefore cannot be measured by, an underlying metric grid. **Example 1** shows Benadon's depiction of "the metric model" that he argues is entrenched in most of Western music theory. In this conception, all rhythmic events are considered proximate to a metric position at some level of the metric hierarchy. "If you sing a note and find you cannot pin it to one layer," Benadon writes, "try the one below. You may have to go as low as thirty-second-notes or even resort to borrowing ternary division, but eventually your note will land on a safety net" (4). He argues that the metric model is flawed, however, because rhythms that do not fit neatly into the grid must nonetheless be forced into its framework. In a pervasive refrain echoing through the book's many analyses, Benadon further warns against the "useful yet maddeningly corrupting" (7) precision supplied by music notation.(2)

[5] To combat both the overly strict metric model and the misleading nature of notation, Benadon devises a new set of concepts, methods, and terminologies under the banner of "swing theory." **Example 2** depicts the starting point for Benadon's conceptualization of non-gridded rhythms by showing a variety of long-short (LS) subdivisions of a single beat. These and similar "swing ratios"(3) are used to explain many non-isochronous relationships between subdivisions, where the timing between notes at one level of the metric hierarchy changes across a single phrase.

[6] Benadon uses these uneven subdivisions as a springboard for the novel claim that we should "induct specific swing ratios into the standard note-value repertory" (9). Under this framework, both the long (L) and short (S) subdivisions of a given swing ratio may individually be treated as their own distinct note values.

[7] **Example 3** depicts relations between Benadon's new duration values and traditional ones.(4) This graphic can be quite difficult to sift through and therefore requires some explanation. The bottom row features mostly familiar durations, with the eighth note in the middle serving as the main reference point, increasingly longer durations (the quarter-note triplet and dotted eighth note) to the right, and decreasingly shorter durations (eighth-note quintuplets, dotted sixteenth notes, eighth-note triplets, and sixteenth notes) to the left.(5) All arcs in the figure represent 1.22 ratios (roughly equivalent to 55/45) where the shorter duration is 1:1.22 shorter than the longer duration. The 1.22 ratio is used as a reference point because of its widespread use in many musics; replacing 1.22 with other ratios would produce different values that would be plotted elsewhere along the non-discrete continuum represented in the figure.(6) Basic swung eighth notes are shown directly above the bottom line; this rhythm, a two-onset LS (long-short), shows two eighth notes that unevenly divide a quarter note, where the long (L) duration is 1.22 longer than the short (S) duration. The L and S durations may each be considered note values distinct from the isochronous eighth note in the bottom row. The durations of these values can be compared to the traditional durations in the bottom row via the horizontal axis. For example, the S of the two-onset LS is shorter than an eighth note but longer than the new pS value, while the L of the two-onset LS is longer than the eighth note, but shorter than the new pL value.

[8] These new values, pulse short (pS) and pulse long (pL), respectively, are named "pulse" values because they do not typically appear in long-short alternations, although Benadon argues that they are common values in their own right. As shown by the arcs connecting them to the central eighth note value, pL is 1.22 longer than an eighth note, while pS is 1.22 shorter than an eighth note. They are therefore related to the eighth note in the same way that other swung durations are related to each other. The other values in the upper rows of the figure that are joined by arcs describe other uneven groupings of long, short, and medium durations. As before, individual values can be compared to more familiar durations in the bottom row. For example, the S of the three-onset LMS (long-medium-short) is longer than a sixteenth note, but shorter than the S of the three-onset LSS

(long-short-short) rhythm.[7] The "dot LS" values at the top of the example subdivide a dotted eighth note instead of a quarter note.

[9] These new values are particularly well-suited to examining variation in timing across a phrase, as in Benadon's analysis of clarinetist Anat Cohen's performance of "La Vie en Rose" (**Example 4**). What might be most simply transcribed as a run of sixteenth notes (as notated at the top of the example) is rendered instead as a more dynamic series of durations. The values beneath the score are arranged from longer (higher up in the example) to shorter (lower down in the example) durations, ranging from 350 ms down to 50 ms. The grey bars show distinct note values, with pL at the top, isochronous sixteenth notes in the middle, and pS at the bottom. The black dots plot the durations of each note of the transcription, with some falling in the range of pL, the sixteenth note, and pS, as well as others falling in between these values. Curved lines connect the notes within each beat and are meant to illustrate the sense of motion as durations change.[8] Benadon attributes the term "swinglines," used in the book's title, in part to the curved lines that represent timing variation in this and other examples (8). The dotted line that runs alongside the plotted durations shows how far behind Cohen's notes are from the rhythm section's groove at any given time. At the beginning of the phrase, she enters only about 50 ms behind the band, but by the third quarter note she is much further behind them. The fluctuating durations of her melodic line therefore impact how far behind the groove her sixteenth notes are at any given moment.

[10] As the preceding explanations of Examples 3 and 4 might suggest, many of the figures and theoretical/analytical accounts in *Swinglines* are complex and time-consuming to engage with, and information is presented in an enormous variety of ways. In scanning through the book, readers will find dozens of analytical figures, each one seemingly using different means of representation. The subject matter of the book is often abstract, and the temporal nature of the analyses requires readers to thoroughly familiarize themselves with each musical example. Although Benadon does an admirable job of guiding readers through the thicket, readers will need to lavish time and attention on each figure to work their way through the dense (if precise and thorough) explanations of each analysis. While I have no doubt that dedicated readers will be rewarded with rich and compelling insights, I cannot shake the feeling that many of the analyses throughout the book could have been represented in a simpler, more accessible, and more consistent way.

[11] Among the more significant contributions of Benadon's theory is its generalization of uneven two-onset subdivisions to three- and four-onset subdivisions, each defined in part by their "spread," the ratio between the shortest and longest durations in the rhythm.[9] When these onset groupings occur with a particular spread—between 1.22 and 1.5 (≅1.222) for three-onset rhythms, or between 1.22 and 1.83 (≅1.223) for four-onset rhythms—they exhibit what Benadon terms "superswing." Just as two eighth notes that unevenly subdivide a quarter note can be said to be swung, uneven subdivisions of a single duration into three or four smaller durations can be said to be superswung.[10] Benadon applies the swing and superswing ratios developed in Chapter 1 to the analysis of musical phrasing over subsequent chapters. Chapter 2 focuses on goal-directed rhythms, showing how durational ratios vary as phrases approach a downbeat, and Chapter 3 focuses on the ways in which singers navigate phrasing, particularly when the presence of words inflects timing. Chapter 4 focuses on the often-close relationship between swing/superswing rhythms and tuplets, as signaled by the proximity of several of the new values in Example 3 to the more familiar triplet and quintuplet rhythms on the bottom row.[11] Chapter 5 examines how all of these ideas combine in several case studies.

[12] This ambitious project to generalize swing is not without problems. One such problem has to do with the term itself: Although "swing" is sometimes used to refer abstractly to uneven durations or non-isochronous subdivisions, both the term and many of its specific conceptual entailments as they appear in most Western music-theoretical discourse are derived from the concept as it is known in jazz. By using swing as the foundation of a wider theory of durational relationships, Benadon is able to gradually introduce readers to analyses that might be difficult to conceptualize were it not for careful scaffolding. The danger in doing so, however, is that the cultural and aesthetic properties of swing that generate meaning for most jazz musicians and listeners are necessarily stripped away, and any parallel but distinct conceptions of non-isochrony that exist in other musical (sub)cultures are ignored.[12] Benadon guards against this criticism at

the book's outset, writing: "whenever the term swing appears in the coming pages, it will denote a quantitative rather than a qualitative sense. This book . . . is not a treatise on musical 'feel' nor does it seek to understand how insiders conceptualize the essence of their music" (3). Bracketing the qualitative in order to deal with the quantitative may be methodologically justifiable in some cases, but I would argue that when the qualitative elements of swing are set aside, what is left are merely raw ratios based on onset timing data—timing data that, when interpreted in actual listening contexts, is unavoidably interpreted in subjective and culturally mediated ways. Because of this, there is arguably no such thing as independently quantitative swing. By reifying "swing" as a generalizable concept, non-jazz musics may potentially be understood to "swing" in a way comparable to jazz; however, this is a misleading characterization that fails to capture the specific and localized ways that enculturated practitioners and audiences make sense of the musical cultures and traditions in which they participate.(13)

[13] Chapter 6 commences the second half of the book with an orientation toward geometric representations of swing and superswing rhythms, primarily in the form of onset space. The most prominent of these models is three-onset space, which maps relationships among the inner ratios of three-onset rhythms. Ratios in three-onset space are expressed using strings of integers: for example, an LSL rhythm such as "quarter note–eighth note–quarter note" (totaling five eighth notes) would be expressed as 212 (shortened from 2:1:2), while an MSL rhythm such as "quarter note–eighth note–dotted quarter note" (totaling six eighth notes) would be expressed as 213. **Example 5** reproduces Benadon's introductory renderings of this triangular space.(14) The space visualizes distance from isochrony in two dimensions for any given three-onset rhythm; the center of the triangle in both graphs represents perfect isochrony, the point at which all three integers are equal (e.g., 222, 333, 444, etc.).(15) The axes in the left graph of Example 5 show where in the space rhythms with only two different durations (long and short, no medium) fall. Onset space is typically displayed using rhythms with shared cardinality.(16) The right graph of Example 5 shows where various rhythms of cardinality 7 appear in the space. The overlapping triangles connecting points show how rotations of the durations in a three-onset rhythm (421, 214, and 142 for the solid-line triangle, and 241, 124, and 412 for the dashed-line triangle) create groups of three rhythms that are themselves equilateral triangles; changing the ordering of these rhythms (e.g., swapping 2 and 4 between rhythms 124 and 142, as shown in the figure) rotates these triangles within the space.

[14] A special region of onset space defined by the superswing ranges referenced above and which form a hexagonal band within onset space, is referred to as the "superswing hexagon," shown in **Example 6**. Rhythms that are plotted within this hexagonal band are superswung. **Example 7** displays Benadon's depiction of how the superswing ratio spread, from 1.22 to 1.5, carves out the superswing hexagon from onset space. Onset space is used primarily to show how close to isochrony rhythms are and whether and to what extent rhythms are superswung.

[15] As Benadon offers relatively limited guidance as to how to assemble and navigate onset spaces, I have developed some of my own figures.(17) **Example 8** shows four of my own diagrams of onset space that are designed to demonstrate how rhythms are plotted in the space. As before, the open circle in each example indicates perfect isochrony in the center of the space. Each edge of the three-onset space triangle is a sliding scale for two of the three integers in the ratio. The onset spaces shown in Example 6 are derived from a set of ratios that add up to a cardinality of six, with the ratio 222 (perfect isochrony) plotted on the upper left graph, 231 plotted in the upper right graph, 321 plotted on the lower left graph, and 411 plotted on the lower right graph. Note how each point is plotted at the intersection of three different lines, each drawn from one edge of the triangle to another. The green line connects the right and bottom edges and represents the duration between the first and second onsets; the blue line connects the left and right edges and represents the duration between the second and third onsets; the red line connects the left and bottom edges and represents the duration between the third onset and the end of the rhythm.(18) If the three integers do not add up to the cardinality of the space, the three lines will not intersect at a single point. In Example 6, 231 and 321 are the same distance from the isochronous center in different directions because they involve the same durations in different orderings. Conversely, 411 is farther from the center than 231 and 321, reflecting the fact that 411 is less isochronous than 231 or 321.

[16] Even once readers become familiar with how onset space works, the way rhythms are plotted in the space remains quite abstract. While there are insights to be gained from plotting rhythms in three- and four-onset spaces (the latter involving three-dimensional modeling), I found these spaces rather unintuitive to read and disconnected from the embodied, temporal way that rhythm is perceived. Benadon's efforts represent a laudable attempt to move beyond standard Western music notation, but I frequently found myself wishing that rhythms would be more simply and intuitively depicted in a way that reflected movement through time, whether through standard notation or other means.(19)

[17] Consider, for example, Benadon's analysis of two performances of Duke Ellington's "It Don't Mean a Thing (If It Ain't Got That Swing)," one from Ellington's original recording (**Example 9**) and the other from a recording by Thelonious Monk (**Example 10**). In each analysis, the rhythm from the tune's memorable tag is segmented into groups of four notes, creating three-onset MLS rhythms. Benadon then plots these ratios in onset space. (Note that in both Examples 9 and 10, although the triangular three-onset space from Example 5 should be understood as implicitly in the background beneath the superswing hexagon, for simplicity's sake only the hexagon is shown.) In Ellington's rendition (Example 9), the rhythms all fall outside the superswing hexagon (but still cluster together in onset space),(20) while in Monk's rendition (Example 10), the majority of rhythms fall within or move through the superswing hexagon. The main takeaway here is that the kinds of swing we find in the two versions differ from one another: Monk's performance is mostly superswung while Ellington's is not, and Monk's swing tends more toward isochrony than that of Ellington's band, as shown by the fact that the plotted rhythms lie closer to the isochronous center of the graph in Example 10 than they do in Example 9. The geometric representations add some helpful nuance to this conclusion, but this nuance could also be communicated without the geometric model, through a simpler comparison of the ratios involved or perhaps through a dynamic swingline graph such as that shown in Example 4.(21) Here, then, as before, I feel that the insights gained from onset-space diagrams does not necessarily justify the effort required to navigate the geometric spaces invoked, especially in cases where the plotted rhythms are scattered widely across the space. In order not to get bogged down in the abstraction of onset space, readers may find it useful to focus on the two primary insights that onset space visualizes: (1) how far away rhythms are from being isochronous and (2) whether and to what extent rhythms are superswung.

[18] Although onset spaces continue to be explored throughout the second half of the book, Benadon also develops a handful of other tools and terminologies. Chapter 7 is focused on "analogues," rhythms that feature similar distributions of ordered durations in a given time span, and "hybrids," which are blends of multiple analogues. To better understand these terms, consider the two rhythms shown in **Example 11**, which represent Benadon's alternate hearings of the ostinato in "Mano Dayak," by the Tuareg band Tinariwen. These two rhythms are analogues of one another due to their four onsets being distributed in similar ways within their respective meters. Because Tinariwen emphasize different metric possibilities at different points in the recording, the continuously repeating ostinato from "Mano Dayak" may be heard as the top rhythm (in $\frac{7}{8}$), the bottom rhythm (in $\frac{3}{4}$), or a hybrid of the two that does not fit neatly into an isochronous metric framework. Analogues and hybrids therefore help to explain how non-gridded, ambiguous rhythms might afford multiple gridded interpretations and how that ambiguity can be exploited to transform one rhythm into another.(22) Benadon notes that analogues tend to cluster together in onset space, but does not otherwise rely extensively on onset-space methodology in his analyses of them. Nevertheless, these complementary concepts are highly flexible and adaptable, and therefore have much potential for broader application.

[19] Chapter 8 theorizes polymeter through the use of "attack matrices,"(23) which summarize the metric positions of onsets when one metric framework is laid over another. **Example 12** shows one such interaction, a repeating 23 pattern against a $\frac{1}{4}$ meter, comprising two complete cycles before the repeat sign loops the pattern. **Example 13** shows the attack matrix for this interaction. The left column lists the durations of each onset: the first onset lasts for two eighth notes, the second for three eighth notes. The middle column shows the metric position of each onset in the first cycle. Because the 23 rhythm subdivides at an eighth-note level, the $\frac{1}{4}$ meter is likewise subdivided by the eighth note into two possible metric positions, 0 (downbeat) and 1 (upbeat). (Other combinations of

meter and subdivisions result in larger numbers of possible metric positions.) In the first cycle, both the first and second onsets fall on downbeats, and so are listed as 0 in the middle column. In the second cycle, both the first and second onsets fall on upbeats, and thus both are listed as 1 in the right column.

[20] The use of these matrices to analyze *tihais*, cadential formulas commonly found in Hindustani music, results in some especially rich analyses that show how repeating polymetric interactions result in shifting accent patterns. Consider, for example, Benadon's analysis of a *tihai* from a tabla solo by Zakir Hussain, shown in **Example 14**. Like all *tihais*, this excerpt features three iterations of a similar rhythm leading up to the *sam* (the downbeat). The accent patterns within each iteration outline a larger pattern of 232 at the sixteenth-note level; the start of each iteration is marked with an open bracket atop the transcription in Example 14. The attack matrix shows a complete cycle, with four cycles being necessary to loop back to the starting point, so the matrix features four columns despite the cycle only occurring three times. Only part of this matrix is therefore relevant to the analysis; the third column, italicized, does not actually appear as part of the *tihai*. To read through the matrix, begin at the bolded **1** and move down through the columns, moving through the columns left to right and cycling back to the first column when the end of the fourth column is reached; the resulting onset position values read as follows: [Column 4] **1**, 3, 2, [Column 1] 0, 2, 1, [Column 2] 3, 1, 0. The bolded **1** in the *fourth* column shows the beginning of the cycle (the first bracket in the example; keep in mind that 0 is the initial downbeat and the matrix features sixteenth-note subdivisions), while the 0 at the bottom of column 2 shows the *sam* where the cycle ends. Note how the values drop by 1 in each column, a result of the 7-against-8 cross-rhythm the *tihai* generates.(24) Benadon highlights the fact that none of the columns feature duplicate values, indicating that "each cycle saturates the beat" (207). He argues that this saturation, combined with the complexity of the shifting values detailed in the attack matrix, is partly responsible for the rhythmic interest that makes *tihais* an appreciated aspect of Hindustani vocal and instrumental music.

[21] Chapter 9 expands on the polymetric view developed in Chapter 8 by considering how accent patterns flow in contrapuntal relationships to the meters that underlie them.(25) Taken together, these two chapters present a substantial trove of foundational ideas from which future theories of rhythm might spring. Unlike the first half of the book, however, the second half of *Swinglines* lacks a clear throughline holding its chapters together, and the result can feel a bit like a grab bag of interesting—but somewhat underdeveloped—ideas whose relations to the book's overarching themes and arguments are tenuous.

[22] The tremendous variety of music featured throughout *Swinglines* is among the chief strengths of the book. The recordings examined span an impressively wide range of styles, including jazz, hip hop, funk, pop, rock, R&B, European concert music, Afro-Cuban batá drumming, Hindustani music, Tuareg music, Afghani folksong, and much more. It should come as no surprise, then, that artists from a wide variety of racial, ethnic, and national backgrounds are represented throughout the book.(26) Although Benadon does not explicitly draw attention to the ways in which the book's orientation might help to answer ongoing calls in the field for diversifying the repertoire with which music theorists engage, *Swinglines* offers a good example of a polystylistic approach to repertoire. Beyond the benefits of this approach from the standpoint of representation and equity, the book's diversity of examples also helps to highlight the broad scope of its theoretical premises, as well as to illuminate sometimes surprising commonalities among rhythmic conceptions across musical styles and cultures.(27) Extensive transcription work was necessary to convey much of the recorded music, and Benadon's transcriptions are invariably clear and accurate to my own hearings of the performances. He responsibly emphasizes the subjectivity inherent in the transcription process and frequently presents alternate renderings of passages to highlight notation's inability to fully capture the nuances of timing.(28) Because the book deals primarily with the analysis of performances, rather than of compositions, access to the recordings of those performances is crucial. Thankfully, these recordings are all available via an easy-to-use, author-hosted companion website.(29) It will be important for this resource to be well-maintained moving forward, as readers attempting to navigate the book without access to the recordings will quickly find themselves almost entirely at a loss.

[23] While the book's inclusion of a great variety of music is laudable, there is a complicating factor: the lack of emic perspectives in the many analyses of non-Western musics. Benadon acknowledges this dilemma somewhat, writing that "it may seem disingenuous to label durations with invented terms not found in the parlance of musicians" (28), but asserts that this disadvantage is outweighed by having a larger repertory of terms to describe what musicians are doing. This sentiment ignores the fact that these new terms may fail to capture the ways in which insider musicians and audiences might conceptualize the rhythms being sounded. An example of this problem may be found in Benadon's discussion of Moroccan *houariyat* songs in Chapter 7. His analysis of a small corpus of songs from this tradition is, on the one hand, detailed and nuanced, exploring several possible ways of hearing $\frac{7}{8}$ metric cycles and their transformations into $\frac{10}{8}$ analogues. Yet on the other hand, despite taking pains to meticulously plot the millisecond durations of drum rhythms and examine the inner ratios of the superswing rhythms they combine to form, there is no discussion of how musicians well-versed in this tradition might themselves conceptualize these striking metric transformations. With so many musical traditions represented in the pages of *Swinglines*, it is perhaps unreasonable to expect Benadon to engage extensively with the full range of cultural and aesthetic contexts in which these musics are situated.(30) At the very least, though, more explicit discussion of these limitations, as well as greater clarity around Benadon's own positionality, would help to shed light on the often etic nature of Benadon's theories and how that etic perspective might conflict with, intersect with, or even enrich more emic perspectives.

[24] In summary, *Swinglines* is an ambitious effort and a significant achievement in the field of rhythm and meter. It is a book packed with bold, creative ideas that asks readers to question their deeply held assumptions about musical time. Benadon offers a thoughtful critique of existing approaches to rhythm, meter, and microtiming, a generous toolbox of modifiable and extensible analytic frameworks, and a wealth of thoughtful, detailed analyses. While readers who are looking for a straightforward overview and theorization of swing and microtiming may find themselves overwhelmed at times by the immense amount of densely presented information, those looking for fertile new ideas to develop will find Benadon's path-breaking work to be an exciting foundation on which to build. It is my hope that readers will take up some of the many nascent ideas that Benadon introduces and use them to further investigate the boundaries of metered time.

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Footnotes

1. *Swinglines* builds especially on several of Benadon’s earlier works (2006; 2009a; 2009b).
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2. Throughout *Swinglines*, Western notation is sometimes conflated with the metric model. While the historical and theoretical relationship between notation and meter is indeed a complex and thorny issue, more clarity on the nature of this relationship would help to tease apart exactly how metric misconceptions take root.
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3. For other writings that refer to swing ratios, see Ellis 1991, Friberg 2002, Butterfield 2006, and Benadon 2006.
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4. The repetition of 1.22 in this caption is not a mistake: that this figure, which so prominently features 1.22 ratios, happens to also be numbered Figure 1.22 in the book is presumably a convenient coincidence.
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5. Note that the vertical axis in the figure does not represent a hierarchical arrangement, but instead is used for readability to avoid having all of the durations in a single horizontal line with overlapping arcs.
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6. Benadon notes that 1.22 “is extremely close to the square root of 1.5 (1.22474487) and is therefore related by one exponential step to the metrically palatable practice of dotting durations: 1.0→1.22→1.5 (dotted)” (18). Given its prominence throughout the book, more space could have been dedicated to explaining the significance of this ratio and the reasoning for its selection as a reference point, as well as the somewhat arbitrary nature of that reference point. pS and pL are abbreviations of “pulse short, and “pulse long,” which are named as such because they do not typically appear in long-short alternations like the other swing ratios do. “Dot LS” is named for the

fact that “dot S” and “dot L” durations add up to a dotted eighth note.
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7. Note that the three-onset LSS only shows two values because the two short values are the same duration.
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8. The curves in the lines themselves do not actually reflect changes in durations; the only data plotted is the durations themselves, which appear as black dots in the figure. Benadon only curves the lines in order to provide readers with a visual equivalent of the sonic effect of acceleration and deceleration that result from the fluctuating durations.
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9. Rhythmic groupings of more than four onsets can also be considered but Benadon prefers to segment such groupings, in part because the geometric modeling introduced in the second half of the book would need to portray such groupings using more than three dimensions (156).
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10. In cases where four-onset rhythms can be grouped into repeating patterns, such as SLSL or LSLS, they would instead be considered two-part rhythms at a lower metric level. For example, a consistent LS swing at the sixteenth-note level would be considered a two-onset rhythm that subdivides the eighth note, rather than a four-onset rhythm that divides the quarter note.
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11. Chapter 4 also notably recasts duration length as “speed,” such that interonset intervals speed up as they get smaller and slow down as they get longer, with metric positions and tuplet subdivisions serving as tangible reference points along the way. The notion of speed returns periodically throughout the text, but never supersedes duration as a conceptual framing.
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12. For most jazz musicians, the notion of “swing” represents a larger cultural and discursive concept and is not reducible to durational ratios alone: at minimum, it typically includes articulation, dynamics, and participatory discrepancies between musicians; see Butterfield 2006 as well as Monson’s (1997) interviews with bassist Cecil McBee (27–28) and pianist Jaki Byard (62–63). Samuel A. Floyd, Jr. notes that “swing is an essential *quality* of black music” (emphasis in original), writing that “when sound-events Signify on the time-line, against the flow of its pulse, making the pulse itself lilt freely—swing has been effected” (1991, 273).
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13. See Leslie Tilley’s (2019) advocacy for what she terms “local music theory”: “Whether formal or informal, musicians’ theories about their own practices can inform our understanding of the roles of different instruments or streams in the model as well as their aesthetic and structural relationships to one another” (197–198). Benadon’s use of swing ratios as an abstract concept is clearly well-intentioned, and it would be disingenuous to accuse Benadon of purposefully engaging in conceptual colonization. Nonetheless, using an abstracted version of swing as a conceptual lens through which to view all non-gridded rhythms flattens the cultural specifics that shape the many aesthetic landscapes of the musics featured throughout the book. This also reflects a lack of emic perspectives in the book, a problem to which I return later in this review.
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14. The axes on the figure are not clearly labeled. Unclear labeling of axes is unfortunately a problem that plagues many of the examples in the book, and while most of the examples do reward close reading, they sometimes require more effort from the reader than might have been necessary if the labeling was consistently clear.
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15. These spaces share some structural features with Tymoczko’s (2011, 89–93) three-note chord space. Yust (2018) presents a contrasting geometric approach to temporal structure.
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16. The cardinality of a rhythm is the sum of the integers that make up the ratio of its durations; for example, the rhythms 222, 231, and 411 have a cardinality of 6, while 314, 115, and 223 have a cardinality of 7. Rhythms of differing cardinality can be shown in a single onset-space diagram because all rhythms in the space are assumed to subdivide the same span of time, and the strings of integers ultimately only show ratios derived from IOIs. Nonetheless, most onset space diagrams in *Swinglines* use only rhythms of a shared cardinality as reference points, as in the right-side graph of Example 5 and the graphs in Example 6.
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17. Benadon's Appendix A offers more technical detail on onset space, but little explicit guidance in navigating it. The main text would have benefited from a more thorough explanation of the model upon its introduction, as the appendix is primarily intended as a more in-depth description of the mathematics that govern the space.
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18. Edges of the triangle reflect onset positions, with the right edge of the triangle responding to the movement of the second onset position, the left edge responding to the third onset position, and the bottom edge coordinating between the two. Since moving the second onset later by 1 would transform 231 to 321, the plotted rhythm simply moves along the axis parallel to the right edge. Moving only the third onset rather than the second would move the plotted rhythm parallel to the left edge.
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19. One such alternative is the circular plot introduced in Benadon 2007, which is inexplicably absent in *Swinglines*.
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20. Although most of the dots in Example 8 cluster together within one of the swing bands (thanks to their MS spreads being between 1.22 and 1.5), they need to cluster within the hexagon in order for the entire three-onset rhythm to be superswung. In other words, all of the spreads of a given rhythm need to be within the 1.22 to 1.5 range in order to fall into the hexagon. Benadon notes that the LS spreads of these rhythms are in the "mid-to-high 2s" (146), which ensures that they do not fit into this category. It is worth noting that Benadon occasionally refers to the lines that denote ratios in these diagrams (such as the 1.22 and 1.5 lines in Example 8) as "swinglines," although this term is never formalized in the book.
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21. Benadon does not use two-dimensional swingline graphs in his discussion of three-onset rhythms because he is interested in showing in detail the relations between all three onsets, which require three-dimensions to display. But whereas two-dimensional swingline graphs can be read left-to-right, depicting change over time, onset spaces do not include a time axis. The swinglines of Example 10 represent a compromise, but can still feel unintuitive and disconnected from time-based perception.
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22. Because transformations between analogues are complicated and culturally mediated processes that can be difficult to trace, Benadon wisely does not attempt to formalize this transformational process beyond suggesting some ways in which repertoire might shape and constrain such transformational relationships.
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23. Appendix B is devoted to offering more mathematical detail on this novel framework.
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24. Given the many similarities in approach, it is disappointing that Benadon does not engage more deeply with or build upon beat-class set theory here, particularly as it pertains to phase-shifting; see Cohn 1992 and Roeder 2003.
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25. Here Benadon coins the notion of a *basic form*, which counts the number of 2- and 3-based subdivisions that comprise a grouping of accents. This is a promising idea with wide applicability, though it could have benefited from explicit comparison with similar ideas, especially in beat-class set theory.
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26. Although Benadon does make an effort to prominently feature many compositions, improvisations, and performances by women, this diversity does not quite extend to gender. A majority of the book's examples are from repertoires historically dominated by men.
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27. In this way, the book tacitly supports Agawu's (2003, 169) argument for "contesting difference through an embrace of sameness."
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28. For more on the problematics of transcription and its impact on music analysis, particularly on the rendering of rhythm and microtiming, see Rusch, Salley, and Stover 2016.
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29. The book's audio examples are hosted at http://www.fernandobenadon.com/swinglines.html.
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30. It should be noted that Benadon does provide references to scholarly work on much of the non-Western music with which he engages. Nonetheless, explicitly emic perspectives are seldom incorporated into his analyses.
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