

**'Irrational Nuances': Expression, Interpretation, and
Performer Agency in Stockhausen's Klavierstücke**

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Abstract

The performance practice of European serial music has long been misunderstood. This thesis uses Stockhausen's Klavierstück I (1952–53), Klavierstück VII (1954–55), and Klavierstück X (1954/1961) as a lens through which to view the realities of this practice. My hybrid, practice-based methodology involves close contextual analysis of the affordances of the scores, empirical and qualitative performance analysis of the now significant corpus of recordings, and the generation of multiple new versions of the pieces. These experimental versions, documented via studio recordings, are inspired by the findings of my performance analysis and facilitated by the same empirical means, offering proof of concept for 'performance analysis and performance' as a new field of musicological research.

The findings of these interactive processes are used to extend M. J. Grant's view of serial aesthetics and to provide a practical basis for what she calls 'serial listening'; to assess the performance implications and long-term outcomes of Stockhausen's 1950s temporal theory; to interrogate the nature of expression and interpretation in New Music; and to promote understanding of the musical work as fundamentally polyvalent, contingent on both acts of performance, and the various modes of appreciation and perception with which they are associated.

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Chapter 1: Serial Music and Performance Analysis

The performance practice of serial music has often been misunderstood. Nicholas Mathew, for example, posits an approach to playing—allegedly prevalent at the 1950s Darmstadt International Summer Courses for New Music—which he labels ‘Darmstadt pianism’, predicated on a one-to-one translation of the composer’s instructions.¹ His discussion centres on the contemporaneous performance practice of Webern’s *Piano Variations* (1936), yet he also invokes the possibility of ‘historically informed Stockhausen performance’.² By way of example, he cites the ‘preposterously prescriptive’ notation of *Klavierstück V* (1954), which, he argues:

appears to take a concern for textual exactness to its farthest possible limits without banishing the pianist altogether. We find ourselves on the eve of the performer’s vanishing, so to speak: for at first blush one might fairly ask what role a pianist can play here other than to become a function of the notation—a mechanical, if athletic, follower of orders; an organic tape player.³

A similar position is taken by Stuart Paul Duncan in his critical appraisal of a style of playing more broadly associated with the Darmstadt New Music Courses of the 1950s and

¹ Nicholas Mathew, ‘Darmstadt Pianism, “Historically Informed” Webern, and Modernism’s Vanishing Performer’, *Keyboard Perspectives*, 3 (2010), 49–73.

² *Ibid.*, p. 49.

³ *Ibid.*, p. 53.

1960s.⁴ Rather than referring to a specific piece, he cites Stockhausen's remark in a later interview that when playing his music, 'a note should not be shortened before the rest, but held exactly to the value that it is written', recalling instructions in the general foreword to *Klavierstück V*, with which Mathew also takes issue.⁵ This is deemed representative of the composer's 'performative mentality'.⁶ Duncan concludes by arguing that 'the technological advancements made during the 1950s, encouraged performers to view the score as a set of instructions that elicited accuracy in all domains (especially in the rhythmic domain)', before bundling Stockhausen's comments together with the more overtly authoritarian rhetoric of Milton Babbitt.⁷ While Duncan's critique is made as a means of distinguishing the performance practice of early Darmstadt from that of New Complexity composers at the 1980s New Music Courses, and Mathew's as part of a broader attack on modernist performance aesthetics, both share a critical view of the supposed literalism and resultant sterility of a practice associated with European serial music, and with Stockhausen in particular.

These comments are symptomatic of a widespread, monolithic conception of this practice in terms of the utopian rationalism of its earliest theorists, and a lack of engagement with the reality of actual performances.⁸ As M. J. Grant has made clear, belief in the

⁴ Stuart Paul Duncan, 'To Infinity and Beyond: A Reflection on Notation, 1980s Darmstadt and Interpretational Approaches to the Music of New Complexity', *Journal for New Music and Culture*, 7 (2010).

⁵ Karlheinz Stockhausen and Robin Maconie, *Stockhausen on Music: Lectures and Interviews* (New York: Marion Boyars, 1989), p. 169, quoted in Duncan, p. 5. Mathew, p. 53.

⁶ Duncan, p. 5.

⁷ *Ibid.*

⁸ See for example Nicholas Cook's reference to 'idealist traditions in post-war Darmstadt, most obviously in the music of Karel Goeyvaerts and Karlheinz Stockhausen', extending across 'theory, composition, and performance'; Frank Cox's critique of an absolutist 'high modernist model of performance practice', which 'initially developed to meet the more stringent performative challenges of radical post-WWII music'; and Justin London's claim with reference to Messiaen's proto-serial *Mode de valeurs et d'intensités* (1949) that 'the music of high Modernism becomes conceptual art: works (that is, scores) are to be seen but not necessarily heard. Performances of such works serve as demonstrations or authentications that simply allow one to say that such-and-such a piece of music has an existence as sounding music.' Nicholas Cook, *Beyond*

possibility of structurally pure musical systems, realisable without the aid of a performer via electronic composition, was in fact extremely short-lived, as composers and theorists quickly came to realise the inherent irrationality of the technology at their disposal.⁹ Stockhausen was chief among these, returning in 1954 to his principal instrument, the piano, after having spent one and a half years working in the newly founded WDR electronic music studio in Cologne. As he explained in early 1955:

I have now taken to working on piano pieces at the same time [as electronic compositions] because the strictest forms of structural composition brought me up against essential musical phenomena that are not susceptible to measurement. This does not make them any the less palpable, detectable, imaginable and effective. I can (for the time being, at any rate) bring these things into play more clearly by using an instrument and a performer than in electronic composition. Primarily it is a matter of imparting a new way of feeling time in music, in which the infinitely subtle 'irrational' nuances and gestures of a good performer often produce what one wants better than any centimetre gauge.

the Score: Music as Performance (Oxford: Oxford University Press, 2013), p. 211. Frank Cox, 'Notes Toward a Performance Practice for Complex Music', in *Polyphony and Complexity, New Music and Aesthetics in the 21st Century*, 1, ed. by Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim: Wolke, 2008), pp. 70–133 (p. 73). Justin London, 'Temporal Complexity in Modern and Post-modern Music: A Critique from Cognitive Aesthetics', in *Unfolding Time*, ed. by Darla Crispin (Leuven: Leuven University Press, 2009), pp. 45–68 (p. 60). As with Mathew and Duncan, none of the authors refer to the specifics of performances or recordings.

⁹ M. J. Grant, *Serial Music, Serial Aesthetics: Compositional Theory in Post-War Europe* (Cambridge: Cambridge University Press, 2005).

Statistical formal criteria such as these will give us a completely new and unprecedented angle on the question of instruments and their playing.¹⁰

This manifesto, touching on matters of expression, performance practice, musical time, form, and the relationship between instrumental and electronic music, was accompanied by an overview of his work for solo piano thus far, which included Klavierstücke I–IV (1952–53) and the newly completed Klavierstücke V–VIII (1954–55). Klavierstücke IX and X would not be completed until 1961, by which time he had already published the standalone Klavierstück XI (1956). These pieces have since become some of the most popular, well-known, and widely recorded works of twentieth-century New Music.¹¹

In 2018, Sabine Liebner released the fifth complete recording of Klavierstücke I–XI, following in the footsteps of Aloys Kontarsky (1965), his student Herbert Henck (1984), Bernhard Wambach (1988), and Ellen Corver (1999), all of whom had worked closely with the composer. Many selected recordings have also been released, including David Tudor’s first recordings of Klavierstücke I–VIII and XI (1959), and, more recently, Benjamin Kobler’s recordings of Klavierstücke I–V (2021) and VII–XI (2014–15). This extensive corpus now provides ample evidence for three areas of musicological inquiry: namely, the aesthetics of Darmstadt serialism; the manifestation of Stockhausen’s 1950s theory of musical time; and

¹⁰ Karl H. Wörner, *Stockhausen: His Life and Work*, trans. by Bill Hopkins (Berkeley: University of California Press, 1976), p. 32. Translation of Stockhausen’s “‘irrationalen’ Nuancierungen und Bewegungen und Verschiebungen’ in Karlheinz Stockhausen, *Texte II: Texte zu eigenen Werken zur Kunst Anderer Aktuelles; Aufsätze 1952–1962 zur musikalischen Praxis* (Cologne: M. DuMont Schauberg, 1964), pp. 43 as ‘irrational nuances and gestures’ is preferred to Hopkins’s ‘irrational shadings and impulses and fluctuations’.

¹¹ Maurizio Pollini has been a particular champion of the pieces on the popular concert stage. For an illustration of the continuing relevance and popularity of the Klavierstücke, see Pierre-Laurent Aimard’s complete single-sitting performance of Klavierstücke I–XI at the Royal Festival Hall, London, 1 June 2019. Astonishingly, Aimard also performed in Stockhausen’s *Kontakte* (1960) in the second half, and *Mantra* (1970) the following day.

the nature and extent of expression, interpretation, and performer agency in the Klavierstücke, and in New Music more broadly. Together, the findings of these inquiries may be used to challenge the positions of Mathew and Duncan, and to offer a clearer picture of the performance practice of serial music.

With few exceptions, contributions to serial aesthetics and the history of 1950s Darmstadt have hitherto failed to engage with issues of performance practice.¹² Perhaps the most significant example of this is Grant's *Serial Music, Serial Aesthetics*. There are many positives to be taken from Grant's study, which places serialism in a range of scientific, theoretical, and artistic contexts, and portrays it as a wide-reaching cultural phenomenon. Nonetheless, she fails to engage with the actualities of performances, citing very few performers and no recordings of serial music. This leaves her central analyses somewhat lacking in substance, and ironically closed, given her otherwise welcome insistence on the fundamental openness of serial forms.¹³ I aim to address this shortcoming, using the evidence of the recordings of Stockhausen's Klavierstücke to extend Grant's view of serial aesthetics and to offer a practical basis for what she calls 'serial listening', founded on the essential polyvalence of serial music in performance.¹⁴

¹² See for example Richard Taruskin, *Music in the Late Twentieth Century: The Oxford History of Western Music* (New York: Oxford University Press, 2010), pp. 20–54; Paul Griffiths, "Serialism" in *Grove Music Online. Oxford Music Online*. <<https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000025459>> [accessed 17 March 2022]; and Paul Atinello, Christopher Fox, and Martin Iddon, eds, *Other Darmstadts* (Abingdon: Routledge, 2007). Martin Iddon, *New Music at Darmstadt: Nono, Stockhausen, Cage, and Boulez* (Cambridge: Cambridge University Press, 2013) does address discrepancies between scores and the sounding results of historical performances, though with no reference to recordings or the particulars of performance practice. Robin Maconie has made some welcome, albeit conservative, contributions to matters of performance practice within Stockhausen scholarship. Robin Maconie, *The Works of Karlheinz Stockhausen* (London; New York: Oxford University Press, 1976); Robin Maconie, *Other Planets: The Music of Karlheinz Stockhausen* (Lanham: Scarecrow Press, 2005).

¹³ See for example her assertion that 'serial form *per se* is open form [...] the aesthetic rather than semantic tendency of new music is such that its essential feature is unforeseeability.' Grant, p. 159.

¹⁴ *Ibid.*, p. 242.

The central tenets of Stockhausen's 1950s temporal theory are explicated in the article '...how time passes...', first published in German in the in-house Darmstadt periodical *Die Reihe* in 1957.¹⁵ Stockhausen begins by criticising the additive serialisation of durational values, such as that used in Messiaen's *Mode de valeurs et d'intensités*, which he views as incompatible with the logarithmic division of the chromatic scale of pitches.¹⁶ As a corrective, he posits a logarithmic 'tempo scale', dividing a base tempo and its double—a 'time octave'—into a series of twelve 'chromatic' steps.¹⁷ These metronomic tempi are then serialised and used to define sections of pieces, giving rise to their macro-temporal dimensions. He then introduces the notion of time strata, beginning with the measurement of time according to the proportional relationship of traditional note values.¹⁸ Then comes time as psychologically determined by the performer, referring to the maintenance and proportioning of metronomic tempi, which may be subjectively varied according to prescribed *accelerandi* and *ritardandi*.¹⁹ Finally, he posits the notion of time as physically mediated by the performer.²⁰ In the piano music, this is chiefly dictated by groups of small notes, which are to be performed as fast as possible.²¹ When such notes are placed in disparate registers of the keyboard, irrational rhythms will be produced in performance, contingent on the technique and physicality of the performer, as well as matters of registral and timbral clarity, that is, on the irrationality of the instrument itself. These ideas are principally associated with the works *Zeitmaße* (1955–56), *Gruppen* (1955–57), and

¹⁵ Karlheinz Stockhausen, '...how time passes...', in *Die Reihe 3: Musical Craftsmanship*, trans. by Cornelius Cardew (Bryn Mawr: Theodor Presser, 1959), pp. 10–40.

¹⁶ *Ibid.*, pp. 12–15.

¹⁷ *Ibid.*, p. 21.

¹⁸ *Ibid.*, p. 33.

¹⁹ *Ibid.*, p. 23.

²⁰ *Ibid.*, p. 34.

²¹ I use Stockhausen's neutral term 'small notes' throughout to avoid the expressive connotations of the term 'grace notes'.

Klavierstück XI. However, they are equally relevant to Klavierstücke V–X, with hitherto unexplored precedents in the earlier Klavierstücke. The significantly larger recording corpus of the piano pieces, in comparison with Stockhausen’s small- and large-scale ensemble works of the 1950s, now provides an excellent opportunity for critical engagement with the varied manifestations and aesthetic outcomes of this theory—the ‘irrational nuances’ of his manifesto—as well as its implications for matters of expression, interpretation, and performer agency.

Klavierstücke I, VII, and X are chosen as the case studies for this investigation, offering a broad overview of the different phases of Stockhausen’s compositional thinking, the varied manifestations of his temporal theory, and the serial-aesthetic development of his music in the 1950s, in addition to a wide range of performance features and interpretative contexts.²² My tripartite approach to each case study involves analysis of the technical demands and affordances of the scores; qualitative and empirical analysis of the recording tradition; and the generation of experimental new recordings.²³

These approaches intersect with a wide range of discourse. My explication of the performance demands of the pieces, for example, enters into the well-established tradition of performers sharing their insights into the performance practice of often highly challenging contemporary music.²⁴ This writing aims to bring the audience closer to the performer’s

²² In-depth contextual analysis of recordings of Klavierstück XI by David Tudor, Aloys Kontarsky, and Bernhard Wambach has already been undertaken by Iryna Krytska. Iryna Krytska, *Karlheinz Stockhausens Klavierstück XI (1956): Interpretationsanalysen* (Kassel: Gustav Bosse, 2015).

²³ My use of the term ‘affordance’ derives from Daphne Leong’s interpretation of James J. Gibson’s theory of affordance, which, she argues, ‘manifests in the tension between score as text and score as script; between music as “works”, composer’s intentions, and scores, and music as performance’. Daphne Leong, *Performing Knowledge: Twentieth-Century Music in Analysis and Performance* (Oxford: Oxford University Press, 2019), p. 69. These notions are further explored in my conclusions.

²⁴ Ian Pace’s work in this field has been particularly insightful and illuminating. See for example Ian Pace, ‘Lachenmann’s Serynade: Issues for Performer and Listener’, *Contemporary Music Review*, 24 (2005), 101–12; Ian Pace, ‘Notation, Time and the Performer’s Relationship to the Score in Contemporary Music’, in *Unfolding*

privileged position, offering an insight into the interpretative processes, expressive sensibilities, and technical and instrumental contingencies that lie behind the aesthetic results of actual performances, whether recorded or otherwise. My innovation is to use these insights as contextual framing for my analysis of the diverse performance traditions of my case study pieces, as well as inspiration for new experimental interpretations, offering a more systematic application of performer insight than has yet been undertaken in the field of New Music.

In terms of existing methodologies, Julian Hellaby offers an excellent example of how performer insight can be applied to qualitative performance analysis of music by Bach, Brahms, and Messiaen.²⁵ This includes analyses of his own recordings. However, the recordings themselves are traditional in nature, and treated with an overriding objectivity, which precludes some of the critical benefits of the autoethnographic style of documentation, experimentation, and reflexive analysis that I adopt. Bryn Harrison, Philip Thomas, Nicholas Cook, and Eric Clarke, meanwhile, demonstrate the potential for the collaborative integration of insights from a composer, a performer, and two analysts—one oriented towards textual analysis and interpretative philosophy (Cook), the other towards data-rich empirical analysis (Clarke)—into the performance of a complex work of New Music, namely Harrison's *être-temps* (2002).²⁶ My research aims at a synthesis of these methods—

Time, ed. by Darla Crispin (Leuven: Leuven University Press, 2009), pp. 151–92; and Ian Pace, 'Maintaining Disorder: Some Technical and Aesthetic Issues Involved in the Performance of Ligeti's Études for Piano', *Contemporary Music Review*, 31 (2012), 177–201. See also Steven Schick, 'Developing an Interpretive Context: Learning Brian Ferneyhough's Bone Alphabet', *Perspectives of New Music*, 32 (1994), 132–53; Sharon E Kanach, ed., *Performing Xenakis* (Hillsdale: Pendragon Press, 2010); and Christopher Redgate, 'A Discussion of Practices Used in Learning Complex Music with Specific Reference to Roger Redgate's *Ausgangspunkte*', *Contemporary Music Review*, 26.2 (2007), 141–49.

²⁵ Julian Hellaby, *Reading Musical Interpretation: Case Studies in Piano Performance* (Farnham: Ashgate, 2009).

²⁶ Eric Clarke, Nicholas Cook, Bryn Harrison, and Philip Thomas, 'Interpretation and performance in Bryn Harrison's *être-temps*', *Musicae Scientiae*, 19.1 (2005), 31–74.

recuperating Stockhausen's perspective from engagement with his theory—applied to multiple works and recording corpora, and to the generation of otherwise inconceivable new performances.

My methods of performance analysis are broadly traditional.²⁷ Taking my lead from the work of the Centre for the History and Analysis of Recorded Music (CHARM), I use Sonic Visualiser to extract timing data, in aid of what Cook has called 'close and distant listening'.²⁸ Simply put, close listening involves detailed analysis of recordings, with empirical data and analytical software used to augment the analyst's aural capabilities, and to convey their findings to the reader.²⁹ Distant listening involves the analysis of trends, typically involving tempo, in large bodies of recordings.³⁰ The dangers of both approaches, including the potential for data to override and even replace the listening experience, persist in the study of contemporary repertoire. It is also important to acknowledge that in approaching the contentious field of serial music, the empirical performance analyst stands open to the same criticisms of artistic rationalisation levelled at the serialists themselves. Stockhausen's observation that there are 'essential musical phenomena that are not susceptible to measurement' remains pertinent, and it is not my aim to prove or disprove 'facts' of performance. Rather, use of data, in combination with qualitative judgements—informed by my own extensive experience of performing the pieces, and insights from expert performers

²⁷ The field of performance analysis is wide and well-documented. See Alexander Lerch, Claire Arthur, Ashis Pati, and Siddharth Gururani, 'An Interdisciplinary Review of Music Performance Analysis', *Transactions of the International Society for Music Information Retrieval*, 3 (2020), 221–45, for a current overview.

²⁸ Cook, *Beyond the Score*, pp. 135–75. Sonic Visualiser is an easy-to-use, open-source application for the analysis of sound recordings. It can be downloaded for free from <https://www.sonicvisualiser.org/>. My analysis of dynamics, articulation, pedalling, and timbre in the recordings remains qualitative. Future research may investigate the applicability of a wider range of empirical methods.

²⁹ Cook has elsewhere described this approach as 'augmented listening'. Nicholas Cook, 'Inventing Tradition: Webern's Piano Variations in Early Recordings', *Music Analysis*, 36 (2017), 136–215 (p. 207).

³⁰ See José Antonio Bowen, 'Tempo, Duration, and Flexibility: Techniques in the Analysis of Performance', *Musicological Research*, 16 (1996), 111–56, for a textbook example of distant listening in analysis of recording corpora of classic symphonic repertoire.

who worked with the composer, such as Kobler—is designed to guide the listener towards the complex tension that exists between the notation and the acoustic reality of actual performances.

The lack of ready access to recordings which remain under copyright, or are expensive or difficult to procure, poses a significant problem for the would-be performance analyst of contemporary repertoire, perhaps explaining why relatively little attention has been directed towards New Music in this field—though this may also have something to do with the musical tastes of its leading theorists.³¹ To date, no comprehensive corpus study of recordings of post-WWII New Music has been undertaken, with Cook’s corpus analysis of recordings of Webern’s Variations offering the closest model for this aspect of my work.³² Most performance analysis of this repertoire has in fact been dedicated to serial music, including notable contributions on the Klavierstücke by Eric Marc Nedelman and Iryna Krytska.³³ This may be explained by the relatively large body of recordings, as well as the apposite textures of the music, its preoccupation with notions of time, its rich theoretical background, and the large critical discourse that surrounds it. Indeed, these are all motivating factors for my own study. What I aim to contribute are new models for

³¹ See for example the predominance of traditional subjects in the full list of CHARM’s publications https://charm.rhul.ac.uk/studies/p6_1_4.html [accessed 15 March 2022]. It is of course recommended that the reader listen to and engage with as many of the recordings under discussion as possible, with timings given where appropriate. However, I recognise that not all recordings will be readily accessible. This is where data collected in aid of distant listening can become important in and of itself, not as representative of individual approaches, but of broader trends in performance.

³² Cook, ‘Inventing Tradition’. Cook draws on Grant’s reading of serial theory to contextualize his more nuanced take on the objective performance style of pianists such as Jean-Jacques Monod in the 1950s, while highlighting the broader diversity of the performance tradition. Like Mathew, however, he fails to engage with recordings of serial music in his appraisal of so-called ‘Darmstadt pianism’.

³³ See for example Dirk Moelants’s analysis of recordings of Goeyvaerts’s Sonata for 2 Pianos, Op. 1 (1951), Dirk Moelants, ‘Statistical Analysis of Written and Performed Music. A Study of Compositional Principles and Problems of Coordination and Expression in “Punctual” Serial Music’, *Journal of New Music Research*, 29 (1994), 37–60; Nedelman’s analysis of Tudor and Henck’s recordings of Klavierstück III, Eric Marc Nedelman, ‘Performance Analysis of David Tudor’s Interpretations of Karlheinz Stockhausen’s Klavierstücke’ (unpublished doctoral dissertation, University of California, Santa Barbara, 2005); and Krytska, *Klavierstück XI*.

engagement with this music, demonstrating, among other things, ways in which to approach nested-tuplet notation and matters of technical and instrumental contingency; how to interpret the performance of non-linear, immanent, and polyvalent forms; how to address questions of style in performance; and how to engage with recording corpora of non-traditional repertoire. These are all notions that extend beyond the serial-pianistic orientation of my project, which will hopefully serve as a catalyst for future performance research in the field of New Music.

My production of experimental recordings of the Klavierstücke is more novel, finding its closest analogue in Sean Williams's documentation of his critical recreation of Stockhausen's *Studie II*.³⁴ I begin by assessing the unexplored affordances of the scores, which in the case of the Klavierstücke have either been supplanted by orally and/or aurally mediated performance practices, overridden by certain expressive priorities and norms, or ignored on grounds of practicality or musical intuition. I then pursue these affordances, while drawing on the results of self-reflexive empirical performance analysis, consciously testing the limits of literalism in my recordings of Klavierstücke I and X. I thus highlight the true extent of interpretation and performer agency in these pieces, playing devil's advocate to the positions of Mathew and Duncan. In the case of Klavierstück VII, meanwhile, the relatively limited agency afforded by the score leads me to consider critical and artistically coherent means of transgressing the strictures of the notation, thereby testing the opposing limits of subjective expression.

³⁴ Sean Williams, 'Interpretation and Performance Practice in Realizing Stockhausen's *Studie II*', *Journal of the Royal Musical Association*, 141 (2016), 445–81. Drawing on his own realisation, helpfully documented via audio and video clips, Williams puts forward the convincing case that the technical realisation of early electronic music itself requires a significant level of interpretation, albeit in the microaesthetic domain. In practice, however, composers' initial 'inscriptions' of early electronic works have broadly remained and continue to be received as fixed artefacts; they are therefore understood as such in the context of my thesis.

To a certain extent, my studio interpretations can be viewed as models, shedding light on 'real world' phenomena, much in the way that computational modelling has been used in the field of empirical musicology.³⁵ Yet they are also artistic statements in their own right. This ties into my investigation of the creative role that performance analysis can play in the generation of new performances, both in pinpointing and exploiting lacunae within the interpretative tradition, and in empirically regulating and refining one's own performance. This invokes the possibility of 'performance analysis and performance' as a field of research, and the potentially controversial notion of 'augmented performance practice', which I explore over the course of the thesis.

While adjusted to the specific exigencies of the pieces, particularly in terms of scale and rhythmic scheme, contextual analysis of the affordances of the scores and of the performance tradition, followed by the generation and analysis of my own recordings, forms the backbone of each of the case studies of Klavierstücke I, VII, and X that appear in Chapters 2–4 respectively. Each case study differs, however, in the emphasis it places on score analysis, drawing inspiration from the recent collaborative work of Daphne Leong, which has sought to explore the intersections and cultural differences between theorists, analysts, and performers in the field of twentieth-century music.³⁶ This is reflected in the adoption of a range of methodological frameworks, arranged according to those that move from performance to analysis, from analysis to performance, and those representative of a synthesis of the two disciplines.³⁷ Together with her performing collaborators, Leong thus aims to explore 'how instrumental and physical affordances affect structure, how stories

³⁵ See Eric Clarke, 'Empirical Methods in the Study of Performance', in *Empirical Musicology: Aims, Methods, Prospects*, ed. by Eric Clarke and Nicholas Cook (Oxford: Oxford University Press, 2004), pp. 77–102 (pp. 95–98), for an overview of the methods and applications of performance modelling.

³⁶ Leong, *Performing Knowledge*.

³⁷ *Ibid.*, p. 17.

emerge from structure, how performative insight and analytical structure intertwine or bypass one another, and how an audience responds to structural information.’³⁸

My case studies follow a similar course, sharing some similar themes and methodological concerns. Analytical engagement with the score of *Klavierstück I*, for example, is minimal, with sectional divisions and broad qualitative observations, chiefly informed by my experience of performing the piece, serving primarily as an orientation for the performance analysis. This is partly a response to the concealed nature of the piece’s serial underpinnings, which I felt uncompelled to decipher as a means of informing my interpretation or contextualising my performance analysis.³⁹ As Leong’s collaboration with guitarist Jonathon Leathwood on the analytically informed performance practice of Elliott Carter’s *Changes* (1983) has demonstrated, the type of systematic de-coding common to the analysis of serial and post-serial music *can* inform the performer’s interpretative choices and the audience’s reception of their performances in meaningful ways.⁴⁰ Nevertheless, I am more interested here in what light the findings of the performance analysis can shed on the dialectical nature of *Klavierstück I*’s proto-complex notation: insights that might otherwise have been overlooked through traditional means of score analysis.

In Chapter 3, score analysis is used as a means of inspiration for the production of new performances of *Klavierstück VII*, in response to the stagnation of the literalist

³⁸ *Ibid.*, p. 8.

³⁹ It is telling that Stockhausen’s own ‘introduction to listening’ includes no reference to numerical ordering, offering instead a qualitative assessment of the aesthetic equilibrium of the piece’s musical materials with reference to an actual performance—namely Marcelle Mercenier’s 1955 live recording—included in the original radio broadcast. Karlheinz Stockhausen, ‘Gruppenkomposition: *Klavierstück I* (Anleitung Zum Hören)’, in *Texte I: Texte zur elektronischen und instrumentalen Musik; Aufsätze 1952–1963 zur Theorie des Komponierens* (Cologne: M. DuMont Schauberg, 1963), pp. 63–74.

⁴⁰ Leong, pp. 287–331. For compelling examples of such analysis see Christoph von Blumröder, *Die Grundlegung der Musik Karlheinz Stockhausens* (Stuttgart: Franz Steiner, 1993) and Peter O’Hagan, *Pierre Boulez and the Piano: A Study in Style and Technique* (London; New York: Routledge, 2017).

performance tradition. This draws inspiration from the work of Wallace Berry and others in the field of ‘analysis and performance’.⁴¹ This field has come under stern criticism from Cook and others for its purportedly didactic tone and the hegemonic status afforded to theory and analysis in relation to performance.⁴² With a little more historical perspective, and a wider range of methodological frameworks from which to choose, I take a more sympathetic view of Berry’s work in particular, with the detailed practical descriptions outlined in *Musical Structure and Performance* illustrating, in concrete terms, how deep analytical insights may be used to inform finely wrought performance decisions.⁴³ Rather than diminishing the role of the performer, I view this as a means of supporting modes of appreciation that are analytically oriented towards the micro-aesthetic qualities of performance. I also view Berry’s writing as a useful indicator of the analytical mindsets that will underscore certain performances—much in the way that discussion of a performer’s technical approach may support greater awareness of the practical contingencies of performance—and not simply as a singular way of doing things. The major criticism that could still be raised is the lack of an end product. As Mine Doğantan-Dack provocatively suggests, ‘for any present-day researcher who wishes to prescribe performance decisions by relying on the authority of analytical findings based on the score, there is no excuse for not demonstrating through a recorded performance of her own how exactly such analytical knowledge is translated into a sounding performance of the piece.’⁴⁴ While I still recognise the validity of performance suggestions from analysts who might not otherwise consider themselves performers, my

⁴¹ See Nicholas Cook, ‘Analysing Performance and Performing Analysis’, in *Rethinking Music*, ed. by Nicholas Cook and Mark Everist (Oxford: Oxford University Press, 2001), pp. 239–61 for a critical overview of the field.

⁴² Ibid.. See also John Rink, ‘Analysis and (or?) Performance’, in *Musical Performance: A Guide to Understanding*, ed. by John Rink (Cambridge: Cambridge University Press, 2002), pp. 35–58.

⁴³ Wallace Berry, *Musical Structure and Performance* (New Haven: Yale University Press, 1989).

⁴⁴ Mine Doğantan-Dack, ‘Recording the Performer’s Voice’, in Mine Doğantan-Dack ed., *Recorded Music: Philosophical and Critical Reflections* (London: Middlesex University Press), pp. 293–313 (p. 302).

analytically informed version of Klavierstück VII offers proof of concept for the type of practice-based research that Doğantan-Dack advocates.

In Chapter 4, I offer a more balanced synthesis of analysis, performance, and performance analysis, using Henck's already comprehensive score analysis of Klavierstück X as the basis for my investigation of the affordances of the notation and the evidence of the recording tradition.⁴⁵ In this way, analysis and performance are placed in closer dialogue with one another. This is accompanied by consideration of the wider range of hermeneutic and theoretical contexts that had amassed around the composition and performance practice of the Klavierstücke by the early 1960s. These include persistent themes of serial structure, and the dialectics of instrumental and electronic performance, alongside growing contradictions between the dramatic and non-linear formal elements of Stockhausen's music, and the changing role of the New Music performer.

In Chapter 5, I summarise and compare the findings of my three case studies, considering the extent of Stockhausen's authority, as reflected in the varied strictures of the three pieces and in his close supervision of the recording tradition, and the practical implications of his temporal theory. This is accompanied by consideration of the nature of expression and interpretation in these pieces, and in New Music more broadly. I conclude by positing the performance of serial music as a means of assessing, contextualising, and ultimately reconciling divergent views on the work concept by authors such as José Antonio Bowen, Peggy Phelan, Lawrence Davies, and Lydia Goehr.

⁴⁵ Herbert Henck, *Karlheinz Stockhausen's Klavierstück X: A Contribution toward Understanding Serial Technique: History, Theory, Analysis, Practice, Documentation* (Cologne: Neuland, 1980).

Chapter 2: Interpreting Klavierstück I

2.1 Introduction

In 1963, two years prior to the release of Kontarsky's first supervised recordings of Klavierstücke I–XI, Gunther Schuller published a thinly-veiled critique of Stockhausen's Klavierstück I in *Perspectives of New Music*.⁴⁶ His criticisms centred on a hypothetical bar (Example 2.1), emblematic of the most complex serial notation of the 1950s, with strong similarities to bar 6 of Klavierstück I (see Example 2.2 for all score references).

The image shows a musical score for a hypothetical bar. It consists of two staves, treble and bass clef. The tempo is marked as $\text{♩} = \text{ca. } 60$. The time signature is 4/8. The score is divided into three sections by brackets with time signatures: 7:8, 5:4, and 11:12. The notation is highly complex, featuring many accidentals, dynamic markings (mf, f, sf), and a final marking '8va' with a dashed line. The bass staff has some notes with a '50%' marking below them.

Example 2.1 Schuller's hypothetical bar

⁴⁶ Gunther Schuller, 'American Performance and New Music', *Perspectives of New Music*, 1 (1963), 1–8.

1

4

7

10

Example 2.2 Stockhausen, Klavierstück I, page 1

13

16

20

24

Example 2.2 Stockhausen, Klavierstück I, page 2

The image displays four systems of musical notation for Stockhausen's Klavierstück I, page 3. Each system consists of a grand staff with a treble and bass clef. The notation is highly complex, featuring numerous dynamic markings (e.g., *ff*, *fff*, *mf*, *f*, *pp*, *p*), articulation marks, and various time signatures. Measure numbers 30, 34, 39, and 43 are indicated at the beginning of their respective systems. The score includes intricate rhythmic patterns, including triplets and sextuplets, and complex fingering instructions (e.g., 5, 3, 3, 3, 5, 8, 6:5). The time signatures change frequently, including 6/4, 4/32, 5/16, 5/8, 8/32, 7:8, 6/4, 2/4, 2/8, and 4/4. The piece concludes with a double bar line and an asterisk in the final system.

Example 2.2 Stockhausen, Klavierstück I, page 3

47

Musical score for measures 47-50. The score is in G major. It features complex rhythmic patterns and dynamic markings. The time signatures are 4/4, 4/16, 5/16, and 6/32. The dynamics range from *pp* to *ff*. The score includes markings for *r. H.* and *l. H.* and various rests.

50

Musical score for measures 51-54. The score continues with complex rhythmic patterns and dynamic markings. The time signatures are 6/32, 4/16, 1/4, and 3/4. The dynamics range from *pp* to *ff*. The score includes markings for *mf*, *ff*, and *p*.

54

Musical score for measures 55-57. The score continues with complex rhythmic patterns and dynamic markings. The time signatures are 3/4, 5/8, and 2/4. The dynamics range from *pp* to *ff*. The score includes markings for *mf*, *ff*, and *p*.

57

Musical score for measures 58-61. The score continues with complex rhythmic patterns and dynamic markings. The time signatures are 2/4 and 4/4. The dynamics range from *mf* to *ff*. The score includes markings for *mf*, *ff*, and *p*.

Example 2.2 Stockhausen, Klavierstück I, page 4

Both bars feature disparate distribution of pitch material and variegated dynamic markings.

Schuller, however, is chiefly concerned with their identical rhythmic notation:

The first 32nd notes have a duration of 8/35 of a second per note; the remaining eleven, 12/55 [...] I defy anyone to differentiate the two speeds accurately and with certainty in performance. Similarly, I find it impossible to believe that a musician could accurately compress five beats (or units) into the time of four, while *simultaneously* protracting two subdivisions thereof in two dissimilar segments, and both at different rates of protraction. The best that such a passage deserves is what it usually gets, an educated guess.⁴⁷

Rather than rejecting the bar outright, he offers an alternative, involving proportional adjustment of tempo from ♩ = ca. 60 to ♩ = ca. 90; the result is a 6/8 bar containing periodic semiquaver triplets, to be performed in the same time-space as the original 4/8 bar (Example 2.3)

⁴⁷ Gunther Schuller, 'American Performance and New Music', *Perspectives of New Music*, 1.2 (1963), 1–8 (p. 5).



Example 2.3 Schuller's simplification

'It is hardly likely', he argues, that this notation 'would result in a difference so vital that the loss in "serial" pedigree would not be more than outweighed by the increased playability of the passage', concluding that 'serial operations which have not been aurally-mentally and perhaps concretely tested by the composer are an aesthetic absurdity, and are bound to fail in terms of performance realities.'⁴⁸ In other words, the notation does not afford a literalist interpretation, which Schuller views as a failure on the composer's part. This modernist standpoint, echoing Stravinsky's concerns for objective execution,⁴⁹ makes for striking comparison with the claims of Mathew and Duncan that the precise notation of early serial music and Stockhausen's purported attitude towards performance preclude anything but literalist interpretation.

Klavierstück I is chosen as my first case study for a number of reasons.⁵⁰ First, its proto-complex notation has generated significant debate, as illustrated by Schuller's

⁴⁸ Schuller, pp. 5–6.

⁴⁹ Igor Stravinsky, *Poetics of Music in the Form of Six Lessons*, trans. by Arthur Knodel and Ingold Dahl (Cambridge: Harvard University Press, 1947), pp. 121–35

⁵⁰ Klavierstück I was actually the last of Klavierstücke I–IV to be completed. Sources agree that Klavierstücke III and II (originally designated Klavierstücke A and B) were the first to be composed in early 1952 as a gift for

critique,⁵¹ while giving rise to performance practices that would become central to the interpretation of later complex music.⁵² Second, in light of its development alongside the composer's first electronic composition, the *Konkrete Etüde* (1952), produced at Pierre Schaeffer's electronic music studio in Paris,⁵³ it offers an insight into Stockhausen's state of mind with regard to the nascent dialectic of electronic and instrumental composition just prior to beginning work at the WDR studio. This experience is reflected in several experimental translations of electronic compositional principles with significant implications for both performer and listener. Third, in terms of Stockhausen's practice and broader trends in European serialism, *Klavierstück I* marks an important step away from the punctual aesthetics of early works towards thinking in terms of groups,⁵⁴ while still preserving elements of punctualism, a transition that can best be understood through comparison with the notational demands and affordances of works such as Messiaen's *Mode de valeurs et*

Stockhausen's then wife, Doris. Jonathan Harvey, *The Music of Stockhausen: An Introduction* (London: Faber and Faber, 1975), p. 22; Michael Kurtz, *Stockhausen: A Biography*, trans. by Richard Toop (London: Faber and Faber, 1992), p. 46. Michael Kurtz, however, writes that *Klavierstück I* (originally designated *Klavierstück C*) was composed 'shortly after', followed by *Klavierstück IV*, whereas Robin Maconie writes that *Klavierstück I* was the last to be composed in 1953. Kurtz, p. 46. Maconie, *The Works of Karlheinz Stockhausen*, p. 62. This confusion may arise from reference by Kurtz to the *manuscript* version of *Klavierstück I*, featuring crotchet metres, and by Maconie to the finalised version, used for publication, featuring variegated metres, new expressive details, and slight modifications to rhythms and registral distribution. Evidence from observation of the manuscript copy at the Stockhausen Stiftung für Musik, Kürten.

⁵¹ See also Pierre Boulez's early critique of the playability of such notation; Pierre Boulez, "'An der Grenze des Fruchtländes'", in *Die Reihe I: Elektronische Musik*, ed. by Herbert Eimert and Karlheinz Stockhausen (Vienna: Universal Edition, 1955), pp. 47–56; Nicolas Ruwet's structuralist critique of the notation of bar 6; Nicolas Ruwet, 'Contradictions Within the Serial Language', in *Die Reihe 6: Speech and Music*, trans. by Margaret Shenfield (Bryn Mawr: Theodor Presser, 1964), pp. 65–76 (pp. 73–4); as well as Robin Maconie's more positive comments on interpretation; Maconie, *The Works of Karlheinz Stockhausen*; and subsequent response to Boulez's criticisms; Maconie, *Other Planets*, p. 122.

⁵² The precedent of *Klavierstück I* remains unacknowledged in the current literature on complex rhythmic practice. See for example Cox, 'Notes Toward a Performance Practice for Complex Music'. Thomas's reference to *Klavierstück I* in discussion of his preparation of Harrison's *être-temps* is a notable exception. Clarke et al., 'Interpretation and performance in Bryn Harrison's *être-temps*', p. 40.

⁵³ See Maarten Quanten, 'On the Temporal Organisation of Karlheinz Stockhausen's Early Group Compositions', in *The Musical Legacy of Karlheinz Stockhausen: Looking Back and Forward*, ed. by M. J. Grant and Imke Misch (Hofheim: Wolke, 2016), pp. 35–51 for more on the compositional similarity of these pieces.

⁵⁴ The idea of 'group composition' is explored in depth in the composer's own analysis. Stockhausen 'Gruppenkomposition'.

d'intensités and Boulez's *Structures, livre I* (1952). Fourth, close inspection of the affordances of the score and the practice traditions that have emerged over the course of the piece's recording history reveal a hitherto unrecognised precedent for Stockhausen's use of small notes in the subsequent *Klavierstücke*, with implications for the development of his temporal theory. Finally, and perhaps most importantly, unlike much early serial music, *Klavierstück I* has continued to attract performers and audiences, with a significant body of recordings available for analysis, eleven of which were selected for this study (see Table 2.1).⁵⁵

⁵⁵ Jeremy Denk's 2019 recording and Gregor Prozesky's YouTube video performance of *Klavierstück I* came to my attention only recently. Karlheinz Stockhausen, *Klavierstück I*, Jeremy Denk, piano. CD, Nonesuch – 563316-2, 2019. 'Karlheinz Stockhausen *Klavierstücke I - IV* - Gregor Prozesky, Klavier', <https://www.youtube.com/watch?v=Nf1tEwA4pXw> [accessed 6 January 2022]. Benjamin Kobler's recording of *Klavierstücke I–V* for Ensemble Musikfabrik was released following completion of the chapter.

Performer	Year	Context
Marcelle Mercenier	1955	<ul style="list-style-type: none"> - Live recording - First performer of Klavierstücke I–V - Coached by Stockhausen prior to premiere at the 1954 Darmstadt New Music Courses
David Tudor	1959	<ul style="list-style-type: none"> - First studio recording of Klavierstücke I–VIII and XI - Worked extensively with Stockhausen from 1954 to ca. 1964
Aloys Kontarsky	1965	<ul style="list-style-type: none"> - First supervised studio recording of Klavierstücke I–XI - Worked extensively with Stockhausen during the 1960s and 1970s
Elisabeth Klein	1978	<ul style="list-style-type: none"> - Independent Danish recording of Klavierstücke I–V, VII–IX, and XI - No known contact with Stockhausen at the time of recording
Herbert Henck	1985	<ul style="list-style-type: none"> - Second studio recording of Klavierstücke I–XI - Student of Aloys Kontarsky - Worked extensively with Stockhausen
Bernhard Wambach	1987	<ul style="list-style-type: none"> - First studio recording of Klavierstücke I–XIV - Worked with Stockhausen
Ellen Corver	2000	<ul style="list-style-type: none"> - First supervised studio recording of Klavierstücke I–XIV - Worked extensively with Stockhausen
Steffen Schleiermacher	2000	<ul style="list-style-type: none"> - Klavierstücke I–V recorded as part of overview disc of ‘Piano Music of the Darmstadt School’ - Klavierstücke VII–IX recorded subsequently - Worked with Stockhausen
Ph-Hsien Chen	2014	<ul style="list-style-type: none"> - Klavierstücke I–VI released alongside recordings of late Beethoven Sonatas - Contact with Stockhausen unknown
Vanessa Benelli Mosell	2015	<ul style="list-style-type: none"> - Klavierstücke I–V and VII–IX released alongside recordings of Beffa and Stravinsky - Klavierstück XII recorded subsequently - Last recorded pianist to work with the composer - Winner of the 2006 Stockhausen Courses first prize for performance of Klavierstücke I–IV
Sabine Liebner	2017	<ul style="list-style-type: none"> - Third studio recording of Klavierstücke I–XI - No known contact with Stockhausen

Table 2.1 Selected recording corpus for Klavierstück I

My analysis of these recordings in relation to the affordances of the score is supported by analysis of my own recordings, which set out to systematically investigate the limits of literalist interpretation in the realms of tempo, rhythm, and dynamics. These findings are then used to test the conflicting, yet similarly polemical hypotheses of Schuller on the one hand, and Mathew and Duncan on the other. They are also used to provide evidence for Grant's vision of serial aesthetics, and to offer a practical basis for serial listening. This concept remains underdeveloped in Grant's book, chiefly through lack of engagement with the affordances of serial scores and the actualities of performances. Nevertheless, it remains worthwhile, encouraging modes of aesthetic appreciation that are suited to the non-thematic principles and hermeneutic contexts of serial music discussed in this thesis.

Ultimately, this chapter aims to address the influence of individual interpretation on the quality of the serial aesthetic, and the presence of three principal styles of performance that have emerged over the course of the nearly seventy year performance history of *Klavierstück I*; these I term the experimental, the analytical, and the classical, epitomised respectively by David Tudor in the 1950s, Herbert Henck in the 1980s, and Ellen Corver in the 1990s. While not mutually exclusive, these styles, discernible to a greater or lesser extent in my own recordings, call for differing modes of serial listening, which may in turn allow for serious judgements of value and taste by the listener. To fully understand these styles, however, first requires an understanding of the affordances of the score.

2.2 Technical demands and affordances

Unlike Messiaen and Boulez, both of whom approached parametric composition for the piano as concert-standard pianists, Stockhausen's primary experience as a performer prior to composing *Klavierstück I* was as a lounge pianist, and as an improviser of accompaniments for Adrion the Conjuror, with whom he toured Germany from summer 1950 to the end of 1951, while continuing to work hard on early serial compositions such as *Kreuzspiel* (1951).⁵⁶ As Michael Kurtz relates, 'during these months there must have been strong conflicts within Stockhausen's music making: when improvising for Adrion he could let his intuition run free, achieving certain things he could never have written.'⁵⁷ These formative experiences offer an important, overlooked context for the originality and creativity of Stockhausen's piano writing in the early *Klavierstücke* and beyond.⁵⁸

It is also worth noting that *Klavierstück I* did not begin life as a compositional experiment, as in *Mode de valeurs*, or as an exercise in stylistic negation, as in *Structures I*, but rather as a *Klavierstück*: a piece written specifically for pianist and piano, in contradistinction to the fixed media of early electronic music.⁵⁹ Much of *Klavierstück I* is therefore idiomatic and physically satisfying to play, despite its reportedly brief period of composition.⁶⁰ This, together with its place in the over-arching *Klavierstücke I–XI*, has undoubtedly contributed to its popularity among performers. Certain aspects of the score,

⁵⁶ Kurtz, p. 44.

⁵⁷ *Ibid.*.

⁵⁸ Kurtz also locates the origins of Stockhausen's improvisational practice of the 1960s in these experiences. *Ibid.*.

⁵⁹ The nineteen *Klavierstücke* that Stockhausen ultimately completed are the only pieces, aside from the *Drei Lieder* (1950), the *Sonatine for Violin and Piano* (1951), and the *Elektronische Studie I and II* (1954) that bear generic titles, with poetic, albeit frequently process-related, single-word titles chosen for most of his oeuvre, signifying his continued interest in the specifics of the piano and later the synthesizer (*Klavierstücke XV–XIX*).

⁶⁰ According to the composer, the original draft was completed in just two days. Stockhausen, 'Gruppenkomposition', p. 74.

however, particularly those less critically translated from electronic music, remain problematic.

The most striking and infamous notational features of *Klavierstück I* are its so-called ‘irrational’ rhythms: complex, non-binary divisions of durational values, such as those reproduced in Schuller’s critique.⁶¹ Maarten Quanten recognises their origins in the proportional measurement of tape for the *Konkrete Etüde*, whereby ‘over-durations’ are divided into complex groups of ‘subordinate durations’, suggesting a translation of Stockhausen’s thinking for the two media.⁶² However, it seems likely that the idea for this notation, and perhaps the origin of what is now more neutrally described as nested-tuplet practice, came from Messiaen’s *Messe de la Pentecôte* (1950), to which Stockhausen would have been introduced during his classes with the composer in Paris in 1952 (see Example 2.4).⁶³

⁶¹ The term ‘irrational notation’ first appeared in *Die Reihe* in connection with serial music, and continues to be used in discussion of Stockhausen’s notation, as well as that of later complex music. The use of such rhythms in the *Klavierstücke* is principally restricted to *Klavierstücke I–IV*, with the composer preferring multiples of demisemiquavers in combination with small-notes and tempo alterations in the subsequent pieces. However, ‘irrational’ rhythms do appear once again in fragments of *Klavierstück XI*.

⁶² Quanten, ‘On the Temporal Organisation of Karlheinz Stockhausen’s Early Group Compositions’, pp. 46–8.

⁶³ Robert Sherlaw Johnson notes that in the *Messe* ‘a number of Greek rhythms are treated in “irrational values”. Instead of being built up from a basic unit-value, these rhythms divide a longer duration into varying numbers of units which fluctuate in tempo one to another. The relationships may be simple ones, such as three in the time of two or five in the time of four, or more complicated, such as fifteen in the time of eight or twenty-one in the time of sixteen’. Robert Sherlaw Johnson, *Messiaen* (Berkeley: University of California Press, 1975), p. 111.

The image shows a musical score for three staves: MAN (right hand), MAN (left hand), and PÉD (pedal). The score is for Messiaen's 'Messe de la Pentecôte, Entrée', bars 24-26. The music features complex rhythmic patterns, including 3:2 and 7:8 ratios, and dynamic markings like 'più f' and 'flegato'.

Example 2.4 Messiaen, *Messe de la Pentecôte, Entrée*, bars 24–26

Regardless of their exact origins, the most challenging rhythms of Klavierstück I represent a significant increase in complexity to those of Messiaen's piece. Indeed, there appears to have been no established practice for their realisation at the time of writing. This is corroborated by the increasingly worried tone of Marcelle Mercenier's correspondence with the composer, prior to the premiere of Klavierstücke I–V at the 1954 Darmstadt New Music Courses,⁶⁴ and Boulez's trenchant critique of their playability in the first edition of *Die Reihe*.⁶⁵ Following the initial publication of Klavierstücke I–IV by Universal Edition in 1954, Stockhausen provided an addendum advising that the more complicated rhythmic proportions be performed using tempo substitutions.⁶⁶ This is the first documentation of a technique that would subsequently be advocated as a means of approaching tuplet rhythms

⁶⁴ 'Because of my growing fear of having to play your pieces to you soon. I am very afraid. Of you'. 'Dû à la crainte grandissante d'avoir maintenant bientôt à vous jouer vos pièces [sic]. J'ai très peur. De vous'. Letter from Mercenier to Stockhausen, 11 August 1954, reproduced in Imke Misch and Markus Bandur, eds, *Karlheinz Stockhausen bei den Internationalen Ferienkursen für Neue Musik in Darmstadt 1951–1996: Dokumente und Briefe 1951–1996* (Kürten: Stockhausen-Verlag, 2001), p. 88.

⁶⁵ Pierre Boulez, "An der Grenze des Fruchtländes".

⁶⁶ This indication appears in the second reprint, published in 1959. Sadly, the Universal Edition archive has no copy of the first reprint from 1956, where it may appear for the first time. As the principal pianist performing Klavierstücke I–IV during this period, the idea may have come from Tudor.

in later complex music,⁶⁷ suggesting a direct practical connection between Stockhausen's early work and the practice of New Complexity, which Duncan overlooks. In combination with other methods, including lowest common denominator proportioning,⁶⁸ and the production of bespoke counting tapes,⁶⁹ the nested tuplets of the opening bar are now eminently realisable, as the precision of a number of performances, to be discussed in due course, can testify.

Not all of the rhythmic figurations in *Klavierstück I* are so straightforward. Particular challenges arise when complex rhythms are combined with disparate pitch distribution and non-idiomatic dynamic markings: a contingency that Schuller fails to address in his critique.⁷⁰ Matters are made significantly more complicated, and from the listener's perspective more interesting, by Stockhausen's direction to perform the piece 'as fast as possible' according to the speed of execution of the smallest note values, which occur in the second nested group of bar 6. As my analysis will show, the non-literal way that performers approach this bar, and what they choose to prioritise in its interpretation, has remained relatively consistent since the first performances, with implications for the aesthetics of each performance as a whole. The possibility of empirically determining a base tempo from this bar while adhering to this traditional performance practice is investigated in my first experimental version of the piece (Version A).

⁶⁷ See for example Cox, 'Notes Toward a Performance Practice for Complex Music', and Schick, 'Developing an Interpretive Context: Learning Brian Ferneyhough's *Bone Alphabet*'.

⁶⁸ Tudor's working notes for *Klavierstück I* show evidence of this method, whereby complex ratios are reduced to their lowest common values. Archival material reproduced in Nedelman, pp. 50–60.

⁶⁹ Use of crotchet-based counting tapes was advocated as a learning strategy for *Klavierstück I* by Ellen Corver at the 2019 Stockhausen Courses, Kürten.

⁷⁰ It is worth noting that, while still challenging, Stockhausen's alternations of *ff* and *fff* are considerably more idiomatic than the wider variety of dynamic markings that feature in Schuller's hypothetical bar (see Example 2.1).

Such instances of 'irrational' notation constitute one extreme of a rhythmic continuum in Klavierstück I, which extends down to simple binary relationships, and ultimately the inaction denoted by various rest durations. This continuum is an essential feature of the statistical form of serial music. According to Grant, 'the criteria of statistical form are not heard in terms of individual formants but as complexes. This depends on the rate at which events occur: slower structures will increase the ability to hear the individual elements, so that pointillist structures can be described as a special case of statistical form', concluding that 'it is the possibility of a field between these extremes which appealed to Stockhausen.'⁷¹ What matters for the listener, and indeed the performer, is the serially determined equilibrium of rhythmic complexity that underpins the piece, ranging from that which might theoretically be performed with the type of literalism ascribed by Mathew and Duncan, to that which demands technical compromise and innovation, ensuring unforeseeable results. The difference in later complex music is the overriding presence and drastic expansion of this latter category. The reduction in speed necessary to perform all of Klavierstück I's rhythms accurately, and the aesthetic and hermeneutic ramifications of this practice, are investigated in my second experimental version of the piece (Version B), which also serves to test Schuller's hypothesis that a literal interpretation of such rhythmic notation is not possible.

In line with its serial premises, the level of variegation in dynamic markings in Klavierstück I does not change when material becomes more rhythmically complex and less idiomatic. Therefore, the possibility of accurately realising dynamic contrasts is also contingent on the complexity of the material, and the performer's choice of tempo. The stark

⁷¹ Grant, p. 139.

opening juxtapositions and subtle *piano* and *mezzo-forte* voicing of the A-B \flat dyad in bar 1 are thus technically achievable at a range of tempi, while the non-idiomatic juxtapositions of bar 6 remain impossible for the performer and imperceptible for the listener at any significant speed. As my analysis will make clear, a wide range of dynamic interpretation has been recorded within idiomatic contexts, with some performers flattening or attenuating contrasts—thereby exhibiting the type of objective colour palette that Mathew describes—while others have played them up. The further reduction in speed necessary to accurately realise dynamic contrasts in bar 6, and the aesthetic and hermeneutic ramifications of this practice, are investigated in my final experimental version of the piece (Version C).

While the non-idiomatic dynamic configurations of bar 6 and elsewhere remain within the realm of technical possibility, Stockhausen's stratification of dynamic markings in certain chords is more fundamentally problematic. Pace has cited non-idiomatic voicing, particularly that which avoids uncritical projection of the upper part, as a key feature of modernist performance practice, with direct reference to Stockhausen's early Klavierstücke.⁷² Countering Ronald Stevenson's assertion that dynamically stratified chords in these pieces are 'simply unplayable', he suggests that they can be discerned in recordings by Kontarsky, Tudor, Henck, Wambach, and Corver. However, close listening to performance of the stratified chords in bars 11 and 54 in these canonical recordings disproves this. Moreover, Corver herself has specifically addressed the impossibility of realising the stratified dynamics of the bar 11 chord—made more challenging by its high register.⁷³ Some

⁷² Pace, 'Notation', p. 161.

⁷³ Ellen Corver, *The Development of the Performer's Role within Karlheinz Stockhausen's Piano Works* (unpublished master's thesis, Royal Conservatoire the Hague, 2019), p. 8. Corver is generally critical of the limited interpretive freedoms of Klavierstück I, which she attributes to its translation of electronic principles, viewing it more as 'music for the eye'. *Ibid.*, pp. 5–16

creative solutions to this problem have emerged, which I will address in due course. In literal terms, however, this notation, which suggests thinking in terms of layers of electronic sound, does not afford direct translation, at best pointing towards the possibility of creative voicing elsewhere.

One of the most significant pianistic developments to emerge from serial and American experimental music of the 1950s was the expanded use of the pedals. These innovations came in two principal forms. First, the colouristic use of half and other variable sustaining pedal markings, often appearing in combination with novel modes of attack, pioneered by Tudor in his work with John Cage and other members of the New York School, and adopted by Stockhausen in *Klavierstücke V–XI*.⁷⁴ Second, and less widely recognised because of its subtlety, was the virtuoso use of the *sostenuto* pedal, which became necessary to manage precisely the stratified textures of early serial music.

Sustaining pedal markings are minimal in *Klavierstück I*, allowing for the accumulation and simultaneous release of disparate tones in bars 1, 46, and 47; supporting a more resonant climax in bars 42 and 61; and giving rise to an impressionistic wash in bars 24–7 and bars 48–50, which will naturally contrast with the dry articulation of surrounding material. This latter colouristic use of the pedal evokes the timbre of early electronic music recordings,⁷⁵ while anticipating the more sophisticated and diverse use of

⁷⁴ See Martin Iddon, *John Cage and David Tudor: Correspondence on Interpretation and Performance* (Cambridge: Cambridge University Press, 2013), pp. 18–21 for correspondence regarding Tudor’s innovative pedalling in Cage’s *Music of Changes* (1951). See also Cage’s report in a letter to Donaueschingen director Heinrich Strobel, 3 December 1954 that, following their first meetings, ‘Stockhausen was delighted with Tudor’s playing and said that ideas which he had refrained from writing thinking they would be unplayable, he will now write’. Cited in Amy C. Beal, “David Tudor in Darmstadt”, *Contemporary Music Review*, 26.1(2007), 77–88, (p.86).

⁷⁵ Hear for example the timbre of Stockhausen’s *Elektronische Studie II*, whose individual sounds were recorded in a reverberation chamber. Williams, ‘Interpretation and Performance Practice in Realizing Stockhausen’s *Studie II*’, p. 451.

sustaining pedal in the later piano pieces. These markings are equally suggestive of Stockhausen's background as an improviser of special effects, particularly when accompanied by *subito* dynamic juxtapositions (see for example the transitions from bars 23–24 and 47–48).⁷⁶

Elsewhere, use of the *sostenuto* pedal is implied, though never indicated. For example, it is needed to sustain the lower dyad of bar 5 through the virtuosic figurations of bar 6.⁷⁷ In other places, such as bar 20, where Stockhausen calls for the stratified release of a six-note chord within a 7:8 quaver-tuplet proportioning, implied use of *sostenuto* pedal is more complicated. Whether envisioned by Stockhausen or not, one 'solution' here involves catching the low grace-note dyad in the *sostenuto* pedal, then quickly playing the upper pair of dyads, before substituting fingers to retake the upper note of the lowest dyad. The low E_b can then be released from the *sostenuto* pedal, with the remaining note-endings controlled manually.⁷⁸ The influence of implied *sostenuto* pedal use in Klavierstück I, and in other early serial music, can be felt in the sophisticated and explicit use of *sostenuto* pedal by composers such as Helmut Lachenmann and Rebecca Saunders, particularly as a means of sustaining silently depressed keys, a technique that would also become prevalent in the later Klavierstücke.⁷⁹ However, as Peter Hill has pointed out, the uncharacteristic cloudiness of Messiaen's own recording of *Mode de valeurs* suggests that such sophisticated use of the

⁷⁶ Although the *una corda* is not indicated in Klavierstücke I–IV, it will remain an important colouristic resource for most performers in instances such as these.

⁷⁷ Corver views this as a problem, since the pitches of the dyad are repeated in the left hand during bar 6. Corver, p. 8. At speed, however, the reduced clarity of the final attacks is virtually imperceptible.

⁷⁸ Mercenier's audible retaking of notes in her early live recording suggests that she had not reached this solution, or that the piano did not have a *sostenuto* pedal. Tellingly, in a letter to Stockhausen dated November 1956 with references to upcoming performances of Klavierstücke I–IV, Tudor writes that 'it is almost essential to have a piano with 3 pedals. Is this possible? – I don't wish to raise the expense of course, but please find out what kind of instruments I will have to use, so I can prepare for the worst.' Copy held at the Stockhausen Stiftung, Kürten. Permission for reproduction granted by the Tudor estate.

⁷⁹ See for example Lachenmann's *Serynade* (1998) and Saunders's *Shadow* (2013), both for solo piano.

middle pedal had not been considered for the earliest serial piano music, even by expert pianist-composers.⁸⁰ Indeed, neither this piece nor Boulez's *Structures I* contain any pedal markings. The performer is thus left to decide whether adjacent notes should be separated or connected, and how to manage and prioritise durational overlaps. This suggests an influential performer-driven development, made in response to music for which, as Grant observes, practice frequently lagged behind theory.⁸¹

As with many aspects of the performance practice of serial music, the use of *sostenuto* pedal becomes a question of technical priority, with ramifications for textural clarity, as well as rhythmic execution, and even choice of tempo.⁸² As Stockhausen's comments reveal, precision of duration was of paramount importance, and as the technical management of bar 20 shows, this was not always as simple as Mathew and Duncan would have us believe. The question of pedalling in relation to the connection or separation of tones, however, remains more subjective in its interpretation.

Klavierstück I features just two explicit articulation markings, namely slurs linking dyads in bars 3–4, and linking a four-note chord with a single high tone in bars 9–10, in stark contrast to the ubiquitous, parametric variety of articulation markings in *Mode de valeurs* and *Structures I*, thereby sidestepping some of the contradictions of these works.⁸³ The

⁸⁰ Peter Hill, 'Messiaen recorded: the Quatre Études de rythme', in *Olivier Messiaen: Music, Art and Literature*, ed. by Christopher Dingle and Nigel Simeone (Aldershot: Ashgate, 2007), pp. 79–114 (p. 87), with reference to Olivier Messiaen, *Mode de valeurs et d'intensités*, Olivier Messiaen, piano (FMR, FMRC120-L0403, 2003). As Hill notes, 'what makes Messiaen's performance so puzzling is that (from my experience) overpedalling was the vice in pianists he most detested, with inappropriate blurring of sounds causing him real distress.'

⁸¹ Grant, p. 51.

⁸² Klavierstück X, which is also to be performed 'as fast as possible', features many more instances of implied *sostenuto* pedal use in extremely dense and virtuosic contexts, with related implications for the performer's choice of tempo (see Chapter 4).

⁸³ For example, the impossibility of accurately realising and distinguishing the many different combinations of dynamics and attack types in these pieces, further complicated by considerations of register, instrument, and venue. This of course becomes even more challenging in a work for two pianos such as *Structures I*.

performer is therefore left to decide in many instances whether to connect adjacent tones, using either a manual legato—often calling for finger substitution or the rearrangement of hands—or the sustaining pedal, or whether to embrace the separation of disjunct intervals, thereby affecting a drier, pointillistic texture. The visual aspect of these decisions in live performance is also important. For example, Gregor Prozesky, in his video recording, the only such version currently available on YouTube, clearly lifts his hands away from the keyboard after playing each note, thereby invoking a pointillist aesthetic, despite their audible connection with the sustaining pedal.⁸⁴ Other pianists, including myself, prefer to connect these—and as many other adjacent tones as possible—manually, to promote a more linear and lyrical sense of line, further conveyed in live performance through physical engagement with the keyboard. The visual impact of this physicality is of course lost in audio recordings; however, an awareness of the embodied gestures involved in all of the interpretive actions discussed above, and demonstrated in my own video recordings, remains vital for appreciation of this music—an idea to which I return at the end of this chapter.

2.3 Orientation and methods of analysis

Bar 6 represents what I will term the ‘crux’ of Klavierstück I and should theoretically determine each performer’s ‘as fast as possible’ tempo, depending on which aspects of the notation they choose to prioritise.⁸⁵ There are five more similarly dense and technically

⁸⁴ ‘Karlheinz Stockhausen Klavierstücke I - IV - Gregor Prozesky, Klavier’.

⁸⁵ As noted, the second nested grouping should technically determine this tempo. However, for the purpose of my analysis, the tempo of the bar as a whole is taken as representative. The term ‘crux’ is borrowed from its use in rock-climbing to describe the hardest move or moves of a route or boulder problem.

challenging passages, constituting further localised cruxes. These six cruxes are fairly evenly distributed between the six sections of approximately twenty-one crotchets that appear in Stockhausen's original sketches, labelled A–F.⁸⁶ As Table 2.2 illustrates, each section contains one crux, except for Section E which contains two, and Section F which contains none.

Section	Bars	Crux	Bars
A	1–7	I	6
B	8–14	II	13–16
C	15–27	III	22–23.1
D	28–41	IV	34–36.2
E	42–52	V	46
		VI	50–52
F	53–61	-	-

Table 2.2 Distribution of sections and cruxes

In light of my analysis of the affordances of the score, and the equilibrium of technical difficulty which stands in direct relation to the serial organisation of material, these passages become important foci for serial listening. First, with respect to their extreme physicality, whereby the irrational, embodied actions of the performer stand in maximum contrast to the analogous, yet fixed sonic complexes of contemporaneous electronic music. Second, in

⁸⁶ Quanten, p. 45.

their contrast with moments of maximum repose and simplicity within the piece itself, that is, as collective extremes of the interrelated, rhythmic, dynamic, and registral continua that underscore the composition. Whether a performer maintains tempo through these passages, speeds up, or as is frequently the case, slows down, and of course how passages of lesser complexity are treated, will also have a significant effect on the maintenance or distortion of rhythmic and textural equilibrium, and thus the quality of the serial aesthetic. For this reason, while bearing in mind the traditional formal significance of rests and long tones, my analysis and the production of my recordings are primarily oriented around these six sections and their constituent cruxes.

Finally, some notes on my technical approach. In Table 2.2 and throughout my analysis, individual attacks, containing single or multiple tones, are referenced in terms of their position within each bar; the G-F# dyad in bar 1 would thus be attack 1.8. Inter-onset timings were extracted using Sonic Visualiser. In light of their temporal ambiguity, grace notes, appearing individually or in pairs in bars 7, 19, 20, 34, 42, and 54 were not accounted for, resulting in an inevitable, if slight distortion of timing data. Misalignments and omissions were necessarily factored into calculations. Since they are not consistently audible, the release of notes/onset of rests was disregarded. Consequently, average tempo was determined from the first attack value of sections beginning with rests and average tempo for preceding sections was determined up until the final attack value. Average tempi for cruxes I and IV were determined up until the final attack of each bar, thereby avoiding the metric ambiguity of subsequent grace notes. Sample data for Mercenier's recording is presented in Appendix A. 'Global tempo' refers to the average tempo of the performance as a whole. Timings are provided for reference throughout.

2.4 Performance analysis of existing recordings

Individual responses to Stockhausen's 'as fast as possible' direction have resulted in a wide range of global tempi in the selected corpus of recordings; these tempi are presented in ascending order in Figure 2.1. While limited, these data suggest the presence of relatively slow (Henck, Schleiermacher, and Wambach), moderate (Corver, Liebner, Mercenier, and Kontarsky), and fast (Mosell, Chen, Tudor, and Klein) performance types.⁸⁷ As the chronological ordering of Figure 2.2 illustrates, Henck's recording is significantly slower than those of his predecessors ($\downarrow = 35$), ushering in a series of slower performances before a return to faster tempi in the 2010s.

While certain stylistic correspondences can be heard between performances at similar tempi, there are also notable differences, particularly with respect to tempo consistency and the proportional performance of cruxes. As Figures 2.3–2.7 illustrate, with performers in ascending order of sectional tempi, these passages are almost always performed more slowly than their respective sections. Isolated exceptions to this rule include Henck and Mercenier for Crux I; Mosell for Crux II; Schleiermacher, Wambach, and Tudor for Crux III; Mosell and Tudor for Crux V; and Wambach for Crux VI. By contrast, six of the eleven pianists play the demisemi-quaver-quintuplets of Crux IV faster than their average tempo for Section D, highlighting a tendency for pianists to perform this crux with greater virtuosity, perhaps in response to the more idiomatic arrangement of pitches.

⁸⁷ It is worth noting here that the tempo of $\downarrow = \text{ca. } 60$ (i.e., $\downarrow = \text{ca. } 30$) given for Schuller's hypothetical bar is significantly slower than any performer on record (see Example 2.1), suggesting either a lack of familiarity with the realities of practice, or a personal attempt at realising the analogous notational challenges of Klavierstück I at such a tempo. See also Quanten's suggested base tempo of $\downarrow = 30$. Quanten, p. 49.

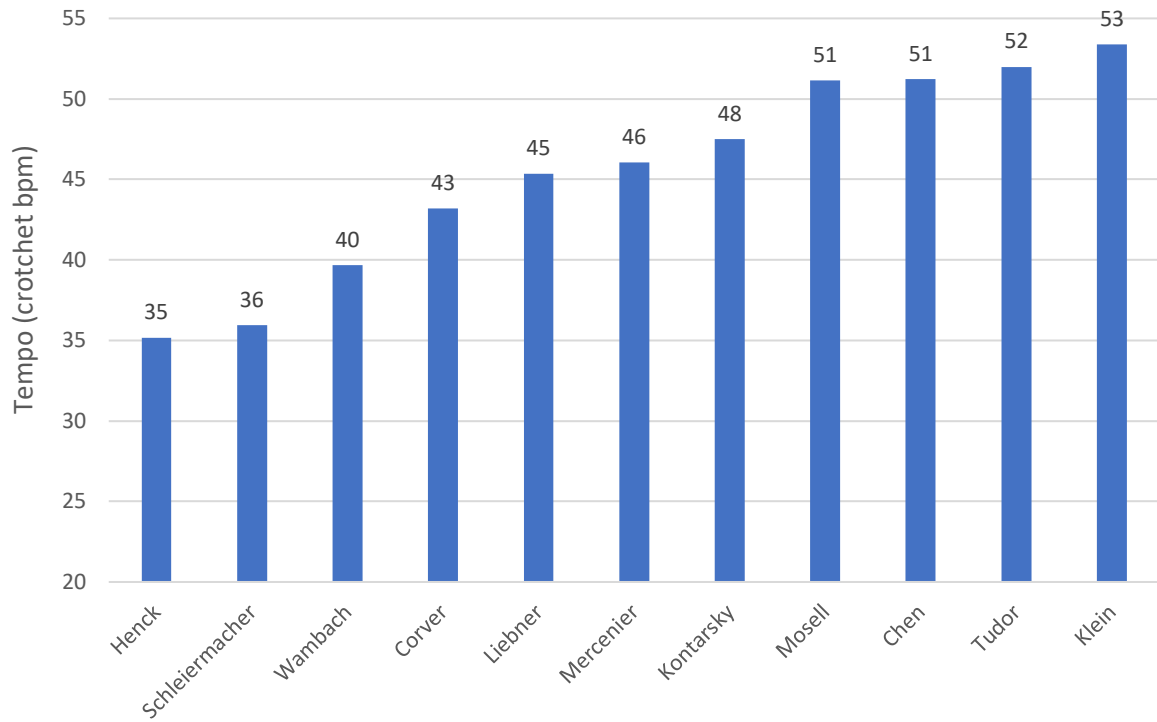


Figure 2.1 Global tempo comparison in ascending order

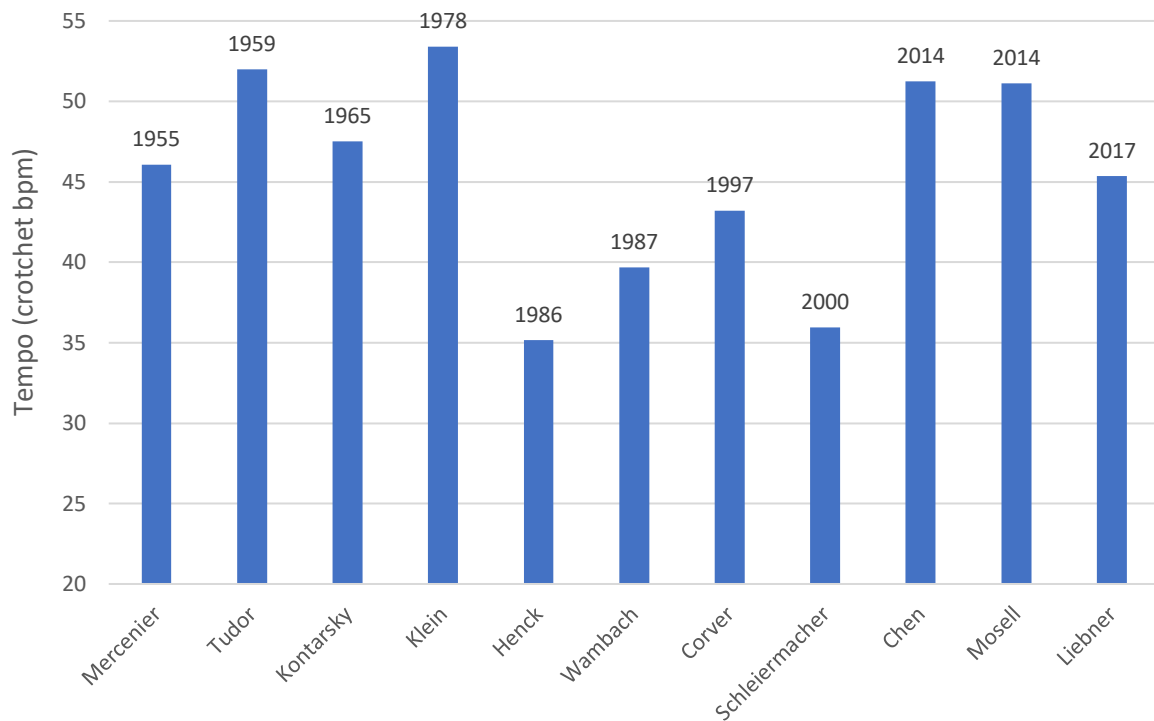


Figure 2.2 Global tempo comparison in chronological order

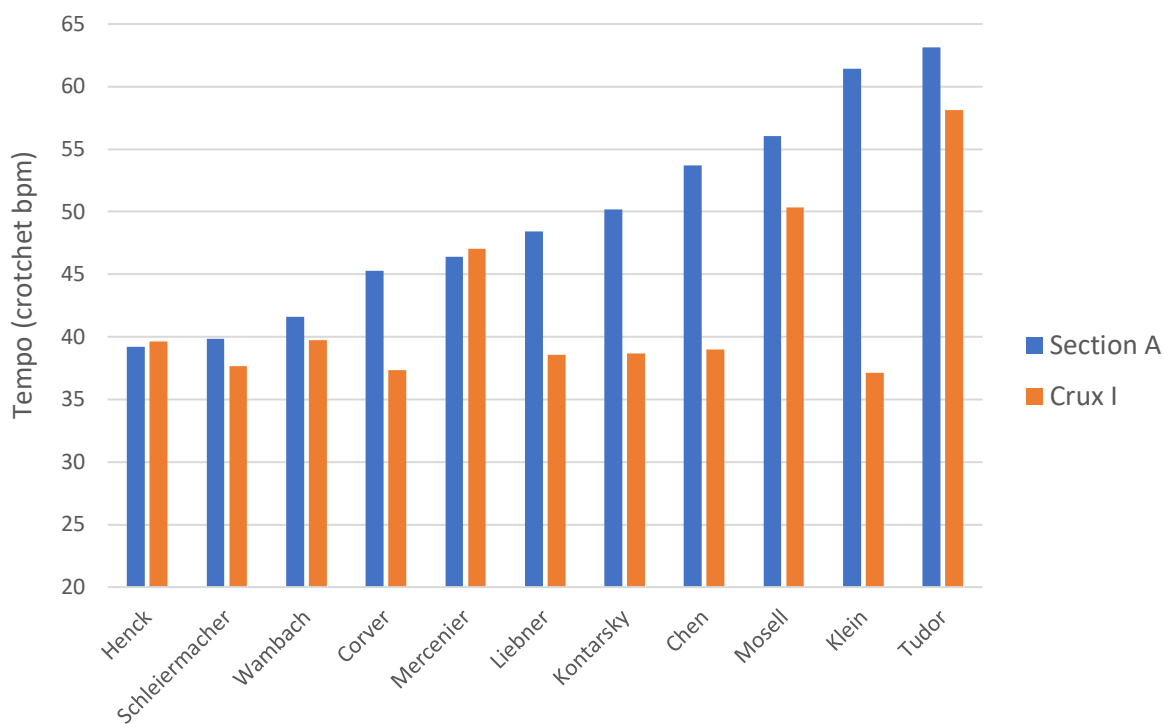


Figure 2.3 Section A and Crux I tempo comparison

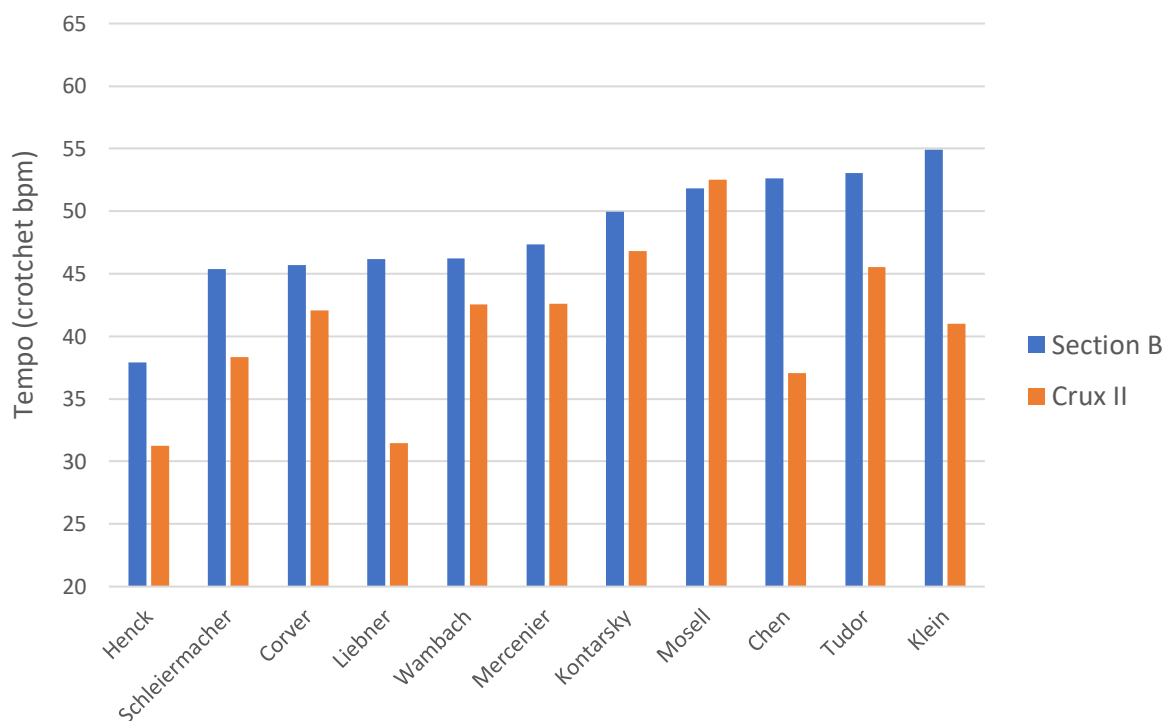


Figure 2.4 Section B and Crux II tempo comparison

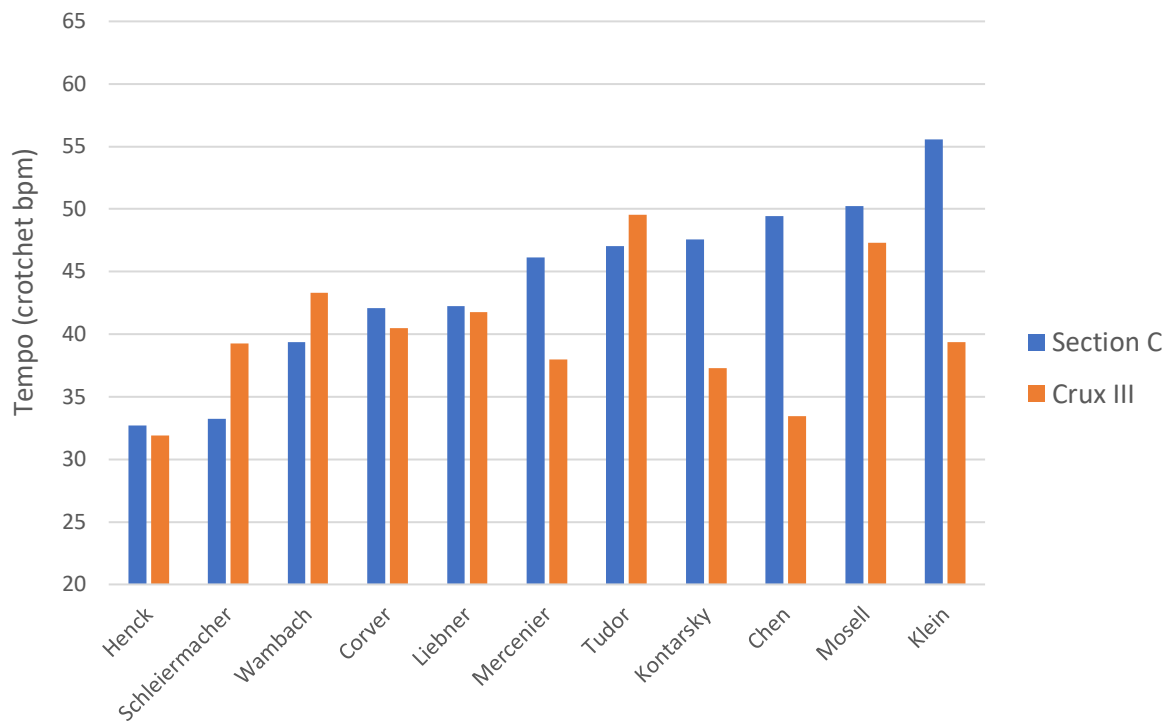


Figure 2.5 Section C and Crux III tempo comparison

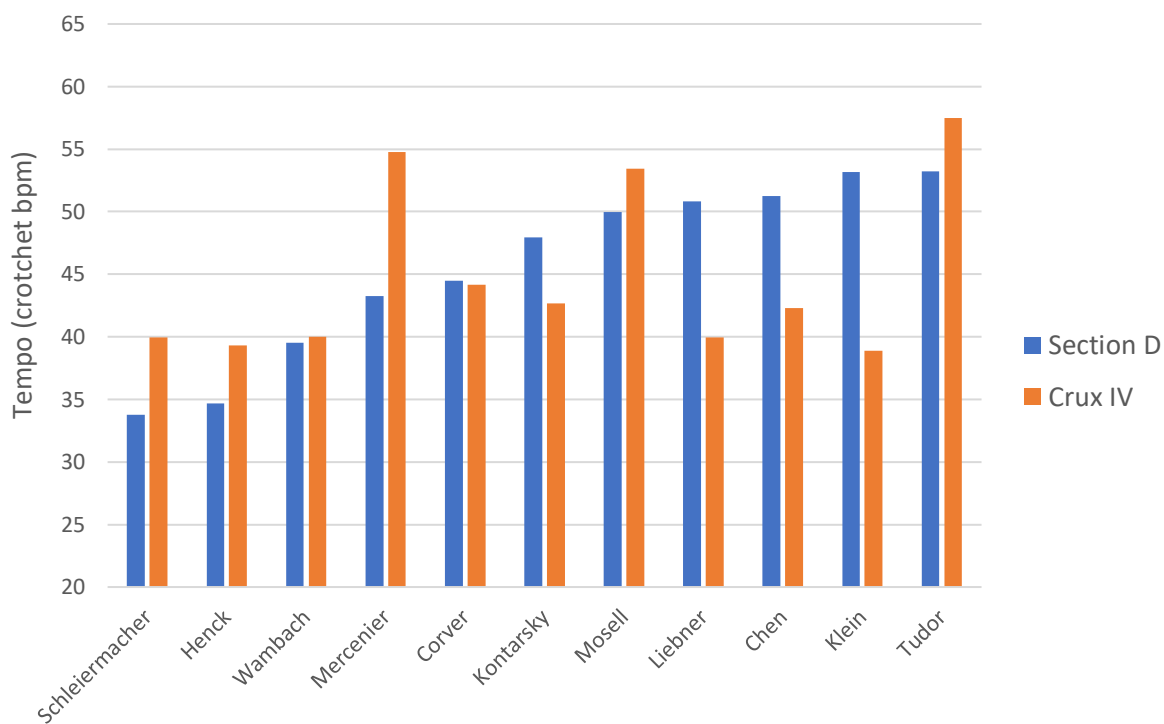


Figure 2.6 Section D and Crux IV tempo comparison

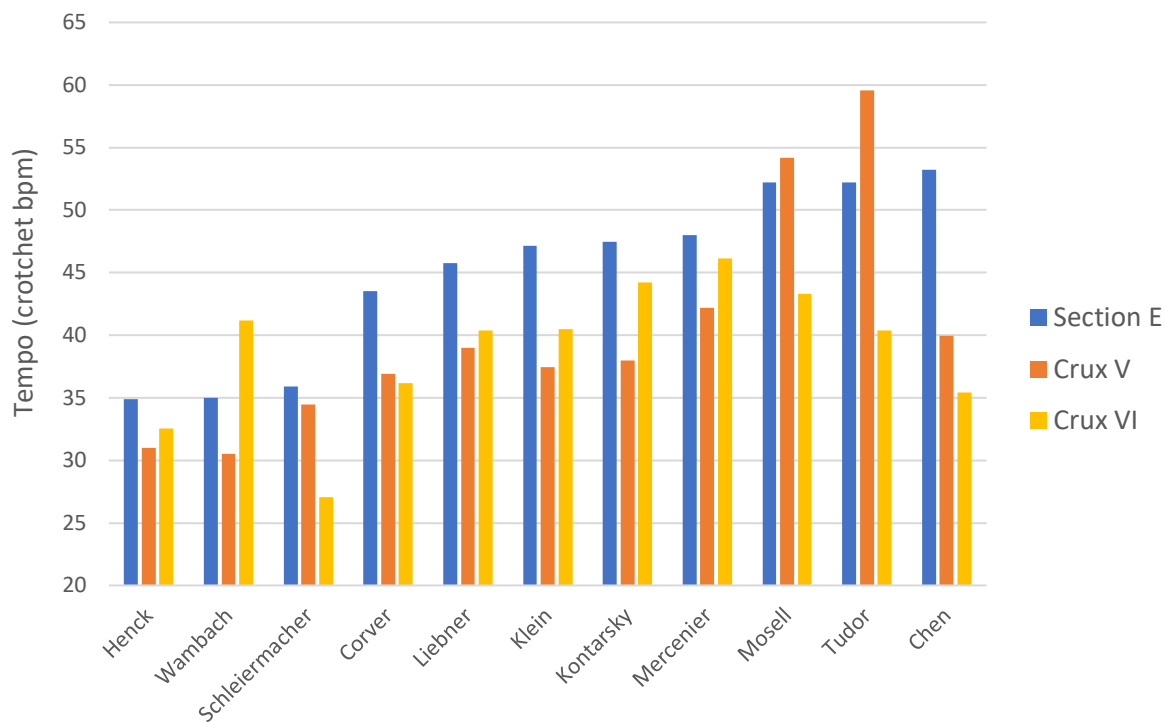


Figure 2.7 Section E and Cruxes V and VI tempo comparison

In terms of individual performances, Mosell is the most consistent, often playing slightly faster during cruxes, despite her fast global tempo ($\downarrow = 51$), thereby foregrounding the inherent virtuosity of the piece. Elsewhere, Henck and Schleiermacher's proportional interpretation of cruxes is the most varied, which, in combination with their slower global tempi and creative approach to expressive detail, to be discussed in due course, foregrounds the heterogeneity of group material. Finally, Klein, Liebner, and Chen show the greatest tendency to slow down during cruxes. This is particularly noticeable in Klein's recording, where slow cruxes are thrown into greater relief by her otherwise propulsive global tempo ($\downarrow = 53$). As a result, the melodic content of each crux becomes easier to discern, in maximum contrast to the irruptive performance of cruxes in similarly fast recordings by Mosell and

Tudor, which take on the quality of statistical *Gestalten*, contrasting in turn with the melodic quality of surrounding material.

As noted, Mercenier and Henck are the only pianists to perform Crux I at a higher average tempo than Section A. Their tempo fluctuation during this crux is also similar, with the exception of Mercenier's anticipation of attack 6.7 and Henck's acceleration towards the final dyad (Mercenier, 1'16"–1'20"; Henck, 0'19"–0'26").⁸⁸ As Figure 2.8 shows, both pianists exhibit considerable tempo irregularity, performing the theoretically periodic groupings in short gestural bursts, though Henck's studio recording is tidier than Mercenier's frantic live performance, the broader implications of which will be discussed in the chapter conclusions.⁸⁹ These bursts, choreographed by the disjunct leaps and suggestive beaming of the groups, feature to a greater or lesser degree in every recording of cruxes featuring periodic note values (i.e., Cruxes I, III, IV, and the 7:6 tuplet of Crux VI). Corver's rapid gestures (0'28"–0'33") and Klein's relatively even, restrained execution, particularly of the 11:12 nested tuplet (0'15"–0'21"), represent opposing extremes of this phenomenon in Crux I (see Figure 2.9).

⁸⁸ Mercenier's timings are given from their embedded position within Stockhausen's 'Anleitung zum Hören', as presented on the CD (see discography for further details).

⁸⁹ All graphs present average tempo between attacks. Hence $\downarrow = 64.49$ for Mercenier's opening data point is the tempo calculated from attack 6.1 to 6.2.

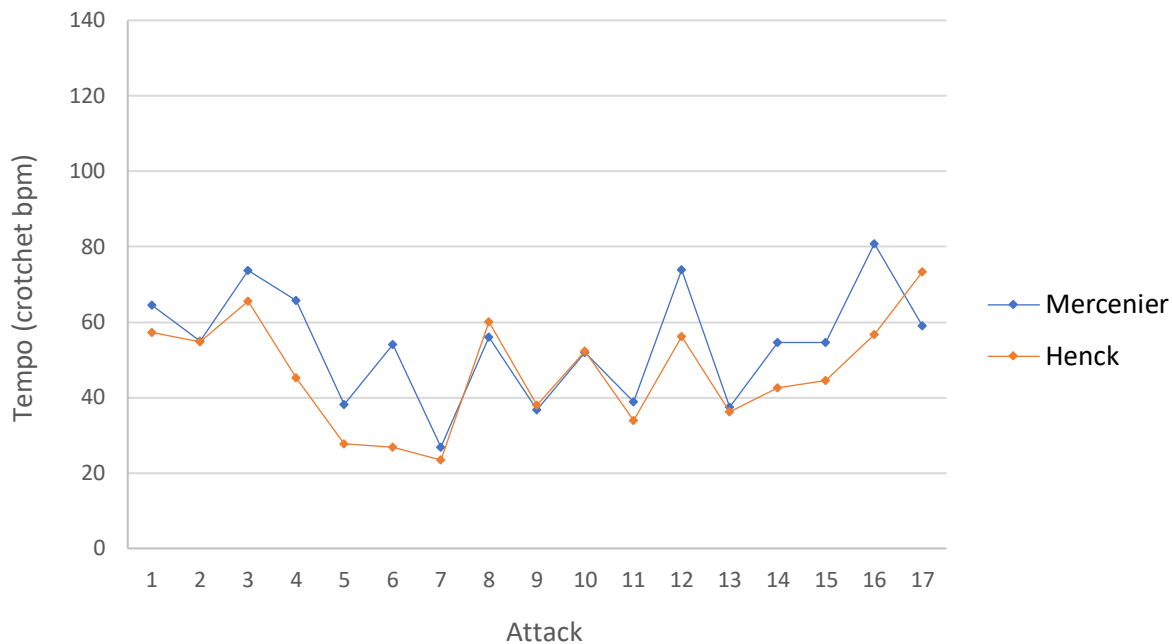


Figure 2.8 Mercenier and Henck Crux I tempo comparison

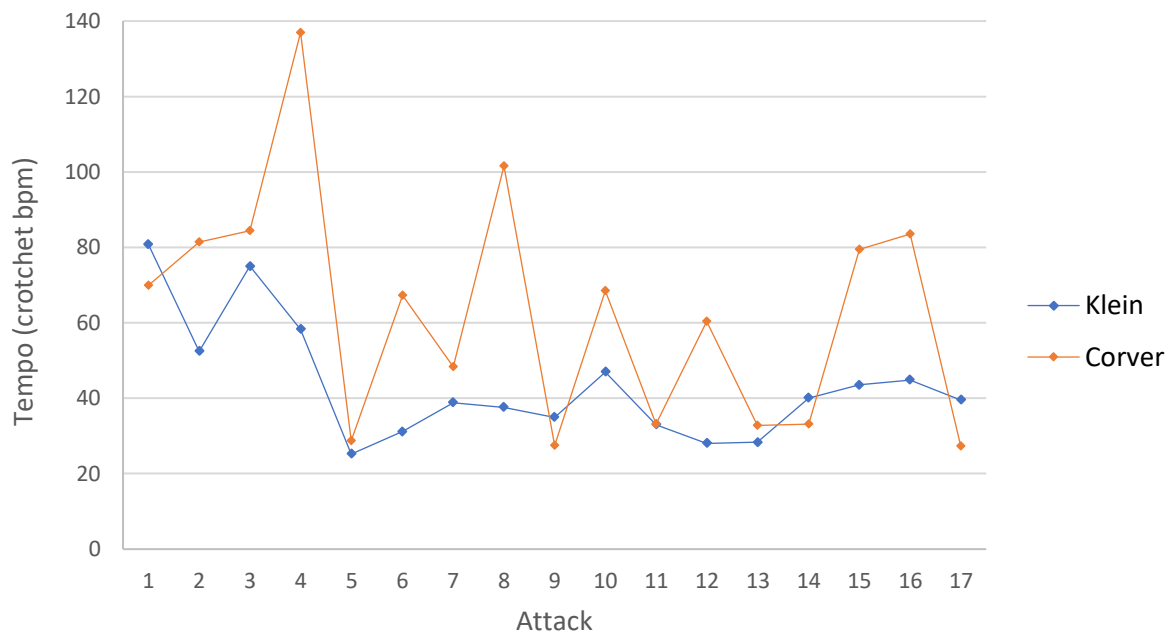


Figure 2.9 Klein and Corver Crux I tempo comparison

Outside of periodic crux contexts, rhythms are generally executed more precisely. This is particularly striking in Wambach’s performance, where the unpredictable dynamism of each crux is enhanced by contrast with the measured poise of surrounding material, as illustrated in Figure 2.10 for Section A and Crux I (0’00”–0’31”). By contrast, Chen exhibits less distinction between rhythmic execution in crux and non-crux contexts, as illustrated in Figure 2.11 (0’00”–0’28”). Together with her proportional slowing of every crux (see Figures 2.3–2.7), this contributes to the prevailing homogeneity and impulsive character of her performance, in contrast to the greater sense of aesthetic variety heard in Wambach’s stricter interpretation.

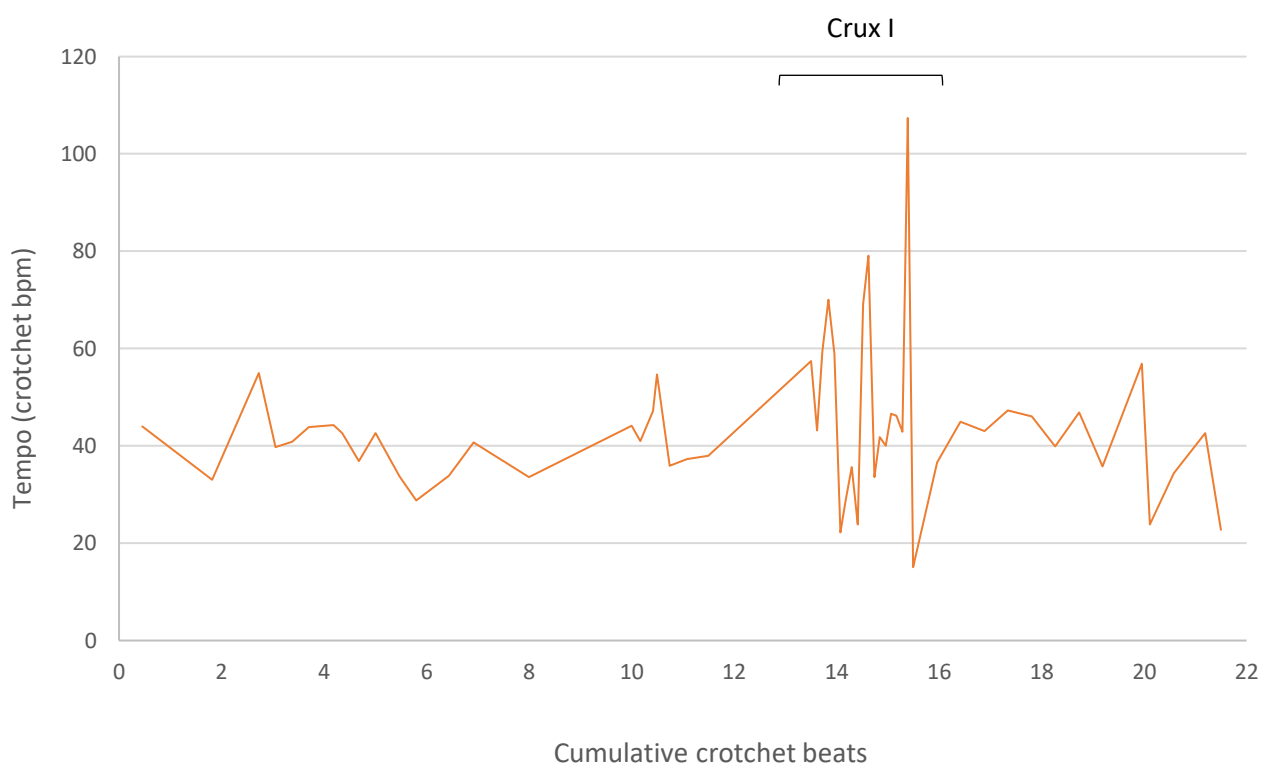


Figure 2.10 Wambach Section A tempo graph

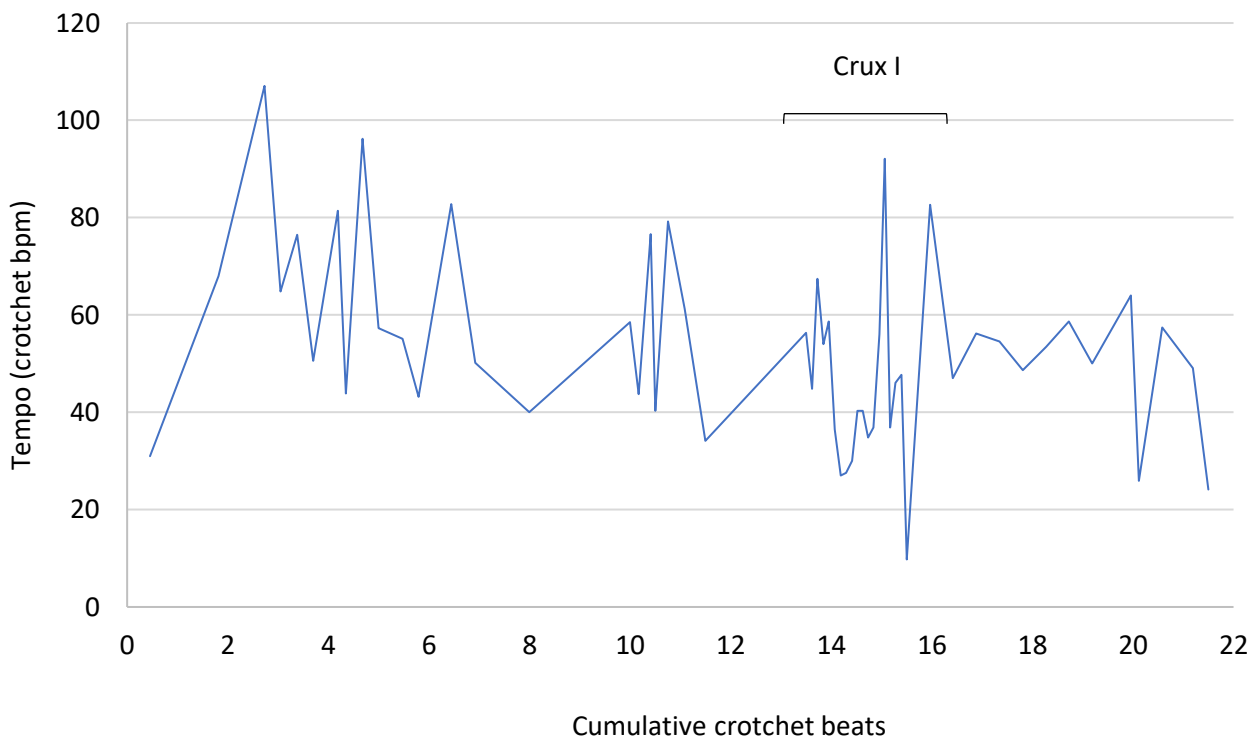


Figure 2.11 Chen Section A tempo graph

In summary, nothing approaching the proportions of the nested-tuplet notation in bar 6 has been reproduced in any of the recordings. Instead, rapid, gestural performance of this and other cruxes, evident from at least the time of Mercenier's 1955 live performance, has become part of the performance tradition, affecting differing degrees of fast, though not precisely calibrated, global tempi. While technically unspecified, evidence from Stockhausen's correspondence with Tudor indicates that he advocated this practice from the outset, writing that for groups of quick notes 'even when [notes] are written with identic [sic] values...If you have a great interval, the duration of the first note will be a bit longer,

than in the case of a small interval!! I really wrote in this manner.’⁹⁰ This directly anticipates his directions for the performance of small-note groups in *Klavierstücke V–X*, which specify that ‘the various intervallic leaps within groups of small notes should result in a differentiation of the actual intervals of entry (do not make them equal),’⁹¹ suggesting a hitherto unexplored dialogical relationship between the performance practice and aesthetics of the two sets of pieces, with implications for the development of his temporal theory.

The emergence of this theory, allowing for degrees of inconsistency in performance within serially ordered ‘time fields’, is commonly attributed to Stockhausen’s work on acoustics and information theory with Werner-Meyer Eppler in early 1954.⁹² However, the composition and early performance practice of *Klavierstück I* might constitute an earlier precedent for this thinking. Given Stockhausen’s abilities as a pianist and the idiomatic writing found elsewhere in the piece, he was surely aware of the performative contradiction between the periodic values and the disparate distribution of pitches in cruxes, in spite of the short time he took to compose the piece. These passages could thus be seen as early prototypes of Stockhausen’s time fields, notated using small notes in *Klavierstücke V–XI*, and

⁹⁰ Letter from Stockhausen to David Tudor, 13 March 1955. Copy held at the Stockhausen Stiftung, Kürten. Permission for reproduction granted by the Tudor estate. In an interview with the author, Benjamin Kobler, who worked closely with the composer during the last ten years of his life and now teaches at the biennial Stockhausen Courses in Kürten, also confirmed that ‘his taste in listening to his pieces was that it doesn’t need to be too mechanical. Which means, for piano piece one, that you can do groupings and play certain notes faster together, have a little pause where you have a jump. He was looking for that [...] He was always encouraging his musicians to play irregularly’. Interview with the author, 9 December 2019, Ensemble Musikfabrik Studio, Cologne.

⁹¹ Karlheinz Stockhausen, ‘General Foreword’, *Klavierstücke V–X* (London: Universal Edition, 1965). Directions for small notes in *Klavierstück XI* are to the same effect but with a slightly different wording.

⁹² As noted, this theory was chiefly expounded in the article ‘...how time passes...’. See Krytska, *Klavierstück XI Interpretationsanalysen*, for in-depth discussion of its application in *Klavierstück XI*, and Grant, *Serial Music, Serial Aesthetics*, for discussion of Meyer-Eppler’s influence on Stockhausen.

through the relation of tempo and breath in the wind quintet *Zeitmaße*,⁹³ wherein irrational rhythmic effects are engendered by the physicality of the performers, as well as the acoustics of the space and the characteristics of the instruments. At the very least, these notational developments and the evidence of the earliest recordings, combined with insights from Stockhausen's correspondence, highlight the reciprocal influence of his observance and involvement in the early performance practice of Klavierstücke I–IV on the development of his temporal theory and his understanding of the unique characteristics of human performance.

For the listener, crux passages in Klavierstück I, lying at one extreme of the statistical spectrum, are the most unforeseeable in performance, varying subtly and sometimes dramatically, not just between performances by different pianists, but between live performances by the same pianist. In response to Schuller's critique, the evidence of the closely supervised recording tradition show that literal translation of this notation was by no means expected, and, in light of Stockhausen's comments to Tudor, actively discouraged in instances such as bar 6. The notation thus takes on a dialectical quality, whereby the density of musical information occasionally overwhelms the information transmission system of the performer; Schuller's simplification (see Example 2.3) would naturally obviate this serial-statistical process. In this sense, he fails to appreciate the type of higher-order serial thought, and its implications for performance practice, which Stockhausen and others were already exhibiting in the early 1950s.

⁹³ The directions 'as fast as possible' and 'as slow as possible' in this piece relate to the breathing capabilities of the performers—as well as speed of manual execution—with the ensemble combination of five different instruments giving rise to unprecedentedly complex statistical forms; *Zeitmaße* could thus be seen as an apotheosis of the statistical performance principles first witnessed in Klavierstück I.

While less gestural and more consistently precise, performances of the idiomatic rhythmic figurations of Cruxes II and V still feature a significant degree of variability, including the appearance of some noteworthy trends. For example, virtually all performers exhibit some form of rubato phrase-arching in the opening septuplet of Crux II (attacks 13.1–7).⁹⁴ Sharing a similar expressive flexibility, Klein (0'44"–0'46"), Henck (1'02"–1'04"), and Wambach (0'55"–0'57") all accentuate the disjunct physicality of the initial hand movement by separating the second and third attacks, before subtly arching the remaining tones, as illustrated in Figure 2.12. By contrast, both Schleiermacher and Corver conceal the physicality of the leap, with Schleiermacher's measured reading slowing subtly from the outset (0'57"–0'59"), while Corver's lyrical arching matches the valleyed melodic counter of the grouping (1'04"–1'06"), as illustrated in Figure 2.13. Finally, Mercenier, Tudor, Kontarsky, and Mosell's interpretations of the septuplet are more physically intense, with Mercenier (1'48"–1'50") and Tudor (0'43"–0'45") dramatically accelerating, while Kontarsky (0'48"–0'50") and Mosell (0'50"–0'52") are more chaotic, as illustrated in Figure 2.14.

⁹⁴ Phrase-arching here refers to the practice of accelerating towards the middle and slowing down towards the end of a phrase. See Cook, *Beyond the Score*, pp. 176–203 for discussion of this phenomenon and its performance-analytical theory with reference to Chopin's Mazurkas.

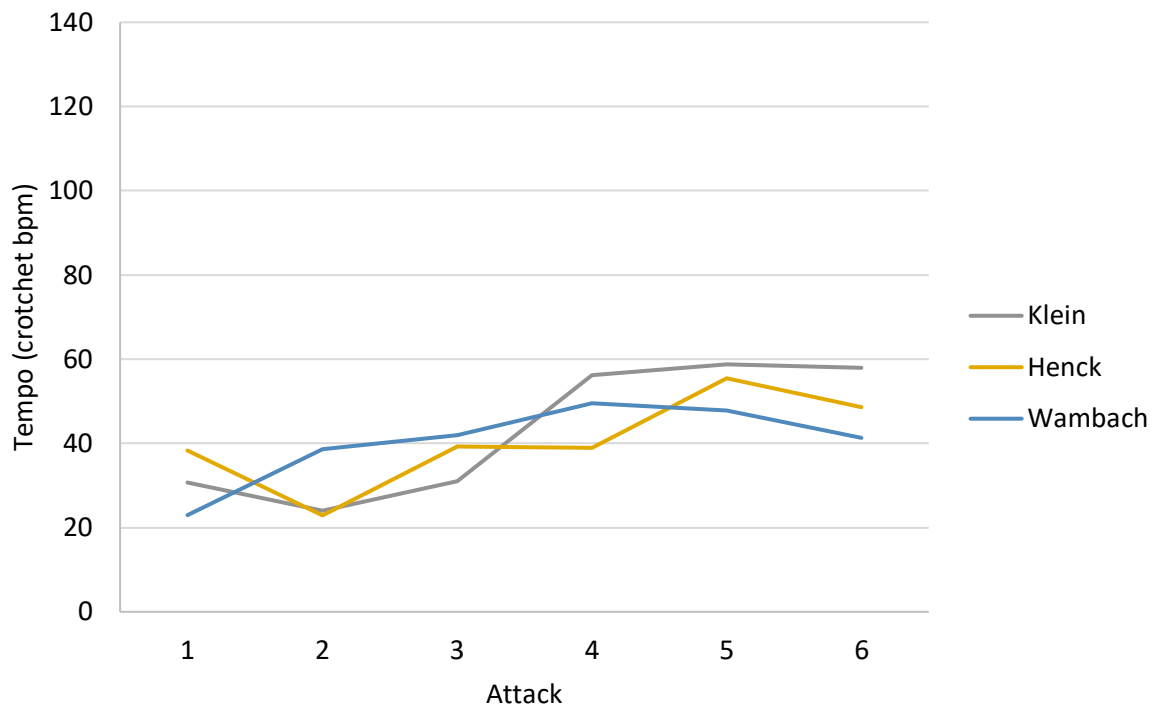


Figure 2.12 Klein, Henck, and Wambach bar 13 septuplet tempo comparison

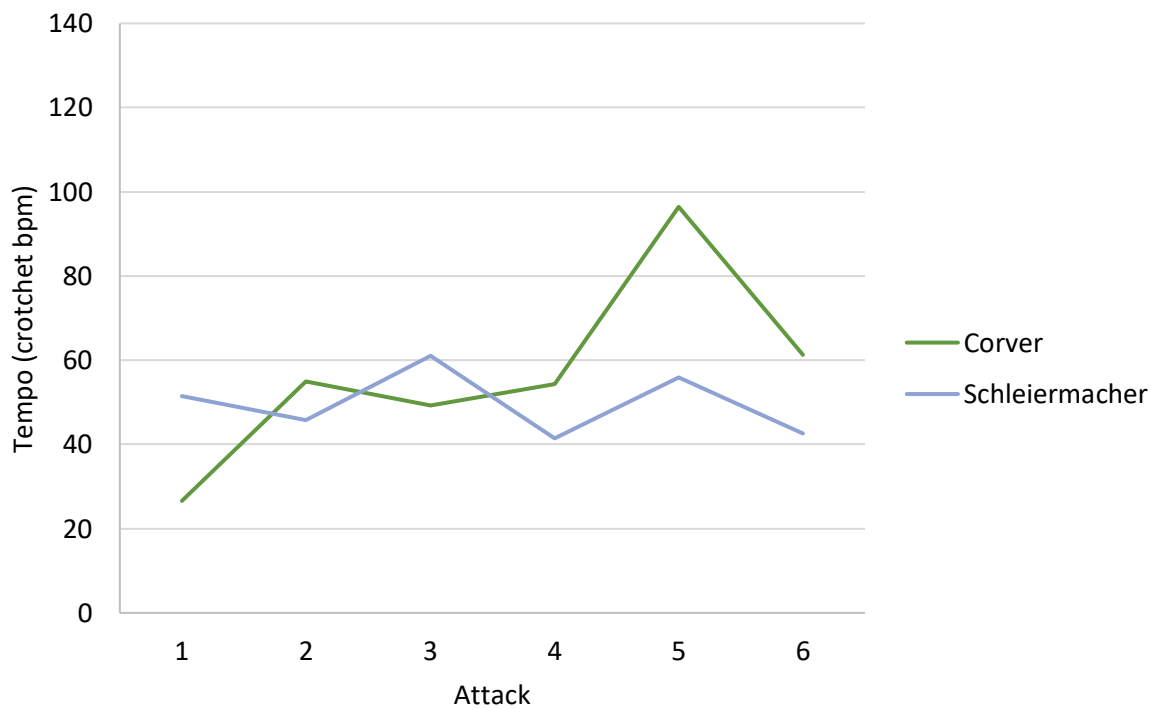


Figure 2.13 Corver and Schleiermacher bar 13 septuplet tempo comparison

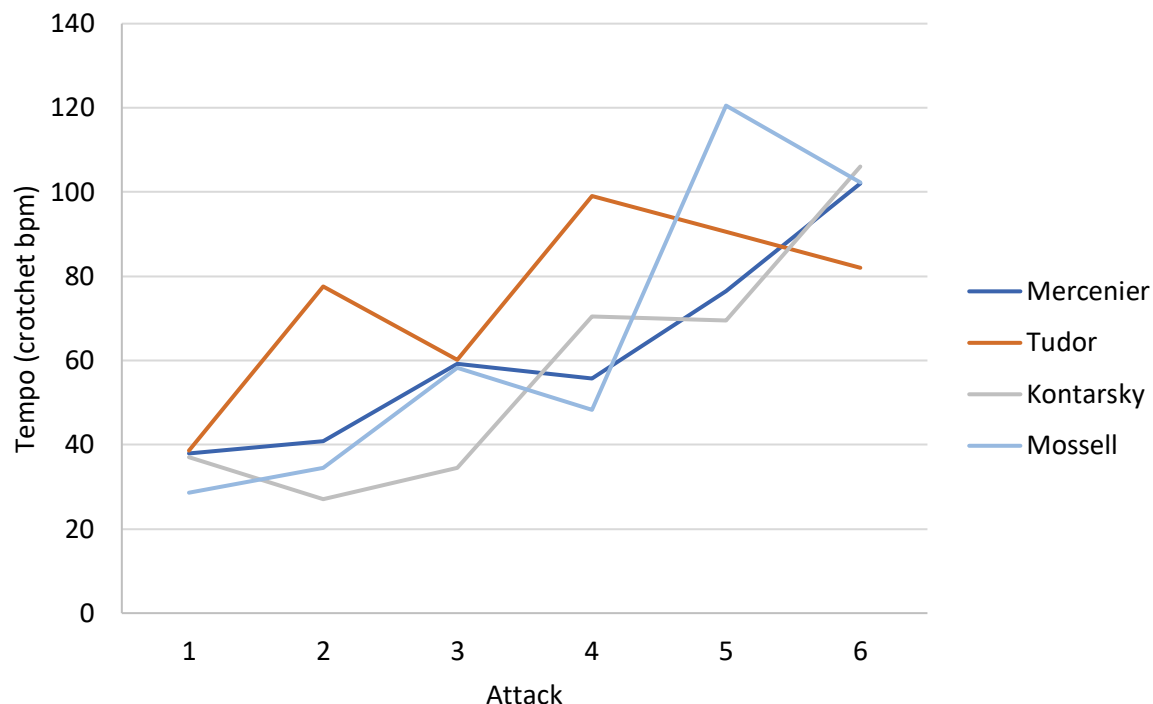


Figure 2.14 Mercenier, Tudor, Kontarsky, and Mosell bar 13 septuplet tempo comparison

Similar trends appear when complex tuplet configurations appear in non-cruX contexts such as bar 1. Thinking in terms of Stockhausen's recommended tempo substitutions, the opening 11:10 quaver tuplet of this bar corresponds to a subtle increase of base quaver speed ($\times 1.1$), with the nested 7:5 tuplet affecting a further proportional, terraced increase ($\times 1.54$). To make sense of the relationship of the performances and the score, I replaced the tuplet brackets with these proportional tempi to create a $6/8 + 7/8$ bar (see Example 2.5).⁹⁵

⁹⁵ This diagram is adapted from that used by Quanten to illustrate his own tempo substitutions. Quanten, p. 49.

♩ = base tempo x 1.1 ♩ = base tempo x 1.54

Example 2.5 Metric re-notation of bar 1 using proportional tempi

I was then able to produce a hypothetical tempo line for each performer based on their average global tempo, to serve as a personalised benchmark for deviation.⁹⁶ As Figures 2.15–2.17 show, Corver, Schleiermacher, and Wambach remain remarkably close to their hypothetical tempi, represented by dotted lines, with both Corver and Schleiermacher beginning slightly slower before gradually accelerating. Corver then peaks with an exaggerated hurrying of the semiquaver dyad, followed by a subtle *allargando*, affecting a greater sense of climactic arrival on the downbeat dyad of bar 2 (0'12"–0'19"). This subtle arching emphasises the implicit tension and resolution of the notation, engendered by diminishing note values and the upwards trajectory of the grouping, further exemplifying Corver's lyrical approach to rhythmic expression. This profile is attenuated in the case of Schleiermacher, which, in combination with his slower global speed, lessens its rhetorical effect, allowing the listener more time to focus on the harmonic accumulation of tones

⁹⁶ Clarke uses a similar technique in his empirical analysis of Thomas's performance of nested-tuplet rhythms in Harrison's *être-temps*, though his comparisons are given in seconds rather than crotchet beats per minute, and are dictated by a fixed tempo marking. Clarke et al., 'Interpretation and performance in Bryn Harrison's *être-temps*', p. 51.

(0'00"–0'09"). Elsewhere, Wambach's pronounced delay of the third attack is atypical, imbuing the opening gesture with a sense of coiled apprehension, which dissipates in his measured reading of the second subordinate group (0'00"–0'08").⁹⁷

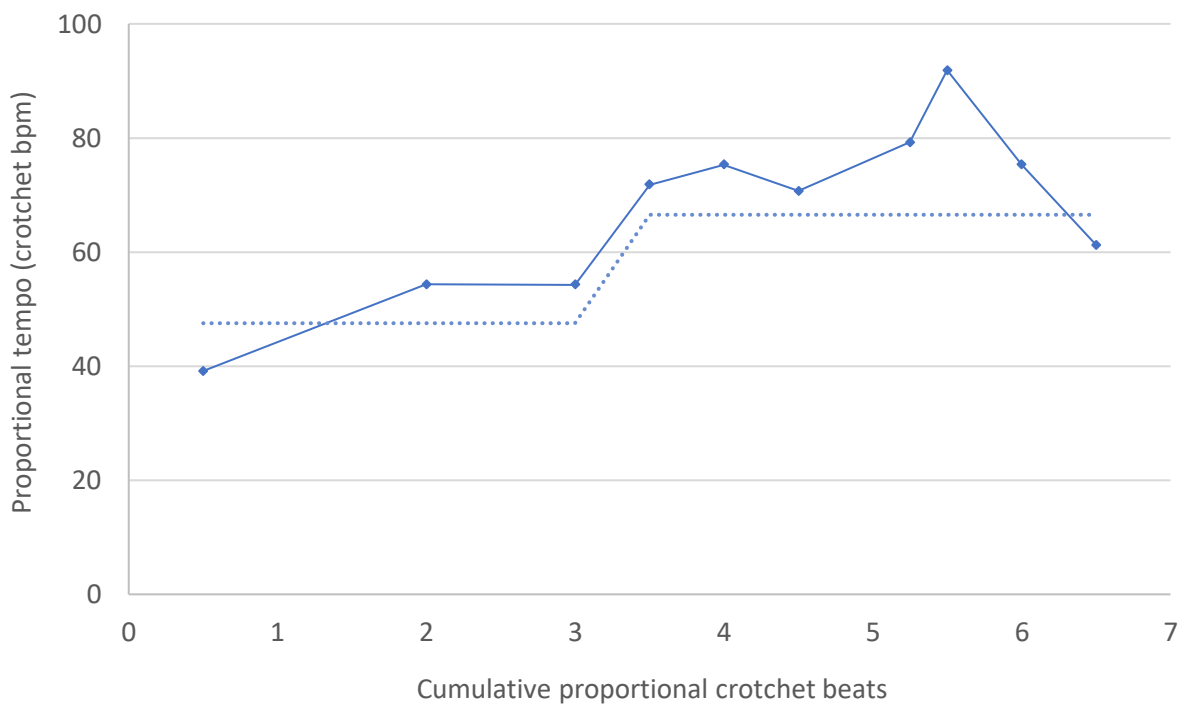


Figure 2.15 Corver bar 1 proportional versus hypothetical tempo

⁹⁷ See also Henck's idiosyncratic 'grace-note' performance of the opening low D (0'00"–0'03"), imbuing the gesture with an unexpected sense of drama.

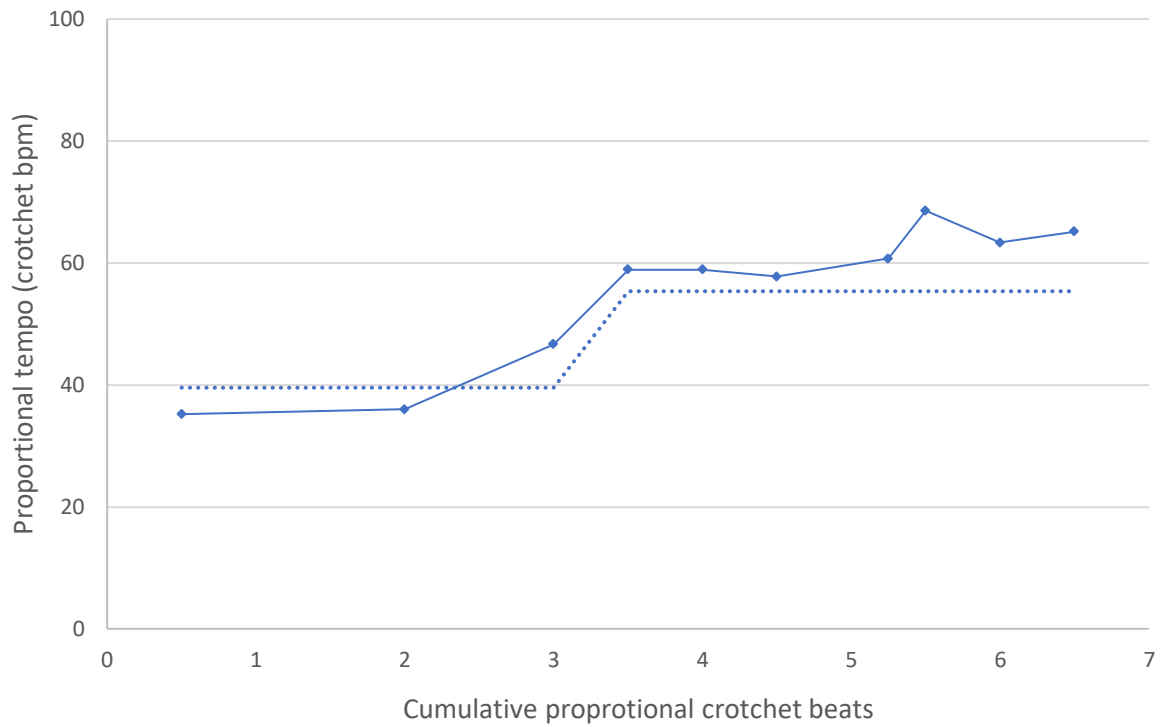


Figure 2.16 Schleiermacher bar 1 proportional versus hypothetical tempo

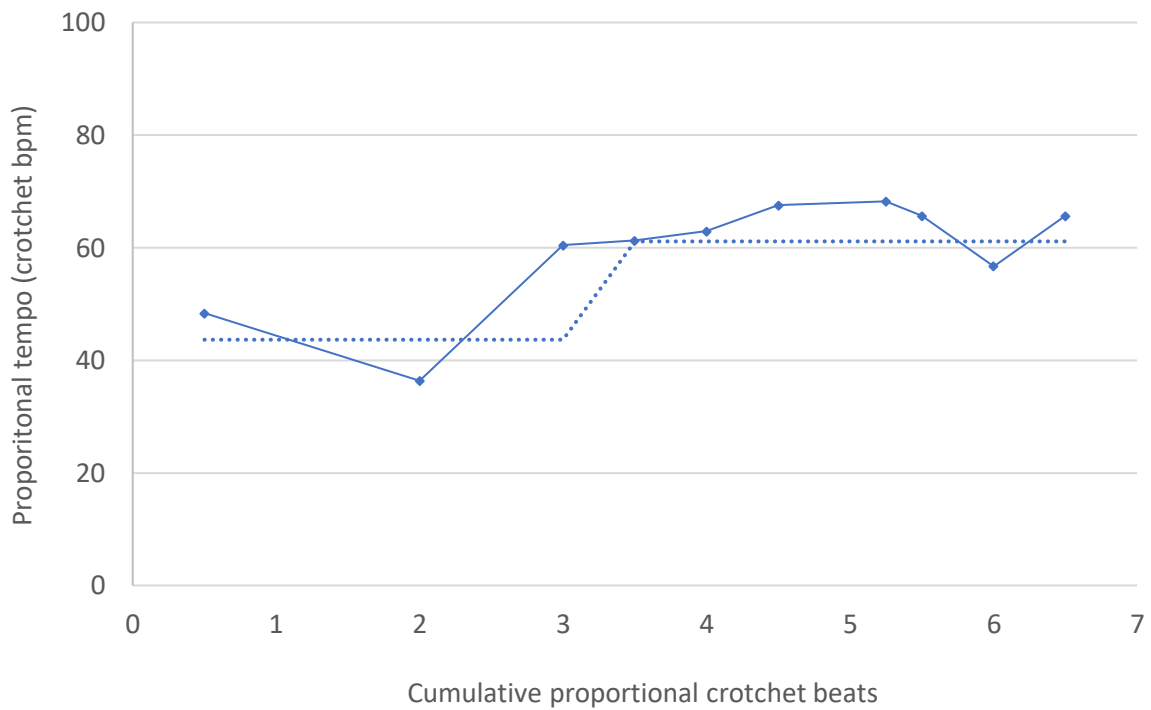


Figure 2.17 Wambach bar 1 proportional versus hypothetical tempo

Contrasting approaches are taken by Tudor (0'00"–0'06"), Chen (0'00"–0'08"), and Liebner (0'00"–0'06"), all of whom deviate significantly from their hypothetical tempi, as illustrated in Figures 2.18–2.20. Tudor's exaggerated tempo and steady acceleration of attacks 1.3–7 is particularly striking, culminating in the dramatic gestural grouping of attacks 1.8–10; together this affects a more intense expressive arching than that witnessed in Corver's recording (see Figure 2.15). Both Liebner and Chen are less predictable, deviating from the internal proportioning of the nested tuplets in a series of irregular gestures. Lack of strict rhythmic proportion is once again particularly pronounced in Chen's recording (see also Figure 2.11), affecting a sense of unsteadiness, in maximum contrast to Schleiermacher's poised equilibrium and sense of unfolding melody. As the data show, Tudor, Liebner, and Chen, like Corver, all delay the downbeat dyad of bar 2. However, while Corver and Tudor's interpretations emphasise the focal position of the chord, albeit with differing degrees of intensity, the sense of arrival is significantly weakened by Chen and Liebner's prevailing inaccuracy in bar 1.

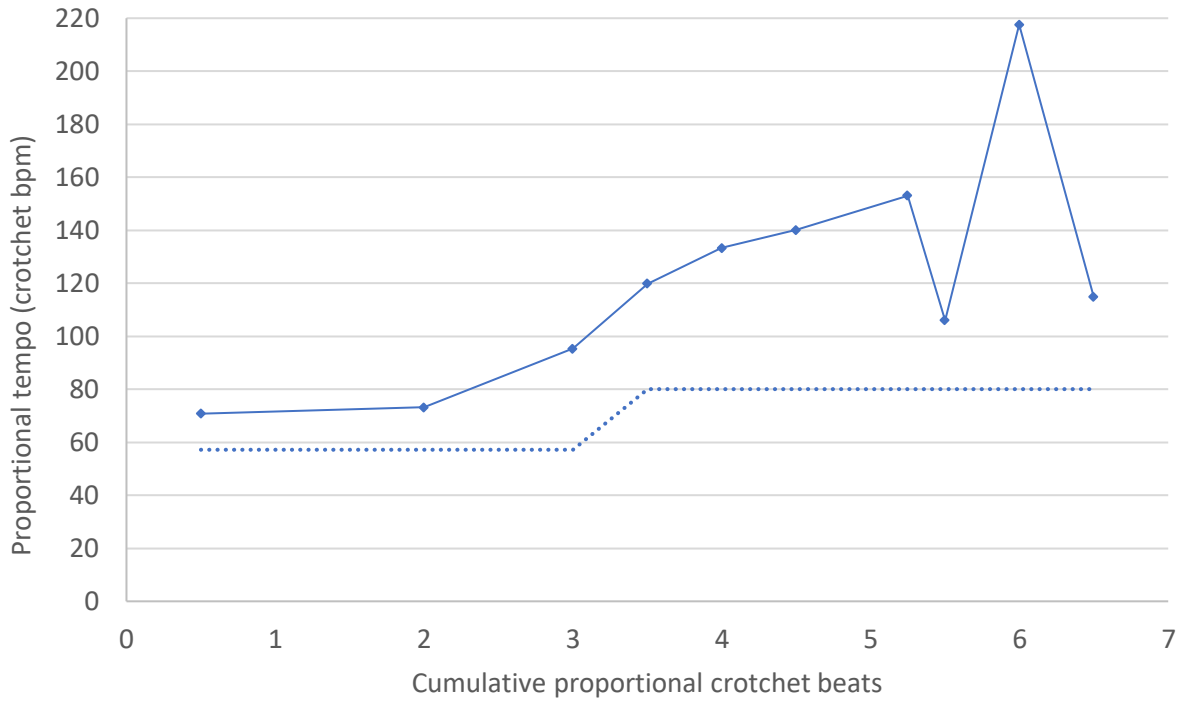


Figure 2.18 Tudor bar 1 proportional versus hypothetical tempo

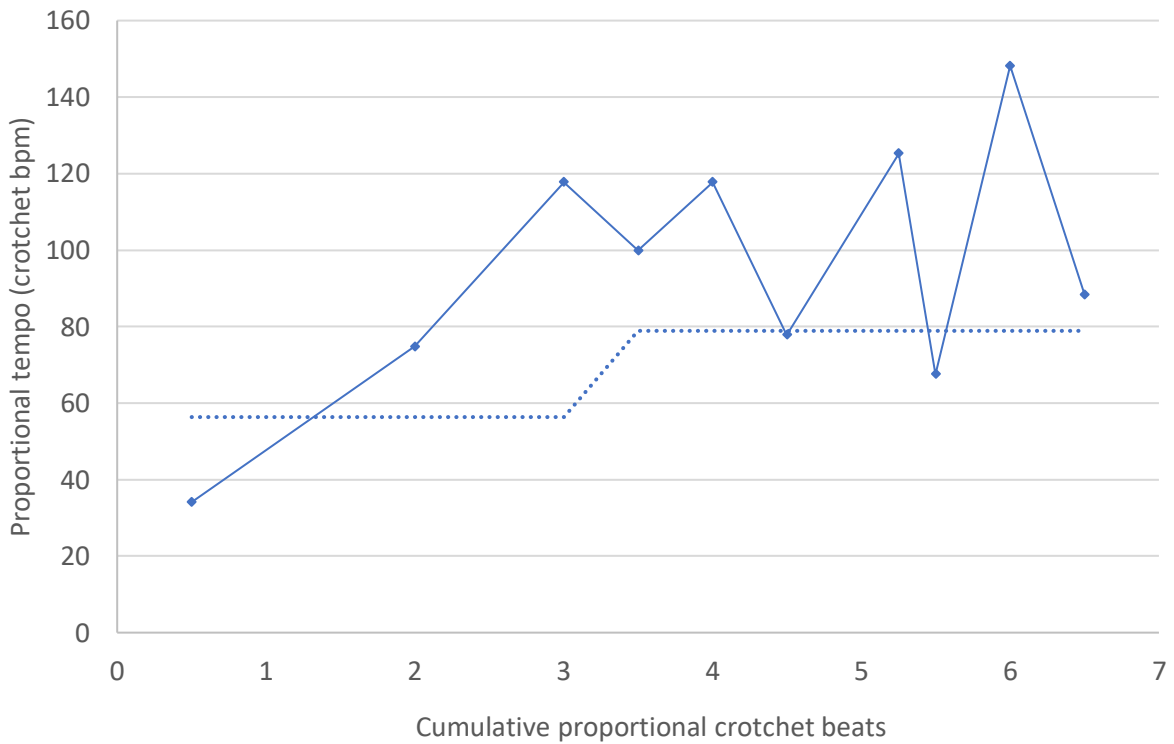


Figure 2.19 Chen bar 1 proportional versus hypothetical tempo

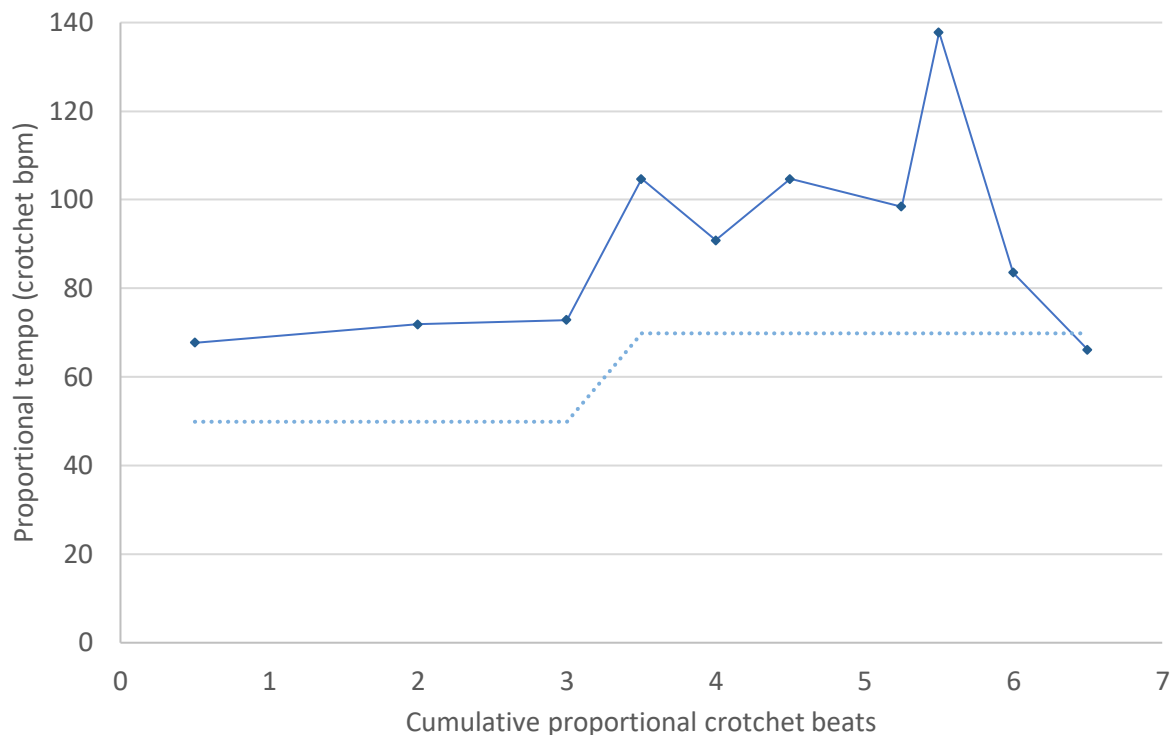


Figure 2.20 Liebner bar 1 proportional versus hypothetical tempo

As these case studies show, the complex rhythms and technical demands of Klavierstück I, combined with Stockhausen's ambiguous tempo direction, have given rise to a wide variety of realisations. Despite this variety, some key conclusions can be drawn. First, performances of the nested tuplets of bar 1 remain much closer to the notated proportions than those of bar 6. As might be expected, this suggests a more direct relationship between the notation and the performed result when technical difficulty is reduced, confirming the need for distinction between levels of complexity, and the limitations of the umbrella term 'irrational notation'.⁹⁸ Second, my findings highlight the continuing presence of performance

⁹⁸ Stockhausen explicitly recognised the inverse relationship between rhythmic complexity and accuracy in his subsequent theory, noting that 'in some recent scores, the notation of duration-relationships has

tropes associated with traditional repertoire, including *rubato* phrase arching, acceleration through rising material and the agogic delay of climactic chords. These tropes appear partly in response to the latent melodic character of much of the ostensibly progressive and intimidating rhythmic notation of *Klavierstück I*: a natural corollary of ‘group’ composition, but also indicative of Stockhausen’s melodic thinking, and a key feature of *Klavierstück I*’s move away from the instrumental pointillism of *Mode de valeurs* and *Structures I*. The impression of traditional phrasing is obscured, however, when, as in the case of Chen, certain rhythms are performed inaccurately. This affects a more consistently statistical aesthetic, in contrast to the interplay of the lyrical and the statistical—reflecting Grant’s interpretation of Stockhausen’s theory—that can be heard in the recordings of Wambach and Corver in particular.

The inaccuracy of many performers in simpler rhythmic configurations points to the more progressive quality of tuplet notation in less ostensibly challenging contexts. For example, the sequential 5:5, 4:5, and 5:4 metric proportioning of bars 24–29 appears to be responsible for significant distortions of the constituent semiquaver pulse and basic iambic rhythms in many of the recordings, including those that are otherwise very accurate (hear for example Corver 1’32”–1’40”). Elsewhere, the nested triplets of bar 44 are performed with a sense of syncopated swing by Klein (1’42”–1’47”), Schleiermacher (2’27”–2’34”), and most notably Kontarsky (1’53”–1’59”). This unexpected and perhaps unintended playfulness appears at odds with the austere rhythmic notation, more precisely reproduced by Henck (2’32”–2’40”) and Wambach (2’14”–2’25”), whose stricter interpretations affect subtle, terraced shifts of rhythmic density, bearing a closer relation to the non-expressive ‘rhythmic’

become extremely differentiated. The result has been that, with an increase of metric-rhythmic complexity the degree of precision in playing correspondingly decreased.’ Stockhausen, ‘...how time passes...’, p. 31.

juxtapositions of electronic music. This shows that whether performers study and perform these passages with the assistance of common denominator proportioning, tempo substitutions, or simply by instinct, and indeed the degree to which rhythmic accuracy is prioritised, will have a significant effect on the aesthetic result, particularly when it is heard in relation to the shifting densities of electronic music. The limits of such practice and its aesthetic consequences are explored in my own Versions B and C of the piece, to be discussed in due course.

In terms of dynamics, the earliest recordings by Mercenier and Tudor feature the broadest range of colours and contrasts (hear for example their similarly clear and accurate dynamic distinctions in bars 39–41: Mercenier, 2'44"–2'52"; Tudor, 1'34"–1'38"). Elsewhere, the extreme range of Tudor's playing can be heard in his differentiation of attacks in Crux II (0'42"–0'52"), and consecutive *fff*, *pp*, and *ff* contrasts in bar 33 (1'20"–1'25"), enhanced by the expansive dynamic capture of the recording. This range foregrounds the disjunct quality of melodic profiles, drawing greater attention to the momentary effect of individual tones and groupings.

By contrast, Kontarsky, Wambach, and Corver exhibit a mixture of dynamic precision in certain passages, and attenuation or even reversal of contrasts in others. This is apparent from the outset in Kontarsky's recording, with almost no sign of the idiomatic contrasts in bar 1 (0'00"–0'08"). However, in most instances, notated contrasts, while clearly attenuated, can still be discerned. In combination with his predominating legato touch, this contributes to the prevailing sense of lyricism and phrasing that characterises his playing. This approach is shared by Corver, who, in addition to the aforementioned lyrical tendencies in her rhythmic interpretation, and broad attenuation of contrasts, occasionally projects quieter

notes, thereby fostering longer melodic connections (hear for example her significant playing up of the *piano* B \flat of attack 40.1, which creates a clear registral link with the climactic ‘cadential’ chord of bar 42, enhancing the implied linear drive of the upward melodic trajectory and diminishing note values).⁹⁹

Prioritisation of melodic line is also recognised by Krytska as an important feature of Kontarsky’s playing in Klavierstück XI, which she attributes to his technical training and continuing role as a regular performer of both avant-garde and traditional repertoire,¹⁰⁰ a role notably shared by Corver, who regularly performed classical repertoire while working with Stockhausen.¹⁰¹ Krytska also recognises the influence of this background in Kontarsky’s measured performance of small-notes in Klavierstück XI, which she contrasts with Tudor’s breakneck execution,¹⁰² practices that are equally reflected in their interpretation of crux materials in Klavierstück I. Incidentally, this is a feature, in addition to Corver’s refined sense of metric proportion, that distinguishes her supervised recording from that of Kontarsky, as her cruxes, most notably Crux I, are significantly more explosive and virtuosic than those of her predecessor.

Following Kontarsky, Henck’s recording is considerably more varied in terms of touch and dynamics. This is made possible by his significantly slower tempo, inhabiting a middle-

⁹⁹ Corver’s comments at the 2019 Stockhausen Courses corroborate her prioritisation of linear connections: ‘If you see the musical language with notes through all registers jumping around, changing every dynamic on every note, then at least give them their proper length so that you can feel still a sort of connection between the notes, otherwise it becomes literally a sort of unrelated single note, which our ears are hardly able to grasp [...] I’ve always felt that the essence of music is that it must connect to something. I mean to speech, or to singing. Music is always related to something that we can grasp or recognise.’ Interview with the author, 4 August 2019, Kürten Bürgerhaus, Kürten.

¹⁰⁰ Krytska draws attention to Kontarsky’s collaborations with his brother Alfons, including recordings of music by Schubert, Brahms, and Dvorak, alongside seminal recordings of contemporary music by Boulez, Stockhausen, and many others. Krytska, pp. 167–234.

¹⁰¹ See in particular Corver’s ongoing work as a member of the Osiris Trio, founded in 1989: <https://www.osiristrio.com/> [accessed 6 January 2022].

¹⁰² Krytska, p. 202.

ground of sorts between the lyricism of Corver and Kontarsky and the momentary beauty of Tudor's physical approach. Henck's pervasive variety of dynamics is particularly effective when contrasted with the mechanistic quality of periodic, dynamically uniform groups (hear for example his interpretation of bars 7–8, 0'25"–0'40"), serving to maximise the opposition of homogeneity and heterogeneity that informs Stockhausen's own analysis.¹⁰³ This sensitivity is also evident in Schleiermacher's similarly slow recording, with characteristic softening of the loudest markings foregrounding the subtle distinctions of his quiet and mid-range playing. Tudor, Henck, and Schleiermacher thus showcase the potential for clarity and distinction of dynamics at the lowest volumes, in contrast to the occasionally fragile tone exhibited by Liebner and Chen, and the less expansive range of Kontarsky and Corver.

As noted, the dynamic stratifications of chords in bars 11 and 54 are not precisely realised in any of the recordings. Interestingly, Mercenier (1'38"–1'42"), Klein (0'34"–0'38"), and Liebner (0'38"–0'42"), split the bar 11 chord, performing the lower D-E dyad either before or after the upper voices, thereby achieving some degree of dynamic distinction.¹⁰⁴ Hand size may factor into this decision, allowing the left to assist the right in performance of the augmented ninth and awkward inner voicing of the chord. Regardless, this practice goes some way towards conveying the dynamics as notated, albeit lacking distinctions between *mf*, *f*, *ff* and *fff* in the upper chord. A distinct rhythmic variation is also created, affecting an echo of the preceding triplet gesture, while attenuating the impact of the chord as the longest duration of the piece thus far, and as a procedural mirror to the accumulations of the opening group.¹⁰⁵

¹⁰³ Stockhausen, 'Gruppenkomposition'.

¹⁰⁴ Chen uses the same technique without observable dynamic contrasts (0'35"–0'39").

¹⁰⁵ See Stockhausen, 'Gruppenkomposition', p. 70, for a detailed description of this mirroring process.

As discussed, the minimal articulation markings and frequent impossibility of executing a default legato without the assistance of the sustaining pedal in Klavierstück I offer the pianist much creative responsibility and freedom. This is borne out by the corpus of recordings, each of which displays a unique approach to articulation and pedalling.¹⁰⁶ Klein, for example, brings aesthetic variety to certain periodic figurations, using a number of un-notated slurs and staccatos in bars 7 (0'20"–0'26") and 19 (0'53"–0'56") to break the implied continuity of beamed pitches into irregular groupings. Elsewhere, articulation is used to establish localised connections or, conversely, to exaggerate the separation of material in a range of contexts. For example, Mosell's *quasi-tenuto* 'full stop' execution of the final *fff* demisemiquaver B \flat of bar 2 clearly demarcates the arching *Gestalt* of the opening bars (0'12"–0'17"), while Henck's crisp, upbeat articulation fosters continuity by anticipating the minim dyad of bar 3 (0'07"–0'15"). Bar 4 introduces another set of common articulative choices, relating to the connection or separation of adjacent pitch material, explicitly directed in this instance by a slur. Where the majority of performers ignore this detail, Henck slightly separates attacks 4.1 and 4.2, affecting a subtle sense of syncopation, enhanced by his delicate distinctions of *pianissimo* and *piano* (0'16"–0'20"), which is then contrasted effectively with the loud physicality of Crux I.

In addition to near universal observation of the seven pedal markings in the score, many of the performers use pedal to forge legato connections and to foster localised colour. According to Benjamin Kobler, who worked extensively with the composer in his later life, Stockhausen insisted on additional colouristic use of pedal in the Klavierstücke, asking him,

¹⁰⁶ Discussion here refers exclusively to use of the sustaining pedal. The *una corda* will be used by most performers to elicit the dynamic nuances discussed above. The *sostenuto* pedal must necessarily be used to produce the suspension in bars 5–6 and the clarity of stratified releases in bar 20, audible in the majority of recordings; its use in other instances is more difficult to determine.

for example, to add ‘dabs’ to each of the isolated attacks in bar 2 of Klavierstück I, thereby attenuating the inherently dry pointillism of the figuration.¹⁰⁷ Wambach’s playing is particularly striking in this respect, with the audio fidelity of his recording allowing for fine appreciation of timbral details, including the use of sustaining pedal to establish internal connections within cruxes (hear for example his subtle linking of tones in Crux I, 0’20”–0’23”), and to enrich and balance high attacks, in particular the G# of attack 28.3 and the D of attack 31.2 (1’30”–1’40”). Taking an alternative approach to the same passage, Chen avoids clearing the pedal at all following the *misterioso* effect of bars 24–27, thereby minimising textural contrast (1’11”–1’25”). She then takes the opposite approach by disregarding Stockhausen’s pedal marking at bar 50, affecting a crystalline textural juxtaposition with the pedalled material of the preceding bars (1’59”–2’05”). Finally, Schleiermacher makes effective use of the pedal to exaggerate elisions, such as those between attacks 4.6 and 5.1 (0’16”–0’20”), between the final chord of Crux I and the *pp* downbeat dyad of bar 7 (0’21”–0’25”), and most strikingly between the *fortissimo* F# of attack 23.5 and the *pianissimo* downbeat A of bar 24 (1’28”–1’32”). This last technique, first witnessed in Henck’s recording (1’35”–1’39”), addresses the problematic juxtaposition of the *fortissimo* triad of attack 23.5 and the fragile *pianissimo* tone of attack 24.1, allowing the latter to emerge from the former, in a manner reminiscent of electronic noise filtering.

The corresponding transitions between loud, un-pedalled material and pedalled *pianissimo* semiquavers in bars 23–24 and bars 47–48 have been interpreted in a number of ways. In contrast to Henck and Schleiermacher’s creative elisions, for example, Mercenier (2’09”–2’16”) and Wambach (1’18”–1’26”) introduce a large break between bars 23 and 24,

¹⁰⁷ Conversation with the author at the 2019 Stockhausen Courses.

allowing for the sound of the low *fortissimo* F# to clear entirely before the semiquavers commence, thus affecting a clear structural break. These breaks are accentuated in Klein's recording by a significant reduction of tempo as the semiquavers begin in both instances (1'00"–1'16" and especially 1'50"–2'00"), further exemplifying her idiosyncratic but effective tendency to reduce tempo in localised contexts. Crucially, the consistency of these techniques helps to establish structural coherence, enhanced by consistent approaches to interpretation elsewhere, which together have a bearing on the emergence of different performance styles, and the quality of the serial aesthetic. Before discussing these styles and suggesting attendant modes of listening, I will first present the methods and analysis of my own experimental recordings, which both draw inspiration from and shed further light on the evidence of the recording tradition.

2.5 New recordings

2.5.1 Production methods

I began learning Klavierstück I in support of my performance analysis, using insights gained from my own experiences to assess the evidence of the recording tradition and its relationship to the affordances of the score. Having learned the piece in private, I received coaching from Corver at the 2019 Stockhausen Courses, including advice on rhythmic and metric preparation.¹⁰⁸ Above all, Corver advocated the use of counting tapes, based on a

¹⁰⁸ The Stockhausen Courses are a biennial series of concerts, masterclasses, and lectures on Stockhausen's music, held in Kürten, Germany, and attended by performers, musicologists, and enthusiasts from across the globe. They were founded in 1998 by the composer as a means of preserving the performance practices and teachings associated with his music. The world's leading Stockhausen experts continue to teach and perform at the courses.

tempo of either $\text{♩} = 40$ or 45, with crotchet beats counted throughout according to Stockhausen's original metric scheme,¹⁰⁹ inspiration she first took from hearing Stockhausen singing the opening of the piece while tapping crotchet time during a masterclass.¹¹⁰ The various tuplets can then be practised in isolation using tempo substitutions, proportioned in relation to one another, and finally felt in tension with the counted crotchet pulse.¹¹¹ In instances such as bar 1, it was helpful to decimalise durations in relation to the crotchet beat, in order to gain a precise awareness of their relationships, which could then be honed via a process of trial and error (see Table 2.3).¹¹² This synthetic method led to a state of tight control over the metric proportions of the piece, which I was ultimately able to feel in relation to a steady, internalised pulse, without the aid of counting tapes. The calibration of my base tempo to that of *Crux I*, however, remained approximate.

¹⁰⁹ See again Quanten, p. 45.

¹¹⁰ Conversation with the author at the 2019 Stockhausen Courses, Kürten.

¹¹¹ Robin Maconie sees the metric tension that emerges from thinking in terms of the basic time signatures as essential 'in order to feel degrees of compression or rarefaction between groups', while refuting the usefulness of Stockhausen's advised tempo substitutions, which he goes so far as to label 'superfluous' in his second monograph on the composer's work. Maconie, Maconie, *The Works of Karlheinz Stockhausen*, p. 66–7; Maconie, *Other Planets*, p. 122. What he fails to appreciate, however, is the usefulness of tempo substitutions as an intermediary practice tool. See for comparison Steven Schick's description of the intermediary use of tempo substitutions in the realisation of Ferneyhough's *Bone Alphabet* (1992). Schick, 'Developing an Interpretive Context: Learning Brian Ferneyhough's *Bone Alphabet*', pp. 137–38.

¹¹² Cox views decimalisation in the realisation of complex rhythmic notation as 'both musically and perceptually suspect'. Cox, p. 99. However, taken as part of a multi-faceted preparation process, I believe that such calculations can be beneficial, particularly in the early stages of learning.

Attack	Pitch	Crotchet beat position
1	D	1.00
2	E _b	1.45
3	F	2.82
4	D _b	3.73
5	C	4.05
6	E	4.38
7	A _b	4.70
8	G-F#	5.19
9	A-B _b	5.35
10	B	5.68

Table 2.3 Klavierstück I, bar 1: decimalised attack positions

Having used Sonic Visualiser to extract timing data from existing recordings, I became interested in the possibility of using the same methods to determine empirically a personal ‘as fast as possible’ base tempo from performance of *Crux I* in isolation. With this method in mind, I set out to make three different versions of the piece, in response to both the practice observed in the recorded tradition, and to the as yet unexplored affordances of the score. This involved consideration of certain criteria of possibility. In traditional performances, ‘as fast as possible’ is taken to mean as fast as one can perform all pitches within *crux* contexts, with a general disregard for rhythmic precision and dynamic distinctions, as highlighted by my performance analysis. My traditional version (Version A) thus pursued these criteria of possibility, while Version B took rhythmic precision as the base criterion of possibility, and Version C took dynamic distinction as the base criterion of possibility.

My aesthetic outlook remained broadly the same in each recording, with each version prepared using the same synthetic approach to rhythmic realisation outlined above. This was a deliberate choice, allowing for an investigation of the relationship between technique, interpretation, and aesthetics, unhindered by stylistic deviation. I thus maintained my personal preference for legato connection, maximisation of dynamic contrasts, and attention to rhythmic detail in each performance.

To calculate the base tempo for each version, I practised Crux I in isolation and then recorded it consecutively five times.¹¹³ I performed each iteration as fast possible without errors, to try to ensure a realistic and reliable base speed of execution. I was then able to calculate an average tempo from the five repetitions, according to which counting tapes could be made, and tempo substitutions calculated (decimalised beat positions of course remained the same). This method proved straightforward and practicable, constituting a viable approach to tempo determination for those wishing to learn the piece—assuming a basic understanding of Sonic Visualiser or similar performance analysis software.

For Version A, I tested different gestural combinations to find the fastest and most reliable combination (hear Audio Recording 2.1 for my recording of the arrangement used for calibration).¹¹⁴ This gave a base tempo of $\downarrow = 42.5$. For Version B, I practised each of the two nested tuplets at high speed, performing leaps as quickly as possible, while slowing down contiguous groups of notes to create an even, subtly terraced ‘tempo’ for each tuplet (hear Audio Recording 2.2 for my recording of the second ‘faster’ group of tuplets used for calibration; see Video Recording 2.1 for a demonstration of this practice at slow speed and

¹¹³ These recordings were made in a practice room at the University of Leeds on a Steinway Model B.

¹¹⁴ I plan to publish my extensive written, audio, and video documentation of these processes, including practical analysis of the many different permutations of gestural groupings possible within cruxes. While valuable in its own right, such comprehensive discussion lies beyond the scope of the current investigation.

Video Recording 2.2 for a demonstration of this practice at high speed). This gave a base tempo of $\downarrow = 31.5$. Finally, for Version C, I used a combination of buttressed fingers for the low *sffz* attack, and an exaggeration of *ff* and *fff* contrasts, made possible by a further reduction in speed, to project accurate dynamic distinctions in the crux (hear Audio Recording 2.3 for my recording of the arrangement used for calibration; see Video Recording 2.3 for a demonstration of this practice at slow speed and Video Recording 2.4 for a demonstration of this practice at high speed). This gave a base tempo of $\downarrow = 27$.

My next step for each version was to test these tempi in Cruxes II–VI, while applying the same criteria of possibility, before assembling and rehearsing the piece as a whole in preparation for the respective recordings.¹¹⁵ As with each case study, the recordings were unedited to preserve a sense of realistic rhythmic deviation across the course of a continuous performance, which might otherwise be manipulated via splicing of takes during the various rest durations. Each set of recordings was also made in a single session to allow for comparison of execution between takes with the same level of preparation. This process was repeated for subsequent versions, with sufficient time left between recording sessions to prepare the new performance specifications. I recorded three takes of Versions A and C to allow for comparison of consistency. Due to technical issues, the first three takes of Version B were only captured by a lower quality back-up device; thankfully a fourth take was captured at the same quality as Versions A and C. As a corollary, a fourth data set was recorded, which I opted to include in my analysis.

¹¹⁵ All final recordings were made on a contemporary Steinway Model D in the Clothworkers Centenary Concert Hall at the University of Leeds.

2.5.2 Performance analysis of new recordings

2.5.2.1 Version A

Take 1 of Version A is presented in Video Recording 2.5; audio recordings of Takes 1–3 are included in Audio Appendices 2.1–2.3. Empirical analysis of these takes shows a slight slowing in relation to my preparation tempo of $\text{♩} = 42.5$, as illustrated in Figure 2.21, with the takes presented in ascending order of speed. This is likely a combined result of the change from practice room to concert hall acoustics, natural relaxation of tempo in the absence of a counting tape, and the added pressure of the recording situation. Regardless, I was satisfied with the level of consistency between takes and the basic correlation with my preparation speed.

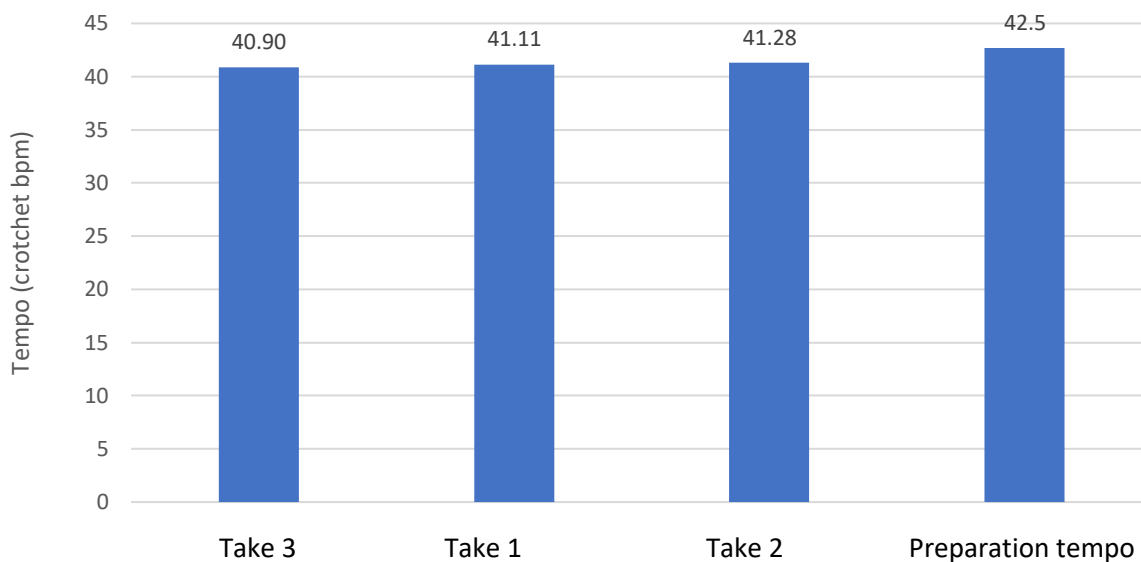


Figure 2.21 Version A Takes 1–3 and preparation tempo comparison

The data also show that standard deviation from my average sectional pulse was lower in Sections B–F in each take than any other pianist, while deviation in Section A was more typical. These findings are presented in Figures 2.22–2.27 (notice also certain outlying results from the performance tradition such as Klein’s deviation in Section A, and Tudor’s deviation in Section B). A number of factors may have contributed to these results, including my level of gestural performance in crux contexts, interpretation of ametric grace notes, and the treatment of rests and long tones. However, the distinctions remain consistent and clear enough to suggest a closer relationship to the rhythmic details of the score than any recording in the performance tradition, confirming the positive impact of my preparatory methods.

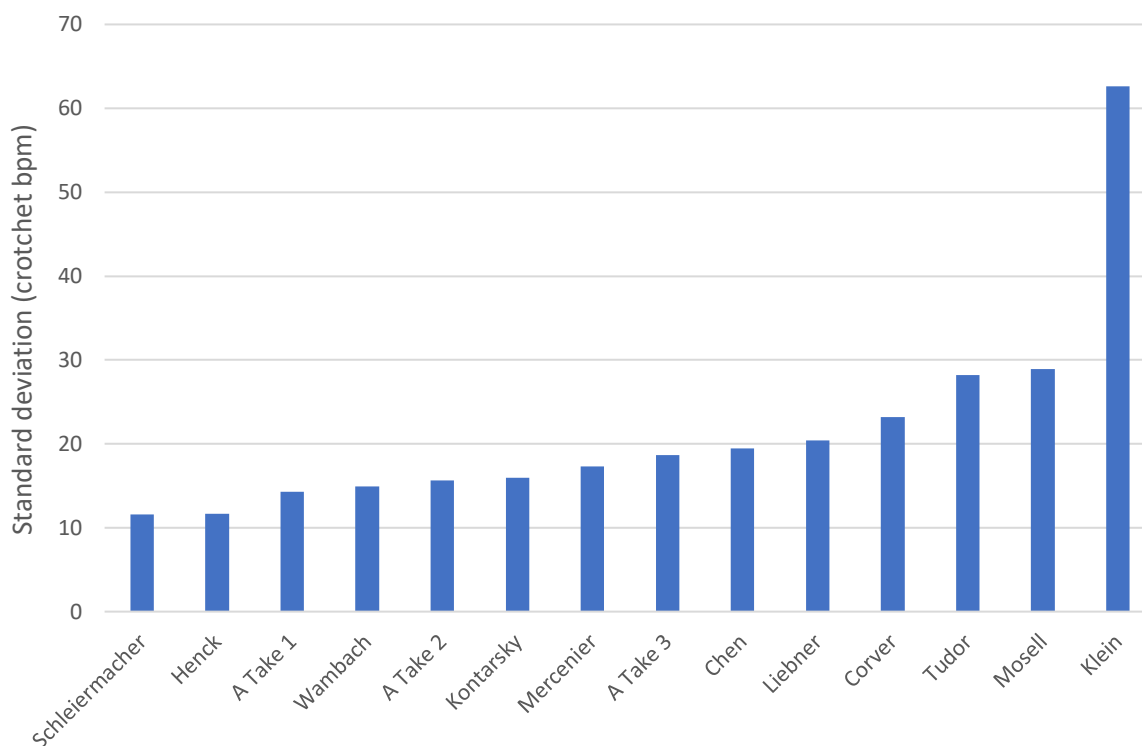


Figure 2.22 Section A standard deviation comparison

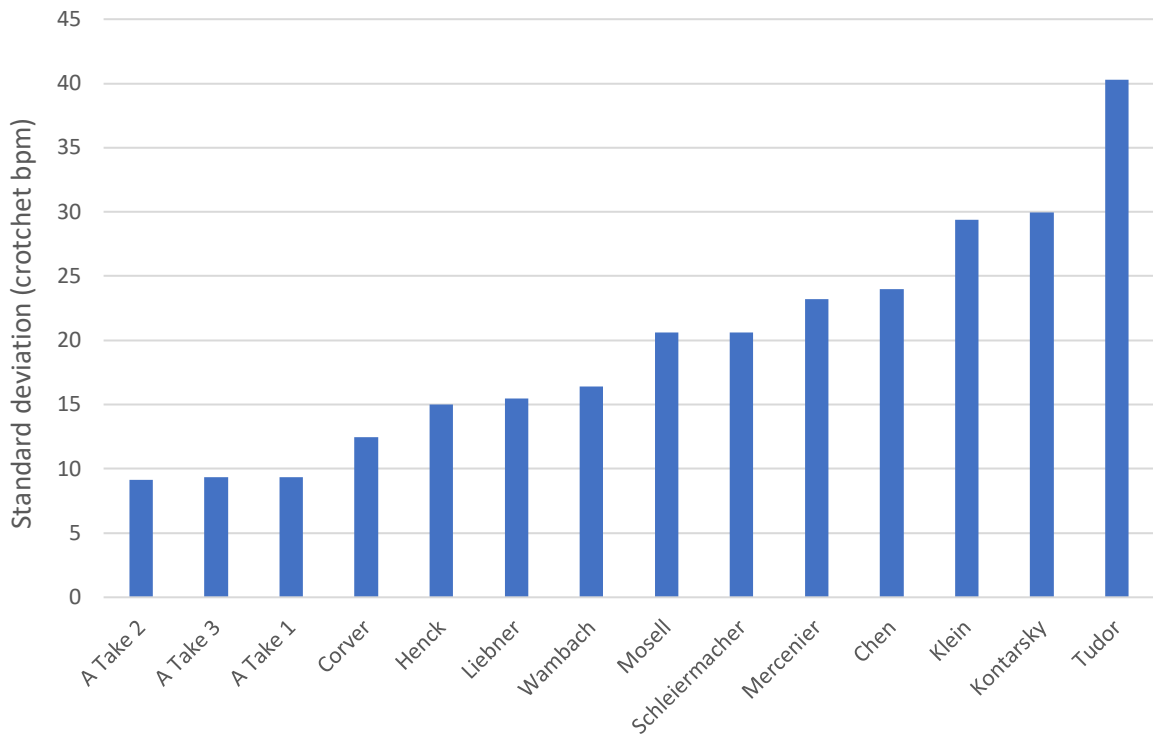


Figure 2.23 Section B standard deviation comparison

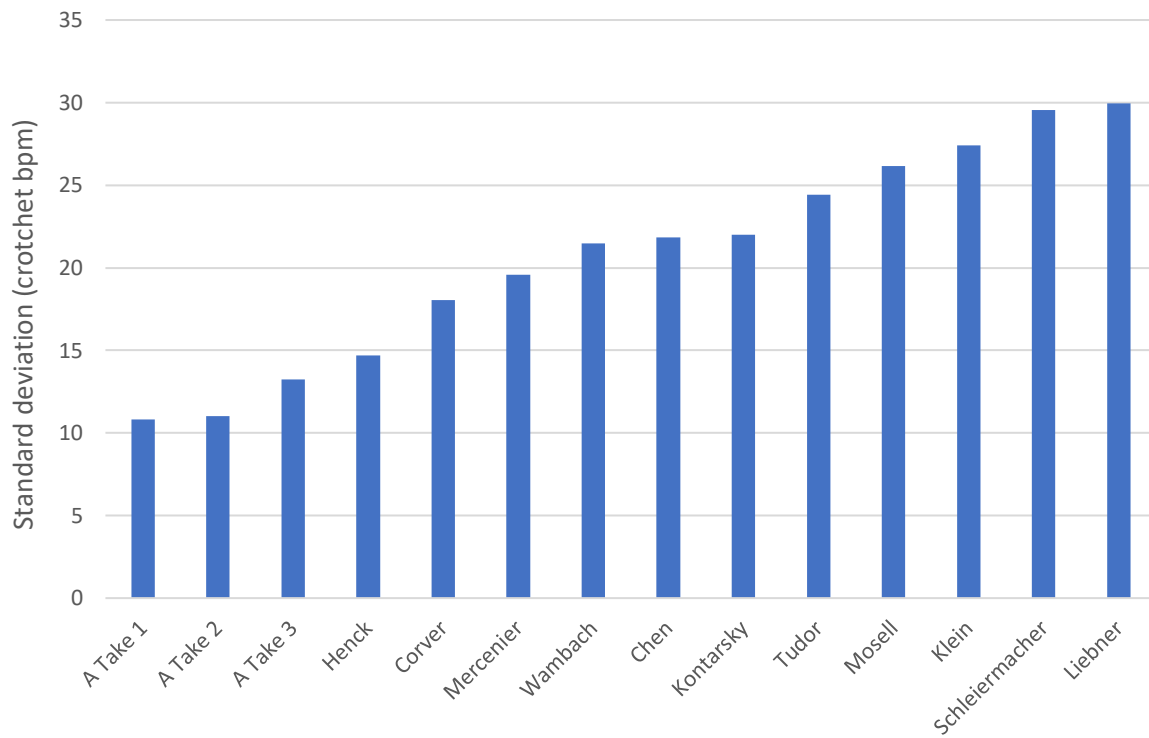


Figure 2.24 Section C standard deviation comparison

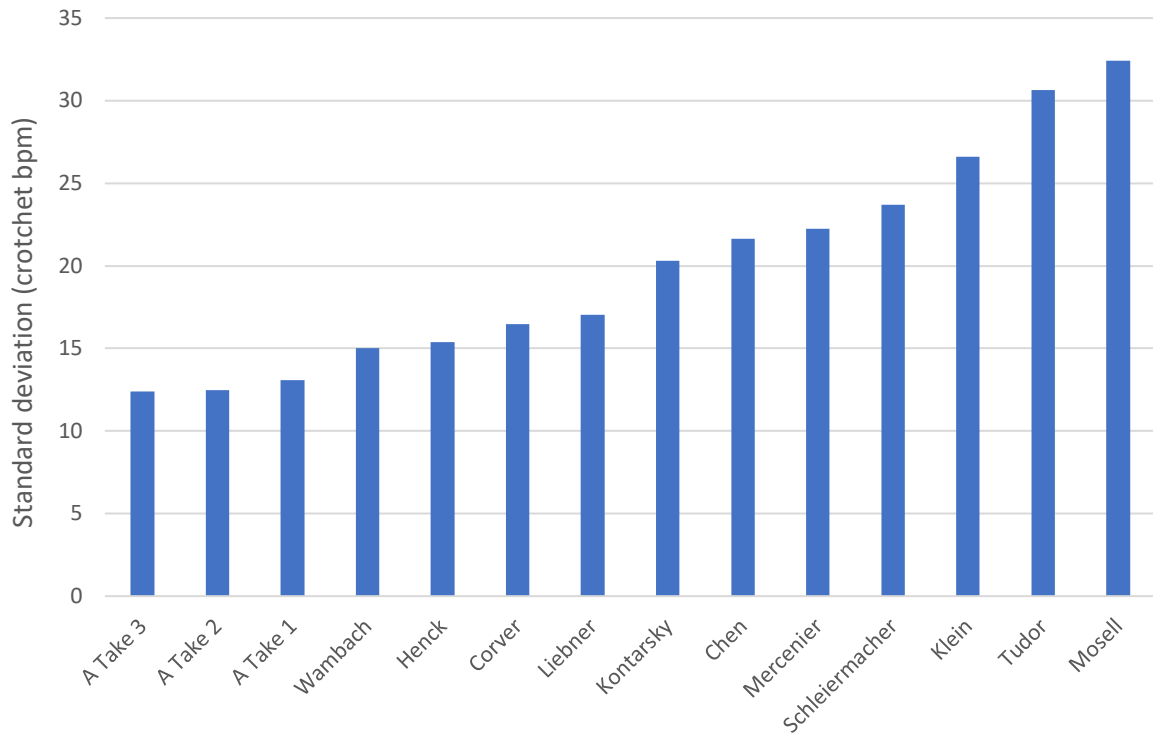


Figure 2.25 Section D standard deviation comparison

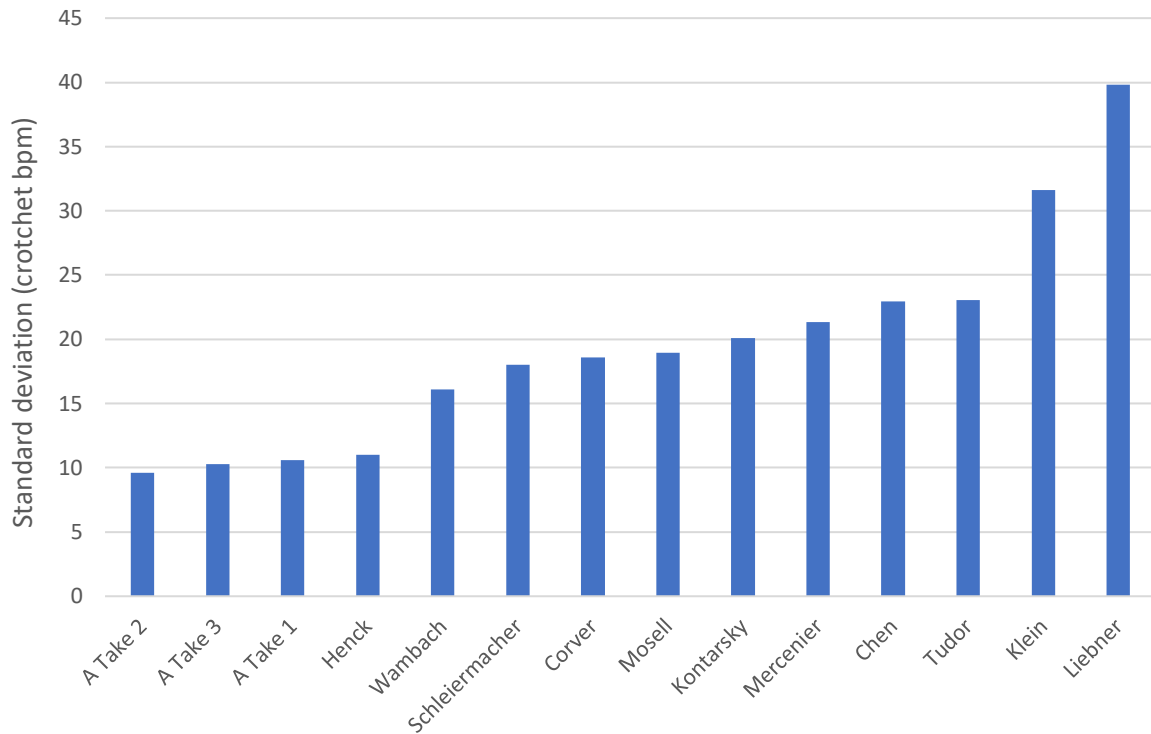


Figure 2.26 Section E standard deviation comparison

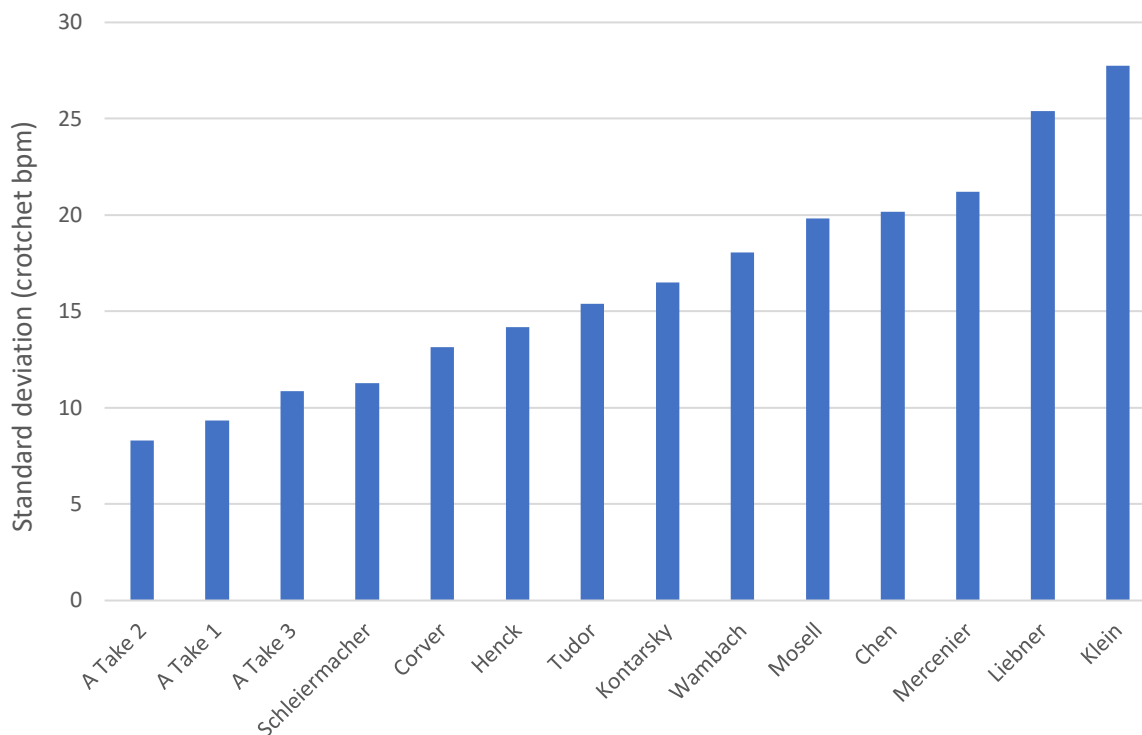


Figure 2.27 Section F standard deviation comparison

The data also show consistency of rhythmic execution across takes, with some notable exceptions. By way of example, Figure 2.28 compares tempo variation for Section A in each take, showing similar tempo contours, with the exception of a hastening between attacks 17 and 18 in Takes 1 and 3. By contrast, I subtly separate these attacks in Take 2 in observation of the notated slur, resulting in less deviation from the notated rhythm (hear Audio Recording 2.4 for comparison of bars 3-5 in Takes 1 and 2). I find this latter approach, inspired by the performance of Henck, livelier and altogether more satisfying, contrasting effectively with the gravity of the neighbouring sustained tones.

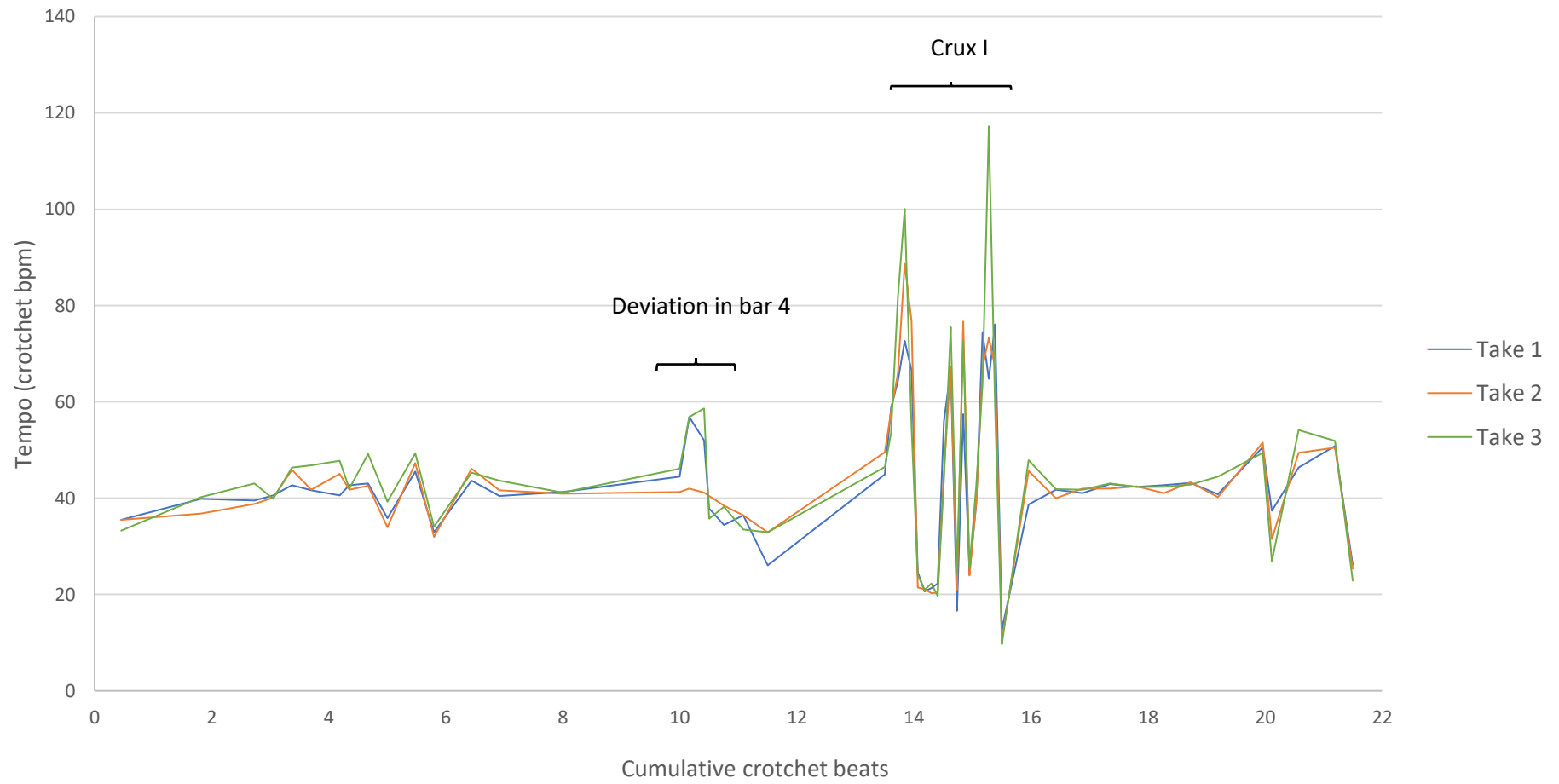


Figure 2.28 Version A Section A tempo comparison between takes

My execution of cruxes was also generally consistent, as illustrated in Figure 2.29 for Crux I. However, despite my careful empirical calibration, all cruxes, with the exception of Crux VI were performed slower than their respective sectional tempi, as illustrated in Figure 2.30, thus conforming to the tendency witnessed within the recording tradition. Given the rigour of my preparation, this was a somewhat disappointing result, likely explained by persistent slips in my execution of Crux I at the beginning of the session, which, in light of my determination to achieve a clean take without playing ‘faster than possible’, led to greater caution. This manifested itself in a slight extension of spaces between leaps, contributing in turn to a loss of rhythmic energy and a significant reduction in tempo, particularly in Crux I.

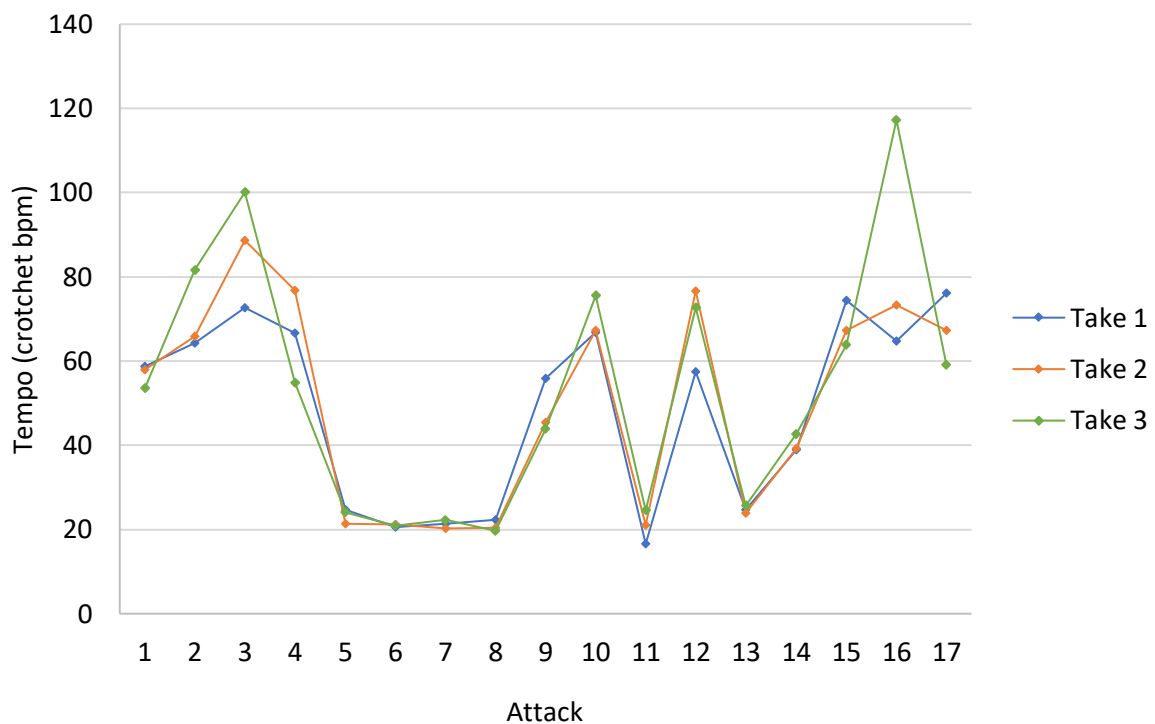


Figure 2.29 Version A Crux I tempo comparison between takes

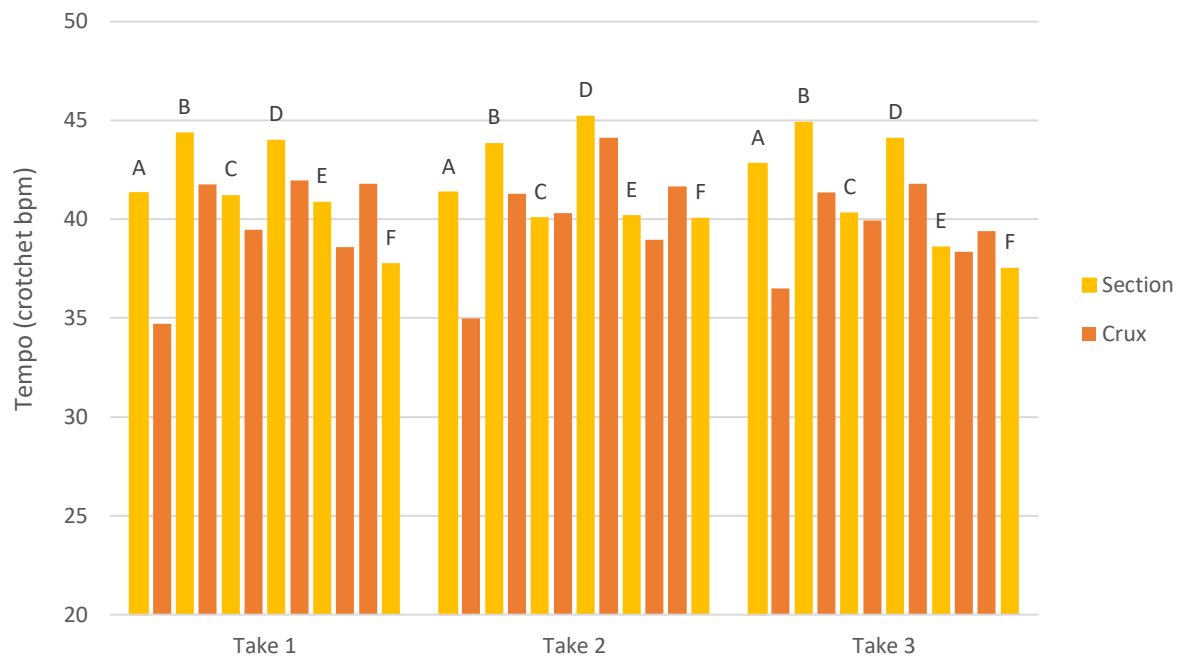


Figure 2.30 Version A section and crux tempo comparison

As well as providing further evidence for this phenomenon in performances of Klavierstück I, the data highlight the need for consideration of human factors in the calibration of base tempi, including performance nerves and adrenaline, as well as consideration of the instrument to be used and the acoustics of the performing space. Such adjustments will always remain approximate, thus demonstrating the fallibility of my method and the persistent irrationality of instrumental performance. Although these localised reductions in speed, and, by extension, disruptions to metric proportioning, are perceptible to the experienced listener, their musical impact nonetheless remains relatively slight, with the lyrical and dynamically varied characteristics of my performances, underpinned by moderate

tempi, placing them somewhere between the styles of Corver and Henck, to be summarised in due course.

2.5.2.2 Version B

Take 4 of Version B is presented in Video Recording 2.6; audio recordings of Takes 1–4 are presented in Audio Appendices 2.4–2.7. Average tempi for these takes were once again consistent and marginally slower than my preparation tempo, as illustrated in Figure 2.31. As expected, given my slower tempo and even performance of cruxes, my standard deviation was further reduced for every section, as shown in contrast to Take 1 of Version A in Figure 2.32. As the chart shows, Sections D and E exhibited greater rhythmic deviation in all takes. Given my express intention in these recordings to play as precisely as possible, this highlights a persistent misrepresentation of rhythmic detail in these passages, possibly affected by their later positioning in the piece.

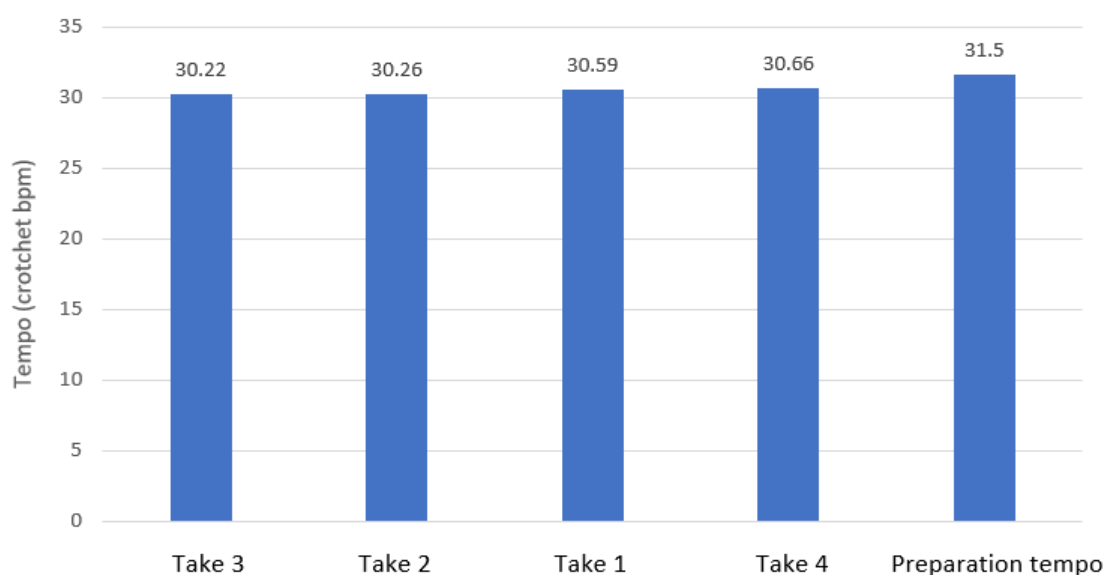


Figure 2.31 Version B Takes 1–4 and preparation tempo comparison

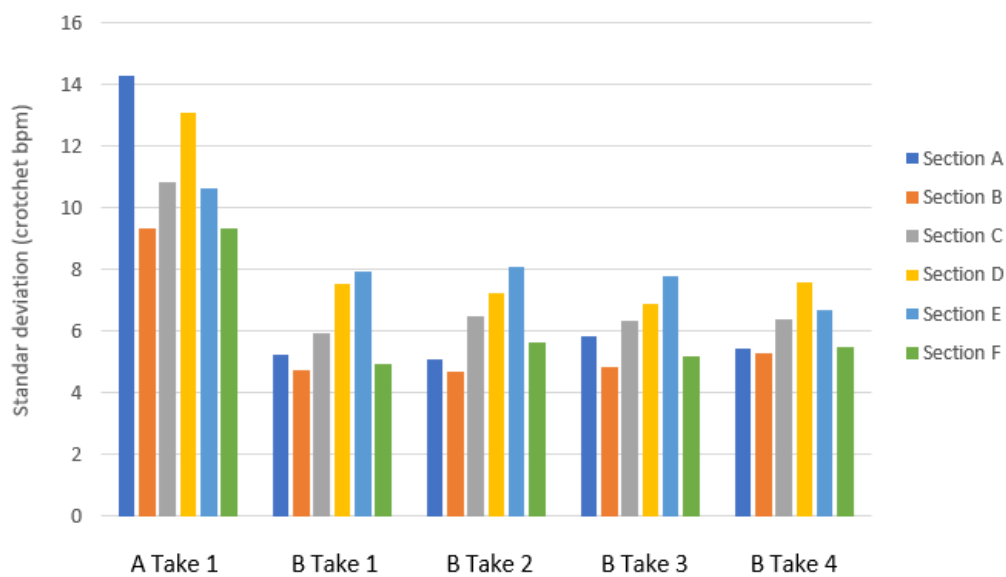


Figure 2.32 Version A Take 1 and Version B Takes 1–4 standard deviation comparison

Empirical comparisons of crux and sectional tempi for Version B led to some interesting results. As Figure 2.33 shows, my average tempo for Crux I was higher than Section A in every recording, including a maximum of $\downarrow = 34.31$ in Take 1, only marginally slower than the $\downarrow = 34.73$ recorded in Take 1 of Version A. This constituted a reversal of my previous experience, where added caution in preparation of my rhythmic tempo determinants was supplanted by greater confidence in my recorded performances, affecting a subtle injection of energy, enhanced by the mechanical effect of my rhythmic execution, as illustrated in context in Audio Recording 2.5 from Take 1. This is likely the result of increased familiarity with the passage and the reduced technical difficulty of the rhythmically precise arrangement.

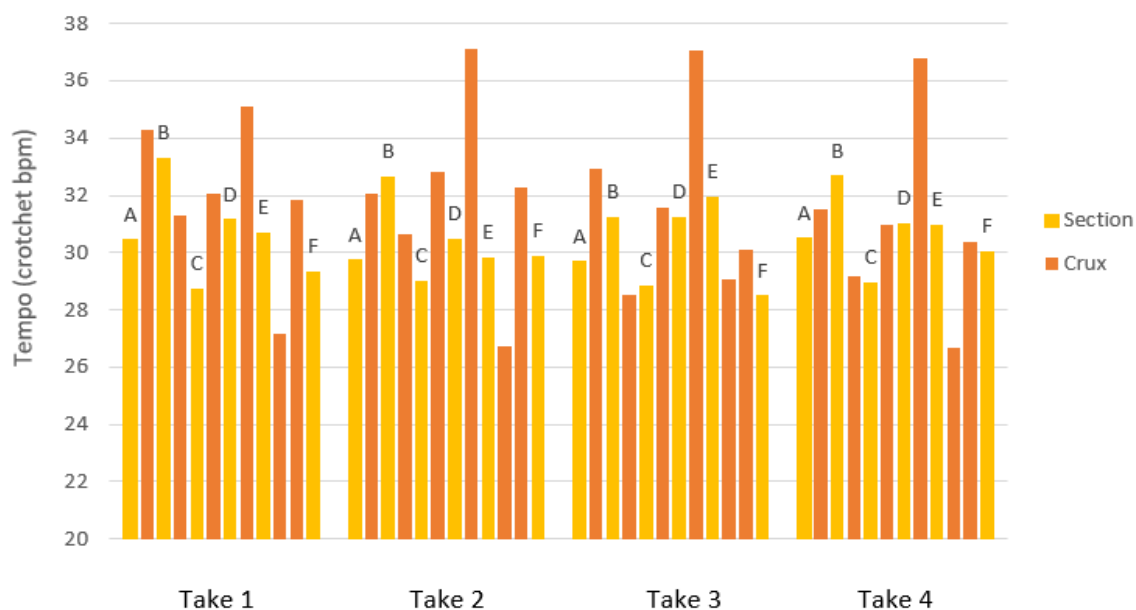


Figure 2.33 Version B section and crux tempo comparison

The rhythmic stability of Crux I in Take 1 is compared with the highly gestural performance of Corver in Figure 2.34. While this is much closer to the theoretical values of the notation, closer inspection reveals no evidence of tuplet gradation, as confirmed in Figure 2.35, which compares my proportional tempo fluctuation with a hypothetical model, represented by a dotted line. In pursuing maximum accuracy, it was perhaps an oversight not to consider the practicality of distinguishing these triplets when calculating my base tempo, though this would inevitably have required a further significant reduction of speed. In reality, my performance is far closer to Schuller's re-notation. Crucially, these extremely subtle rhythmic distinctions would have been more achievable had the pitches been more idiomatically distributed, suggesting the incompatibility of what would become standard rhythmic practice for New Complexity composers and the disjunct pitch constellations of

much early serialism, at least in terms of traditional (i.e., non-statistical) models of interpretation. This is of course countered by the idiomatic arrangement of pitches and complex rhythms in bar 1 and elsewhere, which represent working prototypes of later complex practice, giving rise to practice techniques that have since become standardised in this repertoire.

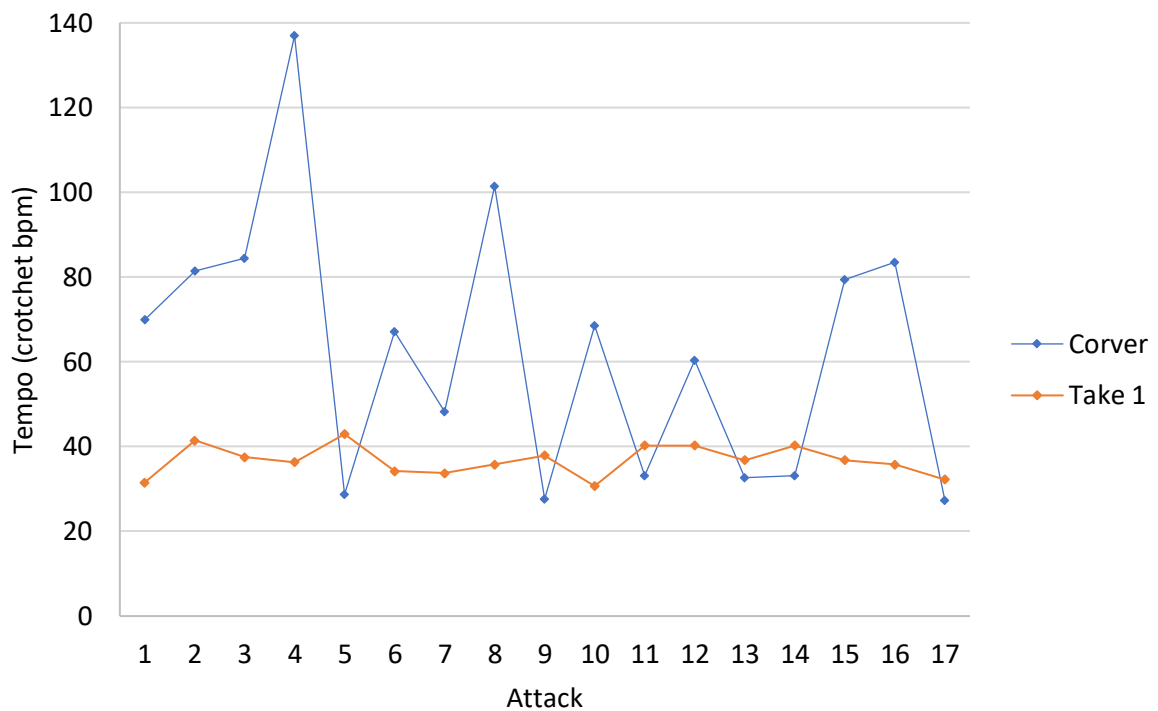


Figure 2.34 Corver and Version B Take 1 Crux I tempo comparison

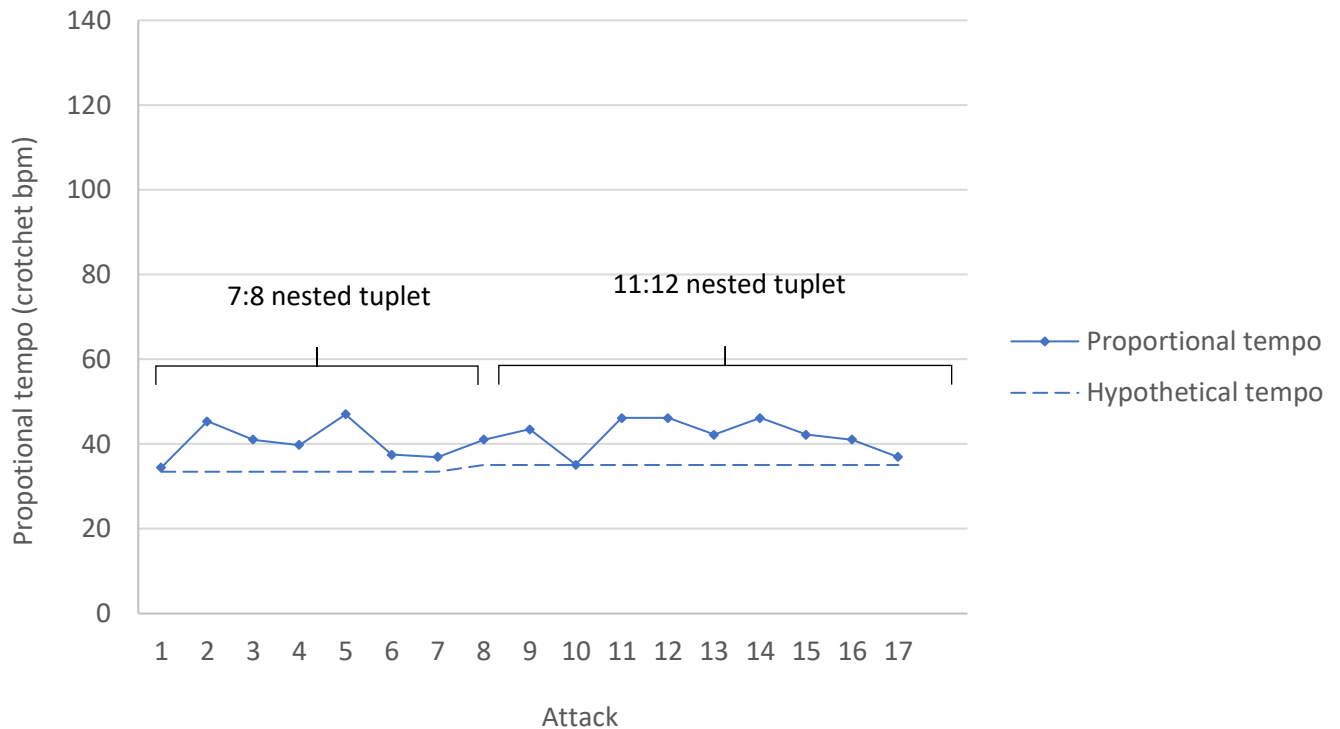


Figure 2.35 Version B Take 1 Crux I hypothetical versus proportional tempo

Aesthetically speaking, Version B marks a significant move away from the recorded tradition. First and foremost, periodically notated crux materials are now periodically performed, affecting a consistent density of attacks, as opposed to the unpredictable rhythmic heterogeneity of traditional gestural practice. This alters the equilibrium of homogeneity and heterogeneity in performance, with progress from the nested tuplets of bar 6 to the 13:12 tuplet of bar 7 affecting a shift in density rather than texture. Elsewhere, the aperiodic rhythms of Crux II are endowed with an even greater sense of internal differentiation and clarity, with the significant reduction in tempo attenuating the effect of a continuous *Gestalt*, and even the sense of this passage as a technical crux. Moreover, while rapid movements persist during all cruxes, strict rhythmic practice naturally limits the

extremes of bodily movement necessitated by gestural practice, thereby drawing attention away from the embodied role of the performer.

2.5.2.3 Version C

Take 1 of Version C is presented in Video Recording 2.7; audio recordings of Takes 1–3 are presented in Audio Appendices 2.8–2.10. Each of these takes exhibited a slightly higher tempo than my preparation base tempo, in contrast to Versions A and B, as illustrated in Figure 2.36. This may reflect my feeling during preparation that I had reached the lower limits of effective tempo, with drawn out fermatas and extended phrasing compromising structural coherence. Having explored the limits of rhythmic objectivity in Version B, I also allowed myself more expressive freedom and a degree of spontaneity between takes, as illustrated by the varied comparison of sectional and crux tempi in Figure 2.37.

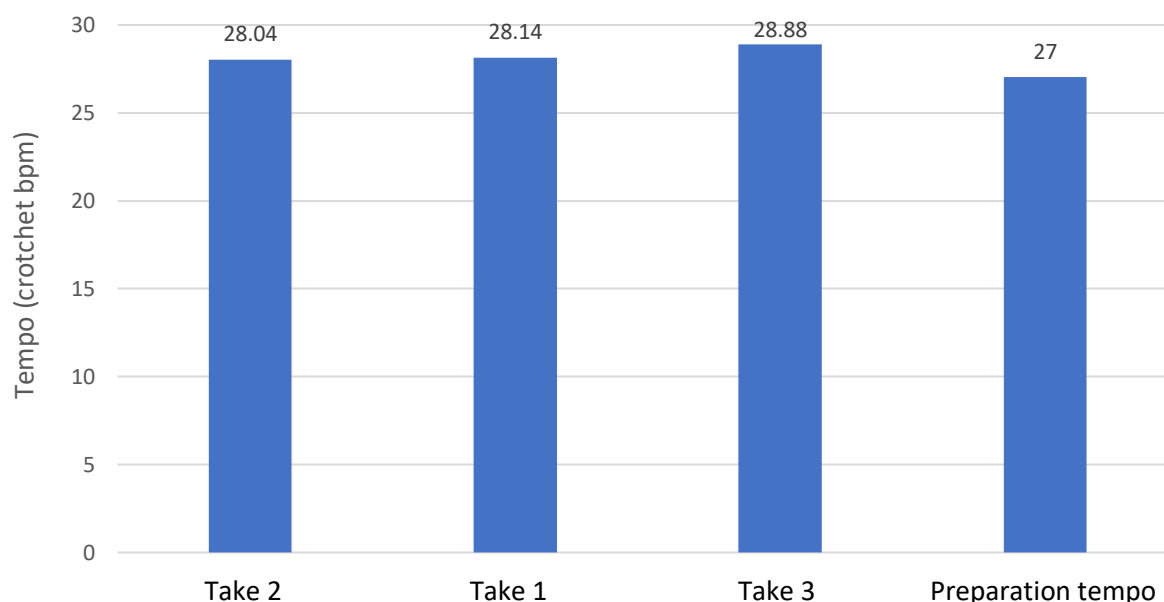


Figure 2.36 Version C Takes 1–3 and preparation tempo comparison

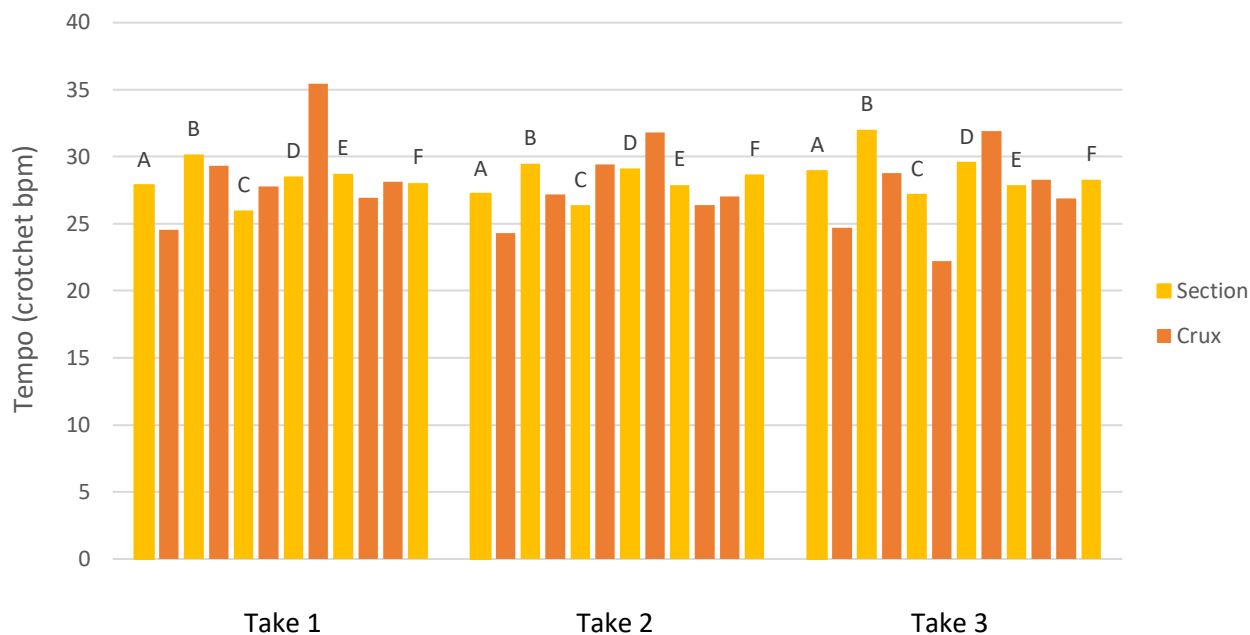


Figure 2.37 Version C section and crux tempo comparison

As the data show, Crux I was once more consistently slower than Section A in every take, affected in this instance by my attempt to distinguish *ff* and *fff* contrasts in the acoustic of the concert hall. In contrast to Version A, however, I was able to maintain dramatic energy through rapid gestural execution of surrounding material. This led to an increase in rhythmic aperiodicity, accompanied by a clear sense of dynamic nuance. This was further clarified by my experimental decision to transpose the underlying A-B dyad down one octave, thereby avoiding the muddying repetition of these tones in the crux (see Video Recordings 2.8 and 2.9 for comparison).¹¹⁶ The rhythmic and dynamic heterogeneity of this bar then contrasts maximally with the periodic attacks and consistent *fortissimo* of the subsequent 13:12 tuplet, which in turn contrasts with the aperiodic values of bar 8, as illustrated in context in Audio

¹¹⁶ This technical issue is highlighted by Corver in her thesis. Corver, p, 8.

Recording 2.6 from take 1. Elsewhere, attention to dynamic detail, and the introduction of subtle articulation and colouristic pedal, made possible by the slower tempo, gave greater variety and nuance to *Crux II*, as illustrated in Audio Recording 2.7 from take 1.

In terms of style and aesthetics, Version C represents an extension of the practice first witnessed in Henck's recording, with dynamic details such as these allowed time to speak at an even slower tempo. The interpretive implications of this style will be discussed at greater length in my conclusions. Before proceeding to this discussion, however, it is worth noting the perceptual opportunities afforded by performance at considerably slower tempi, as illustrated by comparison of the opening bars from Take 1 of Version A and Take 3 of Version C in Audio Recording 2.8. As these excerpts show, slower performance allows for clearer perception of accumulating sound layers in bar 1 and pointillistic colour contrasts in bar 2, while sacrificing rhythmic urgency and linear momentum. As with Version B, this supports a shift of attention away from the actions to the performer, in this case towards the intrinsic quality of the various accumulations and subtractions of sounds, as well as their precise onsets and offsets.

2.6 Conclusion

In a spontaneous 1992 lecture on his early piano music, Stockhausen advocated an idealised mode of listening, whereby the listener becomes so familiar with the pieces that they are able to simulate the gestures and keystrokes of the performer during audition.¹¹⁷ While this may

¹¹⁷ Karlheinz Stockhausen and Jerome Kohl, 'Clavier Music 1992', *Perspectives of New Music*, 31.2 (1993), 136–49 (p. 144).

seem unrealistic, and symptomatic of the composer's desire to control even the way in which his music is experienced, it points towards the importance of an embodied understanding of serial music. As Doğantan-Dack argues, 'music needs to be understood as constituted both by abstract structures and performance movements, both by the score and its performances; and musical meanings are emergent in the processes of listening, performing and composing, where the abstract and the concrete are in continual interaction.'¹¹⁸ In early serial music, and in light of the dialectical relationship of instrumental and electronic composition, this takes on a further dimension, with the performer's defamiliarised, often virtuosic physical movements gaining in significance and independence of meaning. Mathew's characterisation of the performer as an 'organic tape player', and insistence on the metaphor of the 'vanishing performer' is thus extremely unhelpful, and, in light of Stockhausen's mission statement for the Klavierstücke, sorely misguided. While Stockhausen's advice may seem out of reach for even the well-informed listener, an awareness of the defamiliarised gestures of serial music in performance is therefore an important first step towards understanding, which my analysis aims to support.¹¹⁹

If Stockhausen's proposed level of familiarity seems idealistic, it is at least reasonable to suggest that one knows the music well enough to recognise blatant errors of pitch, which can be heard in certain recordings of Klavierstück I. For an experienced listener, these soon become obvious and problematic, just as they would in recordings of traditional repertoire. Such errors are different in kind, however, to those witnessed in Mercenier and Tudor's

¹¹⁸ Mine Doğantan-Dack, 'In the Beginning was Gesture: Piano Touch and the Phenomenology of the Performing Body', in *New Perspectives on Music and Gesture*, ed. By Anthony Gritten and Elaine King (Aldershot: Ashgate, 2011), pp. 243–66 (p. 248).

¹¹⁹ My work is equally a response to Doğantan-Dack's call for performers 'to break the mould surrounding their notorious image as inarticulate doers, and bring to light what is involved in physically making music and what this entails for musicology.' Doğantan-Dack, 'In the Beginning was Gesture', p. 260.

performances of virtuosic material. While Mercenier's splashiness during cruxes may be attributed to live performance nerves, Tudor's comparable inaccuracies are indicative of an explicit performance ethos, expressed to Stockhausen shortly after his first performances of Klavierstücke I–IV in New York in a letter dated 3 February 1955:

My pianistic method involves (usually) doing things with a precise control, as fast as this control can be exercised; and at that point to push beyond into an area where control might be lost (or forgotten) and where the act of playing becomes a 'dangerous' matter.¹²⁰

In this sense Tudor's approach comes closest to a literal realisation of the direction 'as fast as possible', inhabiting a dangerous space which may occasionally stray into performance that is 'faster than possible'.¹²¹ As Stockhausen's enthusiastic reaction to Tudor's performances, and praise of his methods in their correspondence indicates, this is much closer to the way that the performance of serial music was actually conceived in the 1950s: as experimental, irrational, physically mediated, and gaining meaning in its opposition to the fixed inscriptions of electronic music. Far from vanishing, the performer becomes extremely present under

¹²⁰ Letter from Tudor to Stockhausen, 3 February 1955. Copy held at the Stockhausen Stiftung, Kürten. Permission for reproduction granted by the Tudor estate.

¹²¹ In a letter dated 3 March 1955, Tudor wrote that he had reached $\text{♩} = 132$ (i.e., $\text{♩} = 66$) in his preparation of Klavierstück I and hoped to play faster still. As the data show, this is significantly faster than his 1959 recording, and indeed any other on record, indicating a significant relaxation of his approach over time, as well as the extreme nature of his practice during the early years of his relationship with Stockhausen. See also Cornelius Cardew's contrasting outlook in discussion of the literal implications of the 'as fast as possible' performance direction in his own piano piece, *February 1959*: 'A wrong note in this piece is unambiguously a mistake, since the only indication of tempo is "as fast as possible" (for some short groups), and only playing "faster than possible" can result in a wrong note.' Cornelius Cardew, 'Notation: Interpretation, etc.', *Tempo*, 58 (1961), 21-33 (p. 28).

these circumstances. This experimental style (experimental in the sense that by playing at the limit of their capabilities the performer enters into each performance not fully aware of what will result) is what might more accurately be described as ‘Darmstadt pianism’, or simply the historical performance practice of Darmstadt serialism. It is also inimical to recording and the associated practice of repeated listening, wherein instrumental serialism loses its ontological distinction from the inscribed quality of electronic serialism;¹²² experimentalism such as Tudor’s, while valuably documented, therefore demands the unforeseeable, irrational experience of the live musical event, which perhaps explains why Tudor made so few studio recordings.

Kontarsky’s approach to Klavierstück I, later refined by Corver, marked the emergence of a second, classical style of performance, which foregrounded the latent melodic content of serial scores, with a concern for higher level relationships and macro-structure. Shortly prior to the release of Kontarsky’s recordings, Leonard Stein outlined the tenets of this practice with reference to Klavierstück I, noting how ‘changes in tempo, density, emphasis on certain tones—even the appearance of occasional motives and imitations—may be considered by the performer to be more than just fortuitous happenings, and should also be taken into account so that he does not react as a mere automaton but discovers, instead, relationships of a higher order than those inherent in the “serial” system itself.’¹²³ This requires an attenuation of the many *subito* contrasts that populate Klavierstück I, superficially aligning this style of playing with the type of modernist objectivity that Mathew recognises in Jean-

¹²² Grant makes a similar point with respect to the ontological status of variable form works such as Klavierstück XI: ‘It is no accident that variable form arose in a period marked by the rise of constant and repeated access to ‘closed’ works through recording (and all works – not only electronic music, and also variable works themselves – become closed to some extent in this process).’ Grant, p. 158.

¹²³ Leonard Stein, ‘The Performer’s Point of View, *Perspectives of New Music*, 1.2 (1963), 62-71 (p.66).

Jaques Monod's 1951 recording of Webern's Variations.¹²⁴ However, as Cook's nuanced reassessment of Monod's recording attests, this approach to the score, in itself an interpretive choice, retains much of musical interest, and in the case of serial music offers a clear alternative to the practice of the 1950s.¹²⁵ In terms of listening practice, the auditor attuned to this style of performance will gain from creative and comparative listening to the melodic fortuities of the music that are projected, consciously or otherwise, by the performer.

Henck's approach marked the emergence of a third, analytical style of performance in the 1980s, also evident in the recording of Wambach, and to a lesser extent in the later recording of Schleiermacher, characterised by slower tempi and a focus on extreme clarity and variety of detail. In the case of Klavierstück I, this style embraces the manifold, interrelated continua of the piece's parametric composition, calling for fine differentiation of durational and dynamic values (the latter of which offer the bare bones of a continuum) and a creative approach to the management of articulation. The decision to omit articulation markings in Klavierstück I, which, along with its rhythmic innovations and grouping of materials, sets it most clearly apart from *Mode de valeurs* and *Structures I*, allows the performer a strong hand in shaping and communicating this over-arching continuum, itself a function of dynamics and duration, as illustrated by the variety of these three recordings. The choice of cover art by serial artist Paul Lohse (see Figure 2.38), and the inclusion of Lohse's

¹²⁴ Anton Webern, *Piano Variations*, Jacques-Louis Monod, piano (Dial, 17, 1951). Mathew is particularly critical of Monod's 'consistent, and consistently hard timbre: the color of colorlessness', arguing that 'this almost more than any other feature of the recording emblemizes the specious universality of Darmstadt pianism: like the grayness of 1960s brutalist architecture, its astringency and lack of variation imitates the appearance of objectivity, it adopts abstractions tone of voice.' Mathew, p. 60. His pejorative and anachronistic comparison with brutalist architecture incidentally reflects Grant's comment that 'modern architecture has the regrettable distinction of being even more badly received than serial music'. Grant, p. 168.

¹²⁵ Cook, 'Inventing Tradition', pp. 175–89. Cook is also keen to point out that the type of playing that Mathew pejoratively describes, while certainly an established style of performance by the 1950s, was by no means limited to Darmstadt, citing Glenn Gould's recording of the Variations, among others, as a counterexample.

'15 Principles of Serial Orders 1943–4' in the liner notes to Henck's recordings of Klavierstücke I–XI, as well his extensive serial analyses of Klavierstücke IX and X, suggest thinking in these terms, and a keen awareness of the multidimensional principles of serial composition.¹²⁶ Above all, these recordings foreground the microaesthetic qualities of the music, which rise to prominence in relation to the macroaesthetic whole.¹²⁷ This calls for a third approach to listening, diametrically opposed to that of experimentalism, which, rather than taking each musical event as unique and transitory, sets out to discover ever finer expressive nuances and gradations of formal equilibrium through repeated close listening to individual recordings. As noted, I view my performances as occupying a stylistic middle ground between the prioritisation of line and connection witnessed in classical performances such as Corver's and the prioritisation of rhythmic and dynamic detail witnessed in analytical performances such as Henck's.

¹²⁶ Herbert Henck, *Karlheinz Stockhausens Klavierstück IX: Eine Analytische Betrachtung* (Bonn-Bad Godesberg: Verlag für Systematische Musikwissenschaft, 1978); Henck, *Klavierstück X*.

¹²⁷ Grant sees this interplay as an essential feature of both modern art and serial music. Grant, p. 148. Indeed, modern art and its theory, particularly that of Mondrian and Klee, are a constant point of reference in her study.



Figure 2.38 Cover art for Henck's *Klavierstücke I–XI*, featuring Paul Lohse's *Fifteen systematic colour rows with vertical and horizontal compression*

Uniting these styles of performance and suggested modes of listening, and ensuring the interplay between them, is the tension that exists between the manifold parametric extremes of *Klavierstück I*. This is the aesthetic component of serialism that distinguishes it most clearly from thematicism. As Grant writes, 'serialism is based on a tension fraught with expectation', as opposed to the that of American experimental music, which guides the listener towards 'non-expectation'.¹²⁸ The tension inherent in serial music is thus different in

¹²⁸ Grant, p. 239.

kind to that of thematic music, in that it is not predicated on resolution, existing rather in constant anticipation of the unforeseeable.

Arguably the most striking tension in *Klavierstück I*, and that which is felt most keenly by its absence, lies in its rhythmic proportions. Once one has a feel for this tension and the relationship of groups as a listener, these differences and other details—Stockhausen's 'irrational nuances'—come to the fore. It also becomes clear when rhythmic tension is lacking, as in the case of Chen and Liebner, whose interpretations tend towards a general homogeneity, at odds with the multidimensional tenets of serial aesthetics. In Klein's case, meanwhile, these characteristics are pushed to such an extreme, and combined with such imaginative playing, that something quite unusual and to my ears very interesting emerges.

My recordings of Version B illustrate the opposite situation, whereby the rhythmic aspects of the performance come close to the precision of an electronic reproduction. On the one hand, this lends support to Mathew's position. Yet on the other, the very knowledge of the pianist's involvement in the performance situation brings the increasingly fine distinction between electronic reproduction and instrumental performance into greater relief. The performer does not vanish, rather the ad infinitum pursuit of literalism engenders a shift in the quality and intensity of audience scrutiny, and the hermeneutics of the performance act itself. Changes in tempo and criteria of possibility with respect to crux passages also have a distorting effect on the perception of my otherwise consistent stylistic approach, with the aesthetic differences between Versions A–C shedding light on the intersection of technique, interpretation, and sensibility that may be said to characterise performance more generally.

As exemplified in Version C, literalism in performance of *Klavierstück I* has its practical limits, and this is without the further reduction in speed needed to perform *Crux I* with both

terraced tuplet proportions and precise dynamic distinctions. Interpretation of Stockhausen's 'as fast as possible' direction that takes every aspect of the notation at face value thus tends paradoxically towards a performance that is slower than possible, or at least slower than feasible for performers, or comprehensible for audiences. Regardless, the hypothetical possibility of such a performance, in opposition to the extremes of Tudor's practice, highlights the essential dialectic of Stockhausen's notation, a dialectic that is brought to life in performance via the statistical tipping point of crux passages at faster tempi. Klavierstück I represents a special (and remarkable) case of this dialectic that Schuller's argument fails to appreciate, taking on different dimensions in relation to the changing notational practice and thematic contexts of the subsequent Klavierstücke, as illustrated by the case studies of Chapters 3 and 4.

Chapter 3: Interpreting Klavierstück VII

3.1 Introduction

Klavierstück VII was composed shortly after Stockhausen's first meeting with Cage and Tudor in late 1954. Its notational demands are considerably more straightforward than those of Klavierstück I, maintaining a high level of specificity in terms of duration, tempo, articulation, dynamics, and pedalling, with little in the way of technical difficulty or interpretative ambiguity. This would suggest the affordance of literalist interpretations, whose similarities might more accurately reflect the pejorative views of critics such as Mathew and Duncan.

This chapter aims to test this hypothesis, and to consider its implications for audiences, performers, and Stockhausen's temporal theory, through analysis of the recording tradition. My analytical findings are also used to assess the validity and potential compatibility of opposing outlooks on this repertoire by Grant and Jonathan Harvey, ultimately informing conclusions about the form and serial aesthetics of the piece.¹²⁹ Finally, having identified confluences of approach in certain literalist performances, including my own (Version A), I present a new score analysis, which, combined with insights gleaned from my performance analysis, is used to inform the production of a new performance (Version B). In this sense, I adopt a combination of Leong's 'performance → analysis' and 'analysis → performance' models, offering proof of a concept for a more holistic, practice-based approach to the analysis and performance of New Music.¹³⁰ As with the previous chapter, this process begins with an assessment of the technical demands and affordances of the piece.

¹²⁹ Grant addresses Klavierstück VII directly, while Harvey's formal analysis addresses the structurally, aesthetically, and notationally similar Klavierstück V. Grant, pp. 163–64. Harvey, pp. 35–36.

¹³⁰ Leong, *Performing Knowledge*.

Reference should be made throughout this chapter to the complete annotated score in Example 3.1. Event numbers have been used for ease of reference in lieu of bar lines (i.e., E1, E2, etc.).¹³¹ Scientific pitch notation is also used here in light of the particular significance of register in this piece.

¹³¹ Use of event numbers is borrowed from Cook, 'Inventing Tradition'.

Opening section

The image displays two systems of musical notation for the opening section of a piece. The first system covers measures E1 through E6, and the second system covers measures E7 through E15. The notation includes treble and bass staves with various musical symbols such as notes, rests, and dynamic markings. Performance instructions are indicated by brackets and arrows, including 'P' (piano) and 'I.P.' (first performance). Dynamic markings include *ppp*, *pp*, *p*, *sfz*, and *ffz*. A tempo marking of quarter note = 40 is shown at the beginning of the first system. The score is annotated with various performance instructions and dynamic markings.

Example 3.1 Klavierstück VII, annotated score, page 1

The image displays an annotated musical score for Klavierstück VII, page 2, spanning measures E16 to E24. The score is presented in two systems, each with a grand staff (treble and bass clefs).

System 1 (Measures E16-E19):

- E16:** Treble clef begins with a piano (*pp*) dynamic. Bass clef has a piano (*pp*) dynamic.
- E17:** Treble clef features a fortissimo (*ff*) dynamic. Bass clef has a piano (*p*) dynamic.
- E18:** Treble clef has a fortissimo (*ff*) dynamic. Bass clef has a piano (*p*) dynamic.
- E19:** Treble clef has a piano (*p*) dynamic. Bass clef has a pianissimo (*ppp*) dynamic.

System 2 (Measures E20-E24):

- E20:** Treble clef has a piano (*p*) dynamic. Bass clef has a piano (*pp*) dynamic.
- E21:** Treble clef has a pianissimo (*ppp*) dynamic. Bass clef has a piano (*pp*) dynamic.
- E22:** Treble clef has a piano (*p*) dynamic. Bass clef has a piano (*pp*) dynamic.
- E23:** Treble clef has a fortissimo (*ff*) dynamic. Bass clef has a piano (*p*) dynamic.
- E24:** Treble clef has a piano (*pp*) dynamic. Bass clef has a piano (*pp*) dynamic.

Below the staves, performance instructions are provided:

- System 1:** A dashed line with a 'P' at the end indicates a phrasing instruction.
- System 2:** Performance instructions include 'P' and 'I.P.' (likely 'Interpretation') with horizontal lines indicating phrasing and articulation across measures E20-E24.

Example 3.1 Klavierstück VII, annotated score, page 2

The image displays two systems of a musical score for Klavierstück VII, page 3. The first system covers measures E25 to E29. It begins with a tempo marking of $\text{♩} = 63,5$. Measure E25 is marked with a dynamic of *ppp*. Measure E26 has a dynamic of *p*. Measure E27 is marked with *ppp*. Measure E28 has a dynamic of *mf*. Measure E29 has a dynamic of *p*. The tempo changes to $\text{♩} = 57$ at the start of measure E29. The second system covers measures E30 to E33. Measure E30 has a dynamic of *mf*. Measure E31 has a dynamic of *p*. Measure E32 has a dynamic of *ppp*. Measure E33 has a dynamic of *pp*. Performance instructions include *accel.* between E30 and E31, *rit.* between E31 and E32, and *a tempo* at the start of E32. The score is annotated with various musical notations, including slurs, ties, and dynamic markings.

Example 3.1 Klavierstück VII, annotated score, page 3

E34 First resonance section E36

E37 E38 E39 E40

p *pp* *sfz* *mp* *ppp* *pp* *ff* *fff* *p* *mp* *f* *p*

p *I.P.* *fff*

Example 3.1 Klavierstück VII, annotated score, page 4

E41

Grace-note section

Gruppen sehr deutlich, nicht hastig

E42 E43 E44 E45

3.P P

Example 3.1 Klavierstück VII, annotated score, page 5

The image displays two systems of musical notation for a piano piece. The first system covers measures E46, E47, and E48. The second system covers measures E49, E50, E51, and E52. The notation includes treble and bass staves with various musical symbols such as notes, rests, and dynamic markings. Performance instructions are provided in German, including 'cluster stumm' and 'Taste vorher stumm bis zum Druckpunkt, dann ganz niederdrücken'. Dynamics range from *ppp* to *fff*. Pedal markings are indicated as 3.P., 1.P., and 1.P. below the staves. A tempo marking of $\text{♩} = 50,5$ is present between the systems.

E46 E47 E48

ppp *mp* *pp* *fff* *fz* *f* *fff* *mp* *fz* *p* *ppp*

ppp *ff* *mf* *f* *pp*

cluster stumm nur a halten

3.P. 1.P. 1.P.

E49 E50 E51 E52

$\text{♩} = 50,5$

Taste vorher stumm bis zum Druckpunkt, dann ganz niederdrücken

1.P. 1.P. P

Example 3.1 Klavierstück VII, annotated score, page 6

Second resonance section

E53 E54 E55 E56 E57

rit......

E58 E59 E60 E61 E62 E63

rit...... | *a tempo*

subito *ffz* *f* *subito* *ffz* *pp*

3.P. *p* *p* *mf* *p* *mp* *pp* *p* *pp* *mf*

f *f* *ffz* *ffz* *pp*

Example 3.1 Klavierstück VII, annotated score, page 7

Cyclical-group section

E64 E65

accel. *a tempo*

E66 E67

E68 E69 E70 E71 E72

I.P. I.P.

Example 3.1 Klavierstück VII, annotated score, page 8

3.2 Technical demands and affordances

The notation and presentation of Klavierstücke V–XI was influenced by Cage’s time-space notation, and pedalling and articulation techniques that Tudor had developed while working on music by Cage and other composers of the New York School, as mentioned in Chapter 2. This is reflected in the spacious arrangement of materials in landscape orientation, and the lack of meter or bar lines, as well as the inclusion of a range of non-traditional piano techniques, including half-pedalling (see for Example E4–6, page 1), *sforzando* markings in combination with the *una corda* pedal (E10, page 1), ‘*staccato-tenuto*’ re-taking of attacks (E39–41, pages 4–5), and the *ppp* depression of a single key from just above the key bed (E50, page 6).¹³² The markings associated with these techniques require both subjective interpretation and a responsive interaction with the mechanism and timbral quality of the instrument, and the acoustic of the performance space.¹³³ The realisation of dynamic markings, ranging from *ppp* to *fff*, and their interaction with various modes of pedalling and articulation invoke similar considerations.

It is important to note that dynamic markings in Klavierstück VII are more idiomatically configured than those in Klavierstück I, with the exception of the stratified dynamics that appear in the chord at E30, with similar issues in realisation (see Chapter 2). The realisation

¹³² Sketches and manuscript copies observed during a visit to the SSK in August 2019 show that Klavierstück V was originally notated in portrait orientation with serialised crotchet meters, in much the same way as Klavierstück I. Unfortunately, a second extended visit to the archive was not possible during the timespan of the PhD due to the Covid-19 pandemic. Future research may include further visits to the SSK and in-depth assessment of these valuable materials.

¹³³ See Malte Kob, Sebastià V. Amengual Garí, and Zora Schärer Kalkandjiev, ‘Room Effect on Musicians’ Performance’, in *The Technology of Binaural Understanding*, ed. by Jens Blauert and Jonas Braasch (Cham: Springer, 2020), pp. 223–49, for a current overview of empirical research on the impact of room acoustics on listeners and musicians, and Joyce Tang, *Shifting Ideals of Tone in Grand Pianos (1880–1904) and their Implications for Performance Practice* (unpublished doctoral thesis, University of Southampton, 2021) for practice-based discussion of the influence of piano construction on performance practice in repertoire ranging from Beethoven to Liszt.

of dynamics is thus less contingent on what Hellaby has called ‘applied technique’, with flattening of dynamic profiles more directly representative of controlled performance decisions.¹³⁴

These diverse modes of attack and tonal modification are related throughout to various sustained resonances: one of Klavierstück VII’s defining features.¹³⁵ The quality of these effects is a combined function of the instrument and pianistic technique, as Henck explains:

Apart from the vibration ratio, the resonance of the undamped string depends on the alloy and the specific weight of the metal used, length, gauge, and tension, as well as the construction of the string field and soundboard and other structural details. From the player’s side, the impact force and velocity is of utmost importance, because they correspond to the strength of the resonances. The ‘dying-out’ times and resonance capability of the strings are also directly proportional, as can be easily determined empirically.¹³⁶

¹³⁴ Hellaby, *Reading Musical Interpretation*, p. 30.

¹³⁵ Henck provides a detailed history of the use of sustained resonance or ‘piano flageolet’, from Bartók and Schoenberg to Ives, Cowell, and Cage. Herbert Henck, *Klaviercluster: Geschichte, Theorie und Praxis einer Klanggestalt* (Münster: Lit, 2004), pp. 91–104.

¹³⁶ ‘Abgesehen von dem Schwingungsverhältnis hängt die Resonanz der ungedämpften Saite von der Legierung und dem spezifischem Gewicht des verwendeten Metalls, von Länge, Durchmesser und Spannung ab, ebenso von der Konstruktion des Saitenfelds und Resonanzbodens und anderen bautechnischen Einzelheiten. Von Seiten des Spielers hat die Anschlagskraft und -schnelligkeit größte Bedeutung, denn die Stärke der Resonanzen korrespondiert unmittelbar mit diesen. Ebenfalls direkt proportional sind Ausschwingdauern und Resonanzfähigkeit der Saiten, wie sich empirisch leicht feststellen lässt.’ Henck, *Klaviercluster*, p. 88. Empirical measurement of resonance levels in recordings and live performances, lying beyond the scope of this chapter, would make a valuable contribution to future research on this underappreciated aspect of contemporary piano writing.

A blurring of agency between the pianist and the instrument thus takes place, which is difficult for audiences to discern, yet central to the special nature of this particular Klavierstück and its potential for meaning.

Following the completion of Klavierstücke I–IV, Stockhausen set out plans to extend the organisation of musical groups, exemplified in Klavierstück I, to the sextuple grouping of pieces, in the series 4, 6, 1, 5, 3, 2.¹³⁷ This obsession continued in sketches for the sectional organisation of Klavierstücke V–X, in the series 6, 4, 5, 2, 1, 3, with each section defined by a metronomic tempo marking.¹³⁸ Although plans later changed for Klavierstücke VI, IX, and X, the scheme remained in place for Klavierstücke V, VII, and VIII, hence the nominal five sections of Klavierstück VII, defined by tempi of ♩ = 40, 63.5, 57, 71, and 50.5.¹³⁹ These metronomic tempi must be internally determined and proportioned by the performer, thus constituting the psychological time stratum of Stockhausen’s temporal theory. The specificity of fractional metronome markings in this piece—the result of Stockhausen’s ‘chromatic’ division of ‘tempo octaves’—may seem absurd at first glance, yet in practice, whole number metronome marks corresponding to a semiquaver or demisemiquaver pulse can be readily calculated and internalised.

Thinking in terms of the lowest common denominator rhythmic value of a demisemiquaver is in fact essential for a literalist rendering of Stockhausen’s measured time stratum, notated via additive configurations of demisemiquaver durations.¹⁴⁰ Such

¹³⁷ Richard Toop, ‘Stockhausen’s Other Piano Pieces’, *The Musical Times*, 124 (1983), 348–52 (p. 348).

¹³⁸ Richard Toop, ‘Stockhausen’s *Klavierstück VIII*’, *Contact*, 28 (1984), 4–19 (p. 4).

¹³⁹ Of the original versions of Klavierstücke V–X, all of which were composed prior to Stockhausen’s meeting with Tudor, only Klavierstück VIII remained unchanged. *Ibid.*. Given its many textural and notational similarities to the final versions of Klavierstücke V–VII, this highlights the extent to which the distinctive idiom of his mid-1950s piano writing pre-dated their meeting.

¹⁴⁰ Hence the opening section can be effectively practiced with a metronome set to M.M. 160. This practice, which, according to Kobler, was strictly advocated by Stockhausen, is naturally far more practical than the

configurations appear throughout Klavierstücke V–VIII, with the varied inclusion of *ritardando*, *accelerando*, and *a tempo* markings affecting the interaction of Stockhausen’s psychological and measured time strata. As noted in Chapter 2, these pieces also saw the introduction of small notes, whose performance directions may now be cited in full:

Small notes are independent of the tempo fluctuations indicated and are played “as fast as possible”. They are just as important as large notes; they should be articulated clearly and not quasi arpeggiated. Therefore they must be executed more slowly in the lower registers than in the upper. The various intervallic leaps within groups of small notes should result in a differentiations of the actual intervals of entry (do not make them equal). Groups of small notes between vertical dotted lines interrupt the tempo indicated.¹⁴¹

These instructions refer to the performance of small notes in a wide variety of contexts, from isolated groups in Klavierstücke V–VIII to their ubiquitous presence in Klavierstück X. This may explain Stockhausen’s attempt at a directional panacea. In practice, the ambiguity of these instructions grants the performer significant freedom, as evidenced by the extreme variety of interpretative approaches to the relatively limited number of small notes and small-note groups in Klavierstück VII. These include isolated groups appearing at E2, E11, E23, E25, and E71, together with a central ‘small-note section’ (E42–49, pages 5–6), containing six groups

common denominator practice evidenced in Tudor’s working notes for Klavierstück I. Interview with the author, 4 August 2019, Kürten Gesamtschule, Kürten.

¹⁴¹ Karlheinz Stockhausen, ‘General Foreword’, *Klavierstück VII* (London: Universal Edition, 1965).

of small notes, internally divided into sub-groups, and separated by ‘rest-fermatas’ (i.e., fermatas appearing above rest durations) and variously inflected A4s.

The realisation of small notes in this piece seemingly constitutes the physical time stratum of Stockhausen’s theory, with rhythmic execution mediated by the utmost speed of bodily movement and manual control, as anticipated by the practice witnessed in recordings of *Klavierstück I*’s cruxes. However, Stockhausen’s demands in *Klavierstück VII* for clarity of execution in different registers and artifice in distinguishing ‘intervals of entry’ introduce new criteria of possibility with respect to rhythmic interpretation. As with the realisation of resonance effects, consideration of registral timbre and resonance calls for a response to the agency of the instrument. Highlighting disparate intervals, meanwhile, invites an artificiality of response, designed to maximise the salience of physically mediated rhythmic variation, whenever disparate configurations are straightforward to execute. This is further complicated by the salient serial scheme (to be discussed in my score analysis), which governs groups and sub-groups of small-notes in the small-note section, inviting the performative distinction of groups via rhythmic execution.

The performer is also theoretically free to determine the duration of rest-fermatas. These can be separated into those that separate sections (E25 and prior to E30), and those that appear additively within serialised systems. In a specific performance note to *Klavierstück VII*, Stockhausen writes that the smallest rest-fermata duration of a demisemiquaver may be freely chosen, and that longer durations should be proportionately extended, i.e., twice as long for a semiquaver.¹⁴² Literalist practice thus allows for the significant extension or contraction of periods of inaction between materials or sections, with ramifications for the

¹⁴² Stockhausen, *Klavierstück VII*.

dimensions of certain salient serial systems, and for audience reception of the piece as a whole.

3.3 Analytical standpoints

3.3.1 Harvey

Harvey looks in some detail at the role of sectional divisions in his analysis of Klavierstück V, using the traditional labels of ‘moderato exposition’, ‘scherzo’, and ‘slow movement’ to reduce the six nominal sections, marked by changes of tempo, to a tripartite form, dictated by the shared density of activity between sections.¹⁴³ In doing so, he emphasises the traditional, linear, and developmental qualities of the music, and the functional role of sections within a traditional formal framework, drawing parallels with the aesthetics and associated interpretative practices of goal-oriented tonal music.

Delineating sectional structure and form in serial music, and deciding when such delineations are pertinent, is a challenge for analysts, performers, and audiences alike.¹⁴⁴ Hence, while Klavierstück VII has five sections governed by ‘chromatically’ proportioned tempo markings, they do not necessarily reflect the aural reality. As Harvey observes, ‘all I have said about the six sections in *Piano Piece V* is subject to a certain degree of disguise, because not only are there many *ritardandi* and *accelerandi*, but the changes of tempo are

¹⁴³ Harvey, p. 35.

¹⁴⁴ See for example the varied structural analyses of Klavierstück III, summarised in Sun-Ju Song, *Music Analysis and the Avant-Garde Compositions of Post-World War II: Four Case Studies* (unpublished doctoral thesis, Queensland Conservatorium, Griffith University, 2008), and comparisons of audience perception of sectional form in Klavierstück IX in Eric F. Clarke and Carol L. Krumhansl, ‘Perceiving Musical Time’, *Music Perception: An Interdisciplinary Journal*, 7 (1990), 213–52.

not always apparent at the beginnings of the new sections.’¹⁴⁵ This also holds true for Klavierstück VII, particularly during the more active central events, where similar metronomic divisions of ♩ = 63.5, 57, and 71 elide (see page 3), with the *accelerando* and *ritardando* between these latter markings further attenuating any effect of sectional change. As a result, while some sections are clearly defined by changes in tempo, most notably the initial shift from ♩ = 40 to ♩ = 63.5, others are obscured. These are important considerations to bear in mind when assessing performances, which may either enhance or obscure the notated presence of these sectional divisions, with implications for the relevance and delineation of Harvey’s traditionalist formal model.

3.3.2 Grant

M.J. Grant’s brief analysis of Klavierstück VII looks beyond the structural significance of temporally defined sections, focusing instead on non-linear dimensions of the music. While her analysis is somewhat muddled,¹⁴⁶ it offers a clear alternative to Harvey’s traditionalism, interpreting the piece through the lens of early 1950s serial-aesthetic preoccupations with the isolated tone.¹⁴⁷ In Grant’s reading, the repeated C#4s that run through this piece engender stasis, reflecting backwards and forwards throughout the structure, thereby supporting a sense of equilibrium, and thus an affinity with the aesthetics of early pointillistic

¹⁴⁵ Harvey, p. 36.

¹⁴⁶ See for example her non-contextualised reference to the significance of the tritone descent of E18 and description of the ‘much more direct relation’ between the focal C#4 and closing D#4 of the opening section, referring back to a non-existent ‘previously mentioned whole-tone’. Grant, p. 163. Her subsequent insistence that the repeated C#1 of the first resonance section has ‘little save its pitch class to do with the previous one’ also feels odd, given her earlier assertion that the piece is ‘striking for its consistent repetitions of certain pitches’. *Ibid.*, pp. 162–3.

¹⁴⁷ See in particular Grant’s chapter ‘The Isolated Tone: Electronic and Serial Music, 1945–1954’. *Ibid.*, pp. 39–71.

serialism.¹⁴⁸ In contrast to the regular activity of these pieces, stasis is further engendered in Klavierstück VII by the spacious distribution of material, enhanced by the deliberate proportioning of tempi in an ‘octave’ one third slower than the standard ♩ = 60 to 120 used in Klavierstück V.¹⁴⁹ This has the potential to lend itself to the sort of serial listening described in Chapter 2, with attention directed towards moments of timbral beauty and the unpredictable transformation of material—in this case the repetition of certain tonal centres—with subsequent events calling for reflection on what has come before, and the recognition of a poised balance of musical elements once the piece has run its course.

While these opposing viewpoints are convincingly argued, neither author considers the potential for performance decisions or the unpredictable interaction of the performer and the instrument to sway audience interpretation in one direction or the other. This lacuna is addressed by the following performance analysis.

3.4 Performance analysis

3.4.1 Introduction

My performance analysis of Klavierstück VII focuses on twelve recordings (see Table 3.1).¹⁵⁰

In contrast to Chapter 2, I have chosen to present the recordings according to how closely the

¹⁴⁸ Grant asserts that such tones are isolated in silence, ‘among the most striking characteristics of an enormous amount of serial music’. *Ibid.*, p. 163. In fact, Klavierstück VII features very little silence, characterised instead by the virtually ubiquitous presences of piano resonance. As my performance analysis and suggestions will show, this is a distinction with important aesthetic and performance practical ramifications.

¹⁴⁹ Maconie, *Other Planets*, p. 142.

¹⁵⁰ Werner Bärtschi’s 1984 recording of Klavierstück VII came to my attention shortly prior to submission and is therefore not included in my corpus for analysis. Karlheinz Stockhausen, Klavierstück VII, Werner Bärtschi, piano. LP, RecRec Music—RecRec 04, 1984.

performers worked with Stockhausen, moving from directly supervised ‘middle-period’ performers (Kontarsky and Henck), to directly supervised ‘late-period’ performers (Corver, Kobler, and Mosell), to those who received some supervision from Stockhausen (Schroeder, Wambach, and Schleiermacher), to those who, for various reasons, developed their performances independently (Klein, Damerini, Tudor, and Liebner). This is designed to highlight the confluence of approach in those who worked closely with Stockhausen, with particular respect to tempo, in contrast to the more divergent approaches witnessed elsewhere.

Performer	Date	Context
David Tudor	1959	- See Table 2.1
Aloys Kontarsky	1965	- See Table 2.1
Elisabeth Klein	1978	- See Table 2.1
Marianne Schroeder	1984	- Recorded Klavierstücke V–VIII - Gave American premiere of Klavierstück XII - Some experience working with Stockhausen
Herbert Henck	1986	- See Table 2.1
Massimiliano Damerini	1987	- Recorded as part of a twentieth-century retrospective compilation - No known contact with Stockhausen
Bernhard Wambach	1988	- See Table 2.1
Ellen Corver	1997	- See Table 2.1
Steffen Schleiermacher	2005	- See Table 2.1
Benjamin Kobler	2014	- Recorded Klavierstücke I–V and VII–XI for Ensemble Musikfabrik - Dedicatée of <i>Natürliche Dauern</i> (2006) - Worked extensively with Stockhausen - Teacher at the Stockhausen courses
Vanessa Benelli Mosell	2015	- See Table 2.1
Sabine Liebner	2016	- See Table 2.1

Table 3.1 Selected recording corpus for Klavierstück VII

3.4.2 Middle-period supervised practice: Kontarsky and Henck

As with Klavierstück I, Kontarsky's recording of Klavierstück VII is characterised by a lack of dynamic contrast. This is observable from the outset, with monotone performance of the carefully graded opening C#4 repetitions and lack of distinction between quiet pitches from E15–E17 (0'00"–0'09"). The faster sections from E26–E35 also lack dynamic variety, with a prevailing attenuation of Stockhausen's detailed specifications (1'45"–2'25"). Kontarsky performs the following passage from E36 to E39, which I term the 'first resonance section', with muscular brutality, eliciting much resonance from the *ff* and *fff* C#1s (2'25"–3'15"). However, other dynamic shapes, such as the gentler contour of E37–E38, offering potential for contrast and variety, are absent. This contributes to a sense of detached objectivity, which is accentuated by the spacious distribution of material, in contrast to the sense of line engendered by Kontarsky's attenuation of *subito* contrasts in Klavierstück I.

Kontarsky's tempo in the opening is brisk, with a mean of $\text{♩} = 45.5$ for the $\text{♩} = 40$ section, contributing further to the deadpan style of his performance.¹⁵¹ The perceived rigidity of this style is belied, however, by the consistent flexibility of Kontarsky's tempo, exemplified by a standard tempo deviation of $\text{♩} = 8.4$ in the opening section, and underpinned by a gradual hastening as the music progresses, as illustrated in Figure 3.1.¹⁵²

¹⁵¹ All opening section tempo timings were extracted using Sonic Visualiser. IOIs were recorded for notated durations, excluding small notes. Timings for the caesura prior to E13 and the non-durational small-note group of E23 were omitted from calculations. See Appendix B for sample timing data for Tudor's opening section.

¹⁵² This accords with Cook's assessment of persistent rhythmic flexibility in modernist styles of performance in Webern's Piano Variations. Cook, 'Inventing Tradition'.

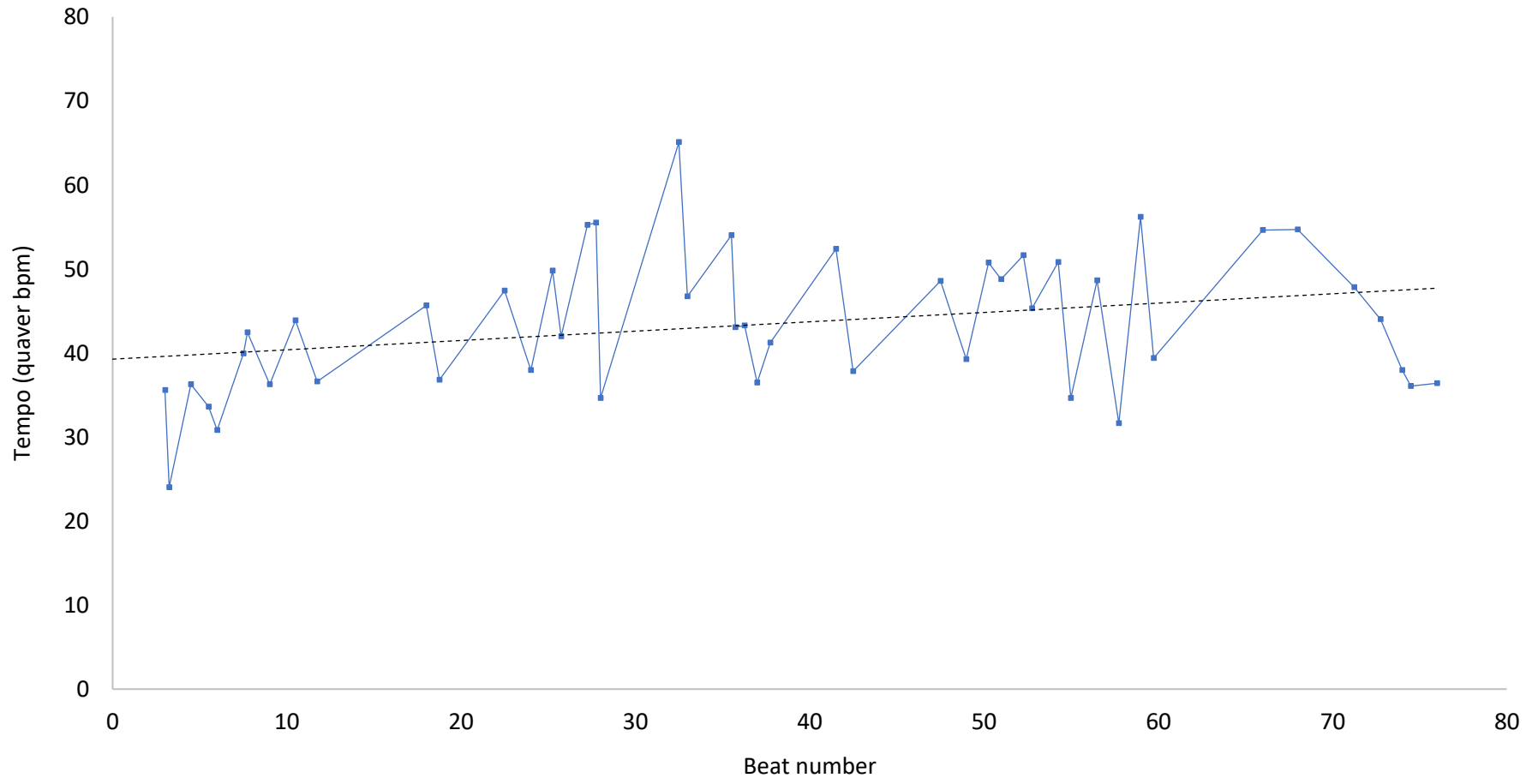


Figure 3.1 Kontarsky ♩ = 40 section tempo variation

This flexibility is tempered in the first resonance section, with a significantly lower standard deviation of 3.3 from a mean tempo of $\text{♩} = 64$. This local speed, slightly slower than the specified $\text{♩} = 71$, also allows for brief resonance effects, such as the re-taken quaver C#1 prior to E40, to speak clearly, thereby foregrounding the sonority that characterises and distinguishes Klavierstück VII.

Elsewhere, Kontarsky's performance of the small-note section (E40–E47) establishes some key aspects of common practice, with each group given its own rhythmic profile, ranging from the four, even pitches of E43 to the unpredictable irregularity of E42, and each intervening A4 receiving a different attack and tonal colour, corresponding to the varied markings of the composer (3'16"–4'05").¹⁵³ Kontarsky's 'irregularity aesthetic' is also applied to the two remaining small-note groups of the piece (E23 and E71: 1'30" and 6'18"), thereby establishing a consistent sense of style, which shows recognition of Stockhausen's call for differentiation of entry and consideration of register.

The serial scheme underlying the small-note section is reflected in the organisation of groups and sub-groups and the scale of rest-fermatas which divide these groups, ranging additively from one to six semiquavers. These additive rest-fermatas recur in ascending order between the more obviously algorithmic series of 'pitch groups' that appears at the end of the piece, which I term the 'cyclical-group section' (E66–E70). Timings for Kontarsky's rest-fermatas show a positive correlation in both sections, though by no means strict adherence to the mathematical proportions of the notation, as illustrated in Figures 3.2 and 3.3. The five

¹⁵³ In light of the quantity and complexity of the groupings, analysis of small-note timing remains qualitative. See Luke Windsor, Rinus Aarts, Peter Desain, Hank Heijink, and Renee Timmers, 'The Timing of Grace Notes in Skilled Musical Performance at Different Tempi: A Preliminary Case Study', *Psychology of Music*, 29. 2 (2001), 149–169 for empirical analysis of grace-note performance in a piece of piano music by Beethoven with reference to discussion of interpretative strategies by performers.

dynamic levels of the groups of pitches are, however, carefully differentiated, indicating a heightened prioritisation of dynamic differences in salient serial contexts.

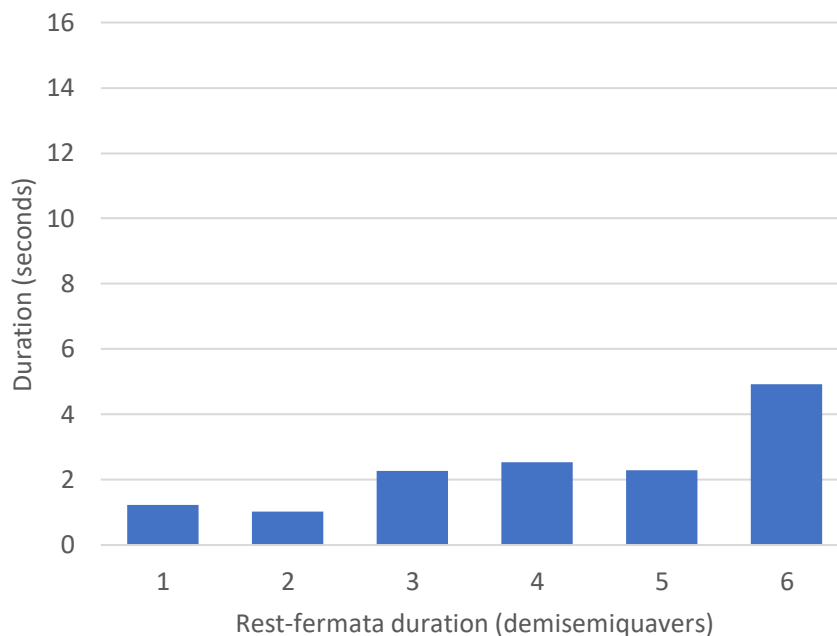


Figure 3.2 Kontarsky small-note section rest-fermata proportions

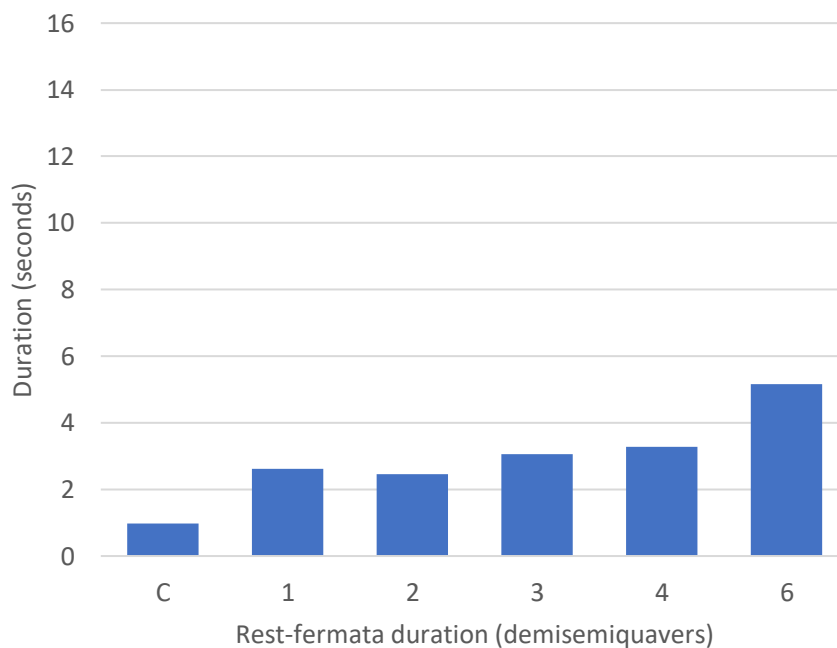


Figure 3.3 Kontarsky cyclical-group section rest-fermata proportions

In contrast to Kontarsky, Henck's performance explores a wide range of dynamic extremes, exhibiting fine distinctions between *p*, *pp*, and *ppp* markings and their varied articulations in the opening section (0'00"–2'02"). This is contrasted with the brutal *ff* and *fffs* of the first resonance section, demonstrating the same consistently graduated maximisation of dynamic extremes heard in his recording of Klavierstück I (2'56"–3'47"). In terms of tempo, Henck's average of $\text{♩} = 41.2$ for the opening is slightly slower than Kontarsky's, and notably closer to the notated $\text{♩} = 40$; however, their deviation from this average tempo is extremely similar, as illustrated in Figure 3.4, suggesting the influence of Kontarsky's teaching and the document of his recording on Henck's interpretation. Elsewhere, Henck is significantly more calculated in his measurement of rest-fermatas. In both the small-note section and the cyclical group section (3'48"–5'10"; 6'36"–7'22"), he adheres closely to Stockhausen's directions, producing an extreme extension of longer rest-fermatas, as illustrated in Figures 3.5 and 3.6. This lends greater prominence to each group of small notes in the small-note section, whose sub-groups are further articulated by unspecified terraced adjustments of tempi, allowing for clearer perception of the dynamic distinctions, as well as the number of constituent attacks.

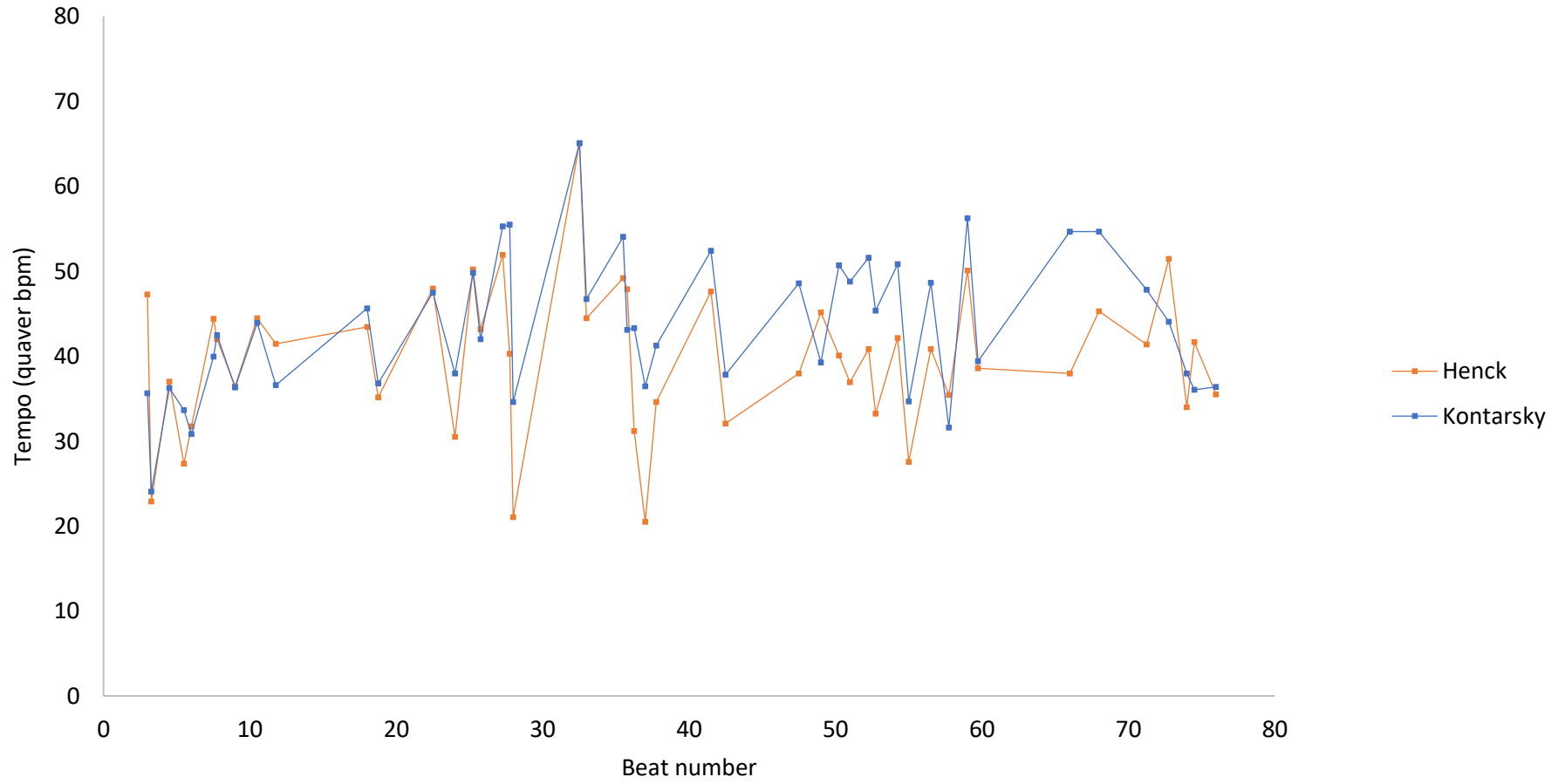


Figure 3.4 Kontarsky and Henck ♩ = 40 section tempo comparison

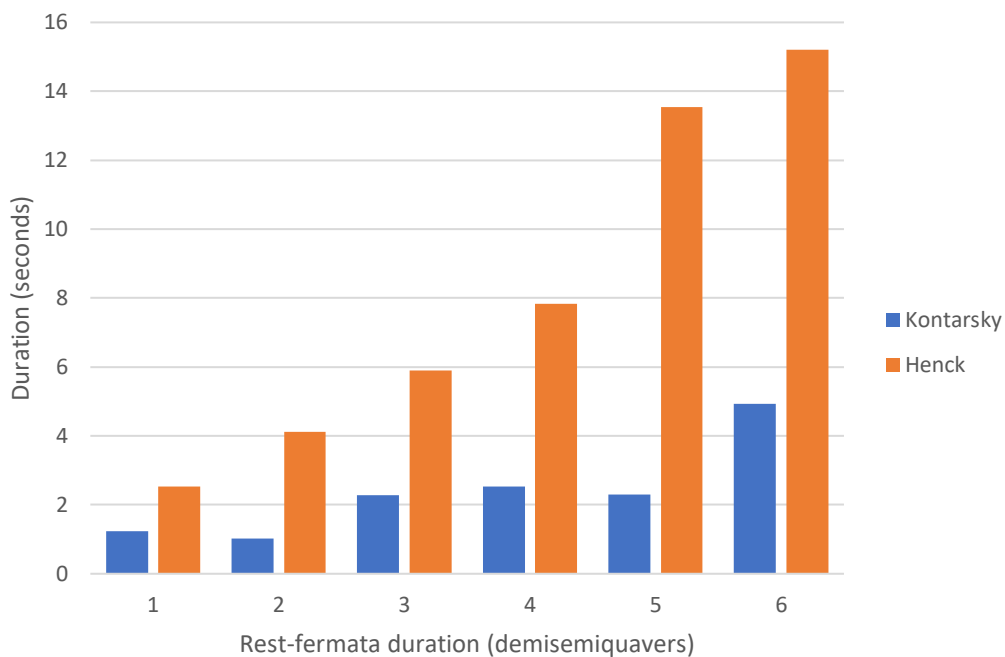


Figure 3.5 Kontarsky and Henck small-note section fermata proportions

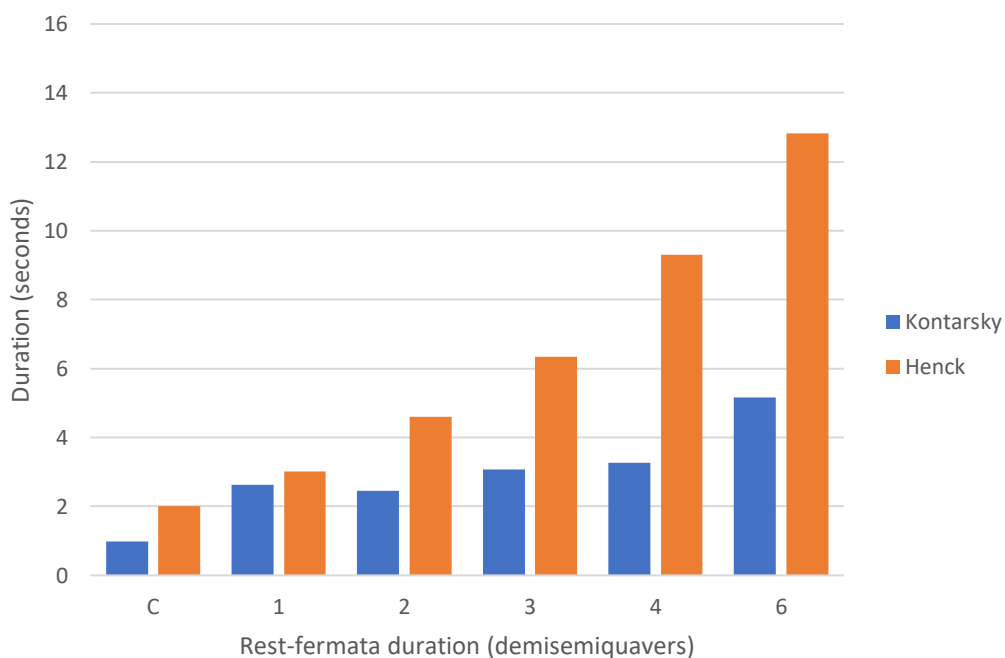


Figure 3.6 Kontarsky and Henck cyclical-group section fermata proportions

In summary, Henck's performance epitomises finesse, attention to detail and a response to Stockhausen's small-notes that, as with his recording of *Klavierstück I*, appears to show a concern for serial analysis. The overall effect is methodically calculated, with the relative simplicity of the notation allowing for clear, controlled presentation of details, while his consistent extension of inter- and intra-section fermatas accentuates the latent spacious character of the piece. The resultant fragmentation, allowing for greater focus on momentary timbral details and the irrational agency of the instrument, would appear to support a static reading of the piece. Yet at the same time, the strict extension of additive fermatas could be heard to affect a sense of progressive discontinuity and linear devolution, less evident in Kontarsky's recording, thus introducing an element of formal tension to his performance.

Kontarsky and Henck's significant levels of rhythmic freedom also suggest the relative performative freedom of pianists who worked closely with Stockhausen during the middle period of his career. Without experience of performing the music, or reference to empirical data, these variations are virtually impossible to perceive, potentially leading to misguided assumptions about the temporal objectivity of the performances. Whether or not Stockhausen was able to perceive these variations, or indeed whether they were a concern for him while supervising performers from the 1950s to the 1980s, remains open to speculation. Regardless, as the following analyses illustrate, the late-period supervised practice of Corver in *Klavierstück VII* marked the beginning of a significant trend towards temporal literalism, reiterated and refined in more recent recordings by Kobler and Mosell,

suggesting an increased concern for metronomic exactitude on the part of the composer, with implications for audience reception.¹⁵⁴

3.4.3 Late-period supervised practice: Corver, Kobler, and Mosell

Corver's opening section is precisely realised with a clear sense of line throughout, aided by discreet, undirected use of the damper pedal to connect repeated C#4s from E15–E18 (1'02"–1'30"), recalling her prioritisation of line in *Klavierstück I*.¹⁵⁵ Her connections here serve to emphasise the isolation of the rising gesture of E21, preceded by the exposition's only moment of silence (1'41"–1'47"). This independent gesture reoccurs much later, similarly isolated and registrally expanded at E63 (6'07"–6'10"), with both placements heralding a clash between C# and D#, thus taking on a thematic and formal significance that I explore in greater depth in my score analysis. For the time being, it is worth noting that Corver's exaggerated isolation of these gestures highlights their parallelism. Her projection of the upper G3 in the *sforzando* chord of E18 also shows signs of motivic thinking, foregrounding the descending tritone, which establishes an elegant symmetry with the resolution of both notes at E20 (1'24"–1'40"). This draws attention to the tritone interval, foreshadowed in the rising G3 to C#4 of E5–E6 and repeated in the outer voices and of the chord at E48 and their resolution at E49. Together, this classical practice recalls Stein's petition for the unearthing of motivic

¹⁵⁴ This is supported by anecdotal evidence of Stockhausen's late-period coaching. Kobler, for example, reported that Stockhausen was meticulous in his demands for rhythmic and metric precision during their studies together and in the coaching he witnessed at the Stockhausen Courses from 1998 to the time of Stockhausen's passing in 2007. Interview with the author, 4 August 2019, Kürten Gesamtschule, Kürten.

¹⁵⁵ Stockhausen explicitly indicates such pedalling at E20.

figures in serial music (see Chapter 2), with such figures lying closer to the surface in the spacious groupings of Klavierstück VII than in the complex textures of the earlier pieces.¹⁵⁶

Figure 3.7 highlights Corver's steady reading of the opening section, with a standard deviation of $\text{♩} = 4.3$ from an average tempo of $\text{♩} = 35.5$. The noticeable tempo spike at E11 (approximately beat 30) is the result of her slight hastening of the final C6 and G#6 of E10, affecting a gestural dynamism, brought into relief by her slower surrounding tempi, which dissipates in her performance of the ensuing small notes (0'43"–0'53").

¹⁵⁶ Stein, 'The Performer's Point of View', p. 66.

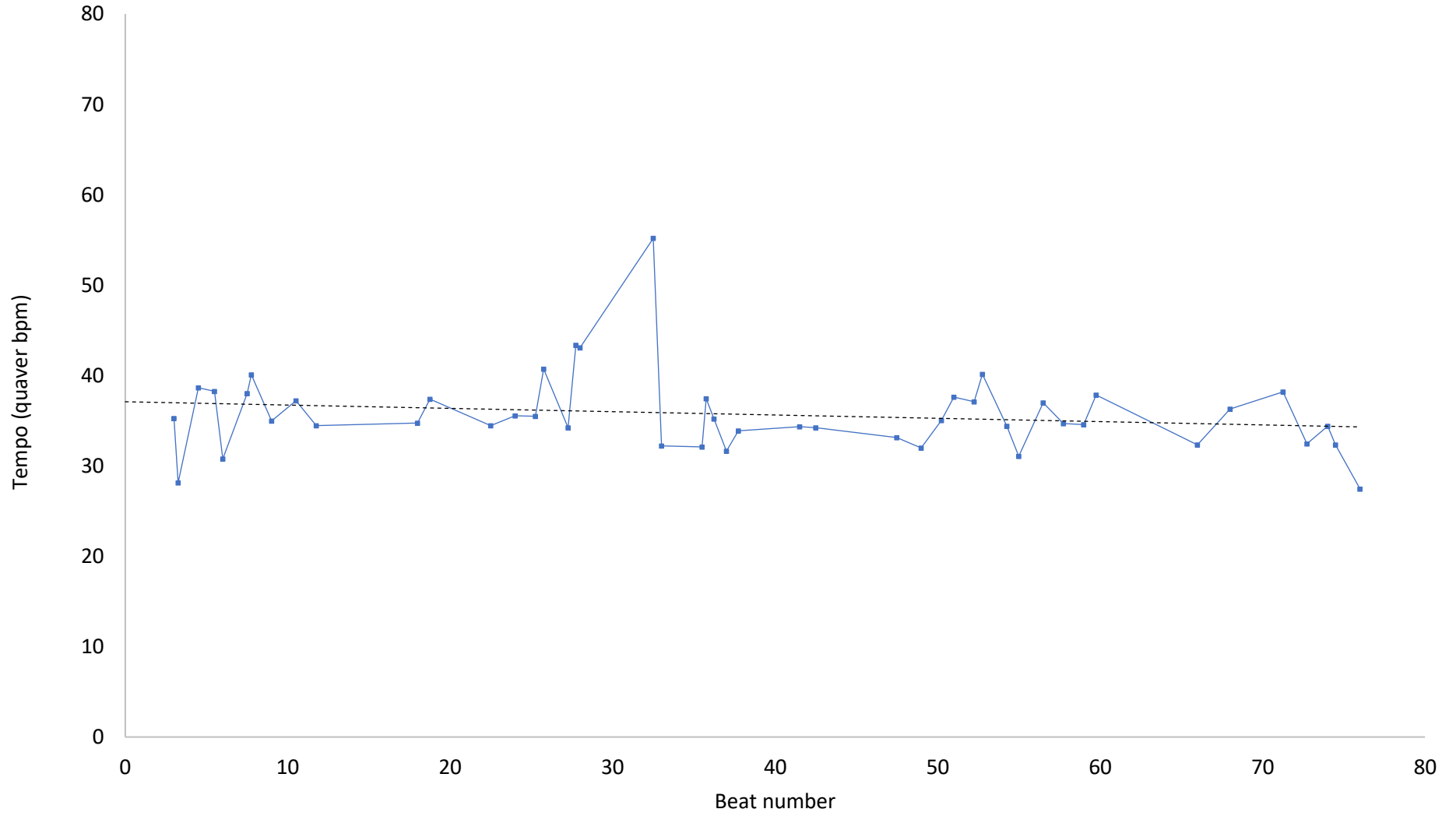


Figure 3.7 Corver ♩ = 40 section tempo variation

Aside from this locus of expressive freedom, she is remarkably measured, showing evidence of rigorous metronomic preparation. Her slightly slower mean tempo also plays into Klavierstück VII's latently spacious character, contributing to the enhanced clarity of brief resonance effects and the layered release of held notes,¹⁵⁷ more clearly audible on this high-fidelity recording than those of her predecessors.¹⁵⁸

Corver's reading of the small-note section differs somewhat from that of Kontarsky, as illustrated by her uneven playing of the descending gesture of E41 and the clear distinction of groups and their individual dynamics in the bubbling contours of E43 (3'50"–4'44"). Overall, however, there is a shared sense of controlled irregularity, accompanied by a clearer distinction of the notated groups—though not to the same extent as Henck. As Figure 3.8 shows, Corver observes the increasing rest-fermata durations, though with a much lower rate of increase than Henck. This affects a greater sense of forward motion and connectivity between groups, in accordance with her preceding prioritisation of musical line. As Figure 3.9 shows, Corver's significant expansion of the additive rest-fermata system in the later cyclical-group section is closer to Henck's literalism, with her progressively spacious final rest-fermatas contrasting effectively with her foregoing aesthetic of legato connectivity (6'20"–6'57").

¹⁵⁷ This modification is sanctioned by Stockhausen's performance note, stating that tempi 'may be transposed to suit the resonance of the instrument and the acoustics of the room'. Stockhausen, 'Comments on Piano Piece VII', *Klavierstück VII*.

¹⁵⁸ Henck cites Ives's disappointment at the perceptibility of resonance effects in recordings and live performances of his piano music. Henck, *Klaviercluster*, p. 106. Recording technology has of course improved since this time, allowing for greater capture of such nuances, as evidenced in Corver and Kobler's recordings in particular. In Kobler's case this was achieved by placing two microphones on the low strings, two microphones very close to the hammers, and two microphones high above the performer's back, in line with Stockhausen's own recording practice, allowing for subtle mixing and nuanced capture of dynamic levels and sustained resonances. Interview with the author, 4 August 2019, Kürten Gesamtschule, Kürten.

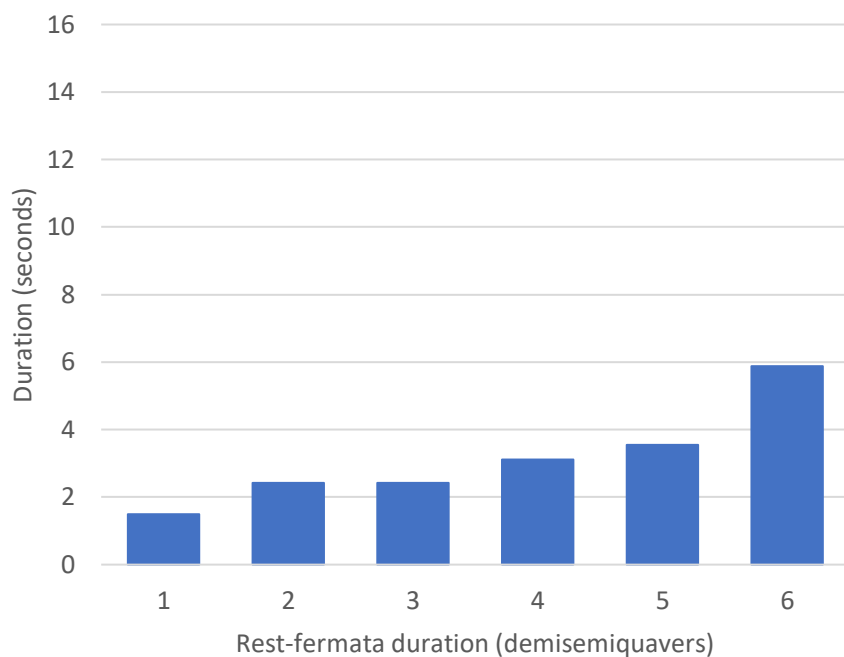


Figure 3.8 Cover small-note section fermata proportions

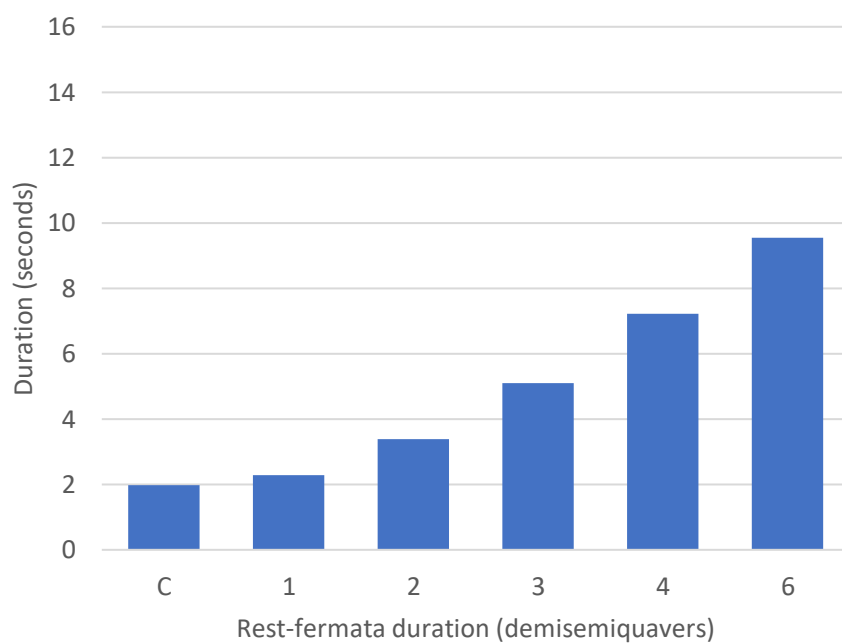


Figure 3.9 Cover cyclical-group section fermata proportions

Together, this contributes to a balancing of global extremes, and a sense of progress from stability in the early sections to fragmentation in the later sections. This imbues the music with a sense of direction, foreshadowing the linear compositional dialectics of Klavierstücke IX and X (see Chapter 4 for in-depth discussion of the latter). In spite of certain superficial similarities, then, indicative of a shared tradition, Kontarsky, Henck, and Corver's recordings all display personal traits and characteristics. Examination of later supervised recordings shows a much clearer convergence of approach.

Figure 3.10 highlights the similarity of Corver and Kobler's tempi in the opening section, with Kobler's standard deviation of just $\text{♩} = 2.9$ from a mean tempo of $\text{♩} = 34.8$, constituting a further level of metronomic refinement, tending towards absolute consistency. As the graph shows, the complex of E11 represents a locus of expressive freedom once more, with Kobler taking the opposite approach to Corver by slightly delaying the accented C6 (0'43"–0'55"). This gives the preceding *sforzando* G#6 a playful agogic emphasis, setting it apart as an axis of symmetry. The performers also take similarly reduced tempi in the first resonance section, with Corver's mean $\text{♩} = 64.4$ virtually identical to Kobler's $\text{♩} = 63.9$. Furthermore, their recordings exhibit extremely similar rest-fermata durations, both in the small-note and cyclical-group sections, as illustrated in Figures 3.11 and 3.12.

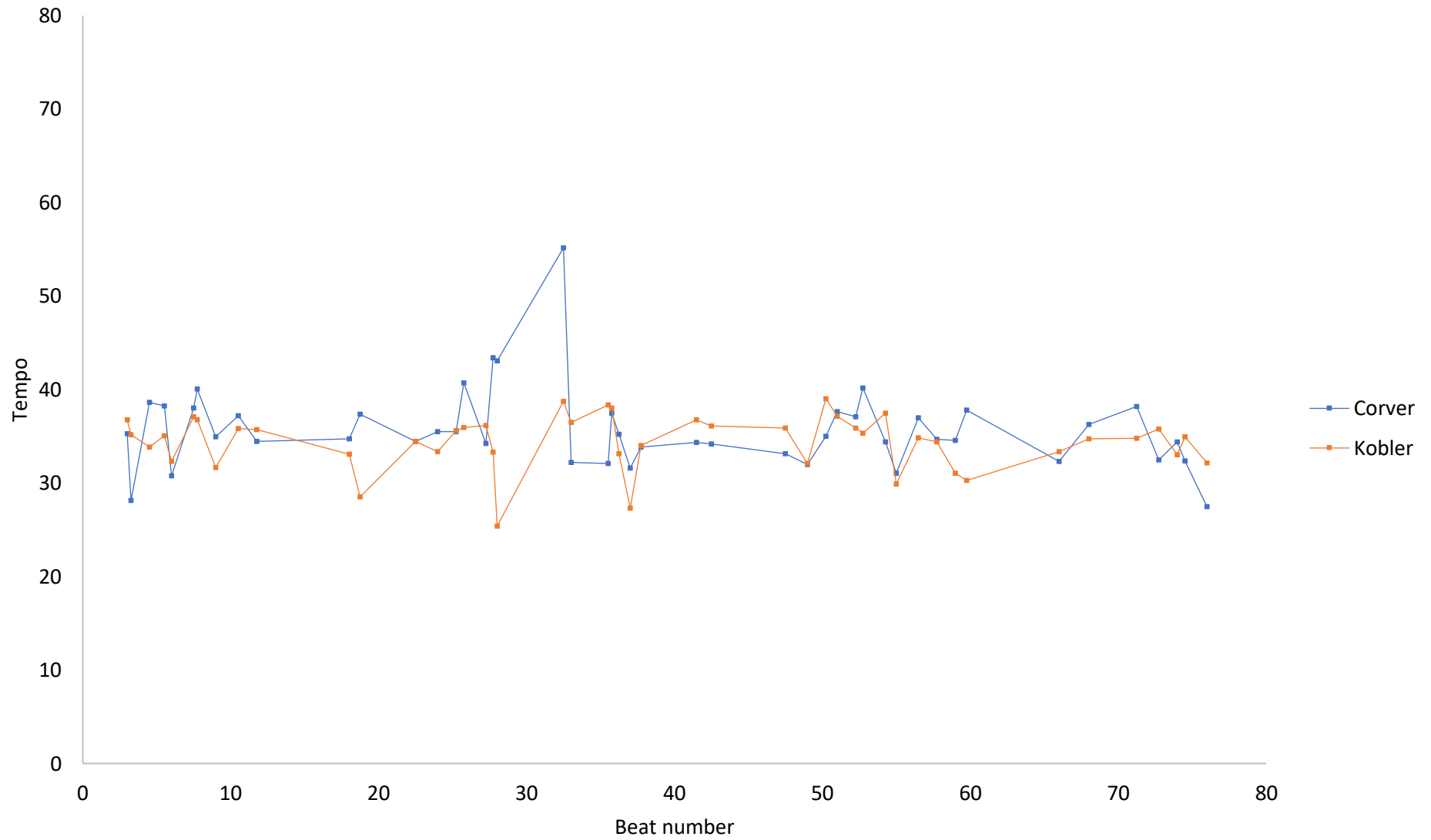


Figure 3.10 Corver and Kobler ♩ = 40 section tempo variation

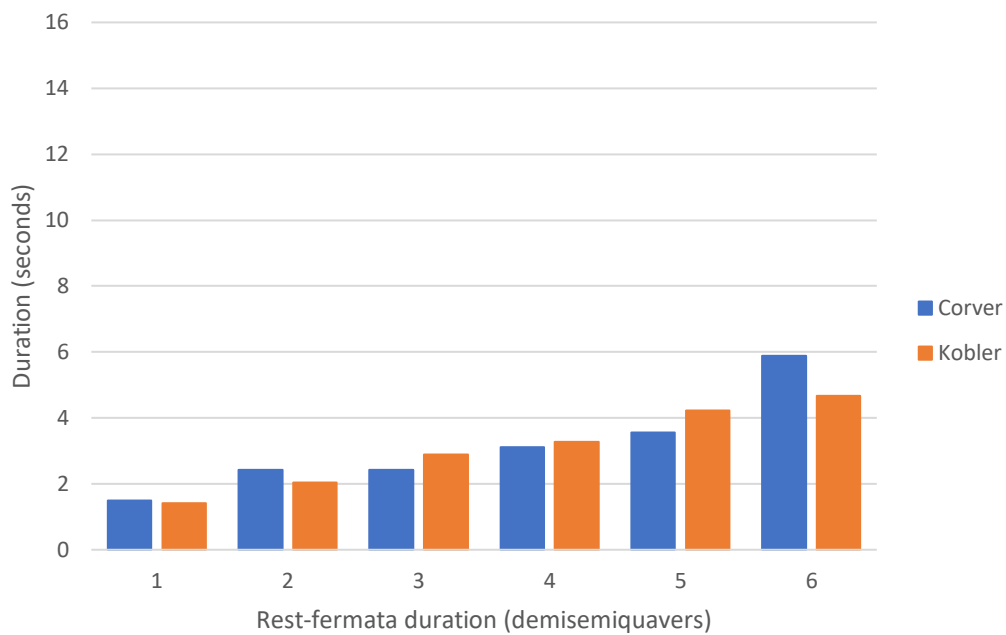


Figure 3.11 Corver and Kobler small-note section rest-fermata proportions

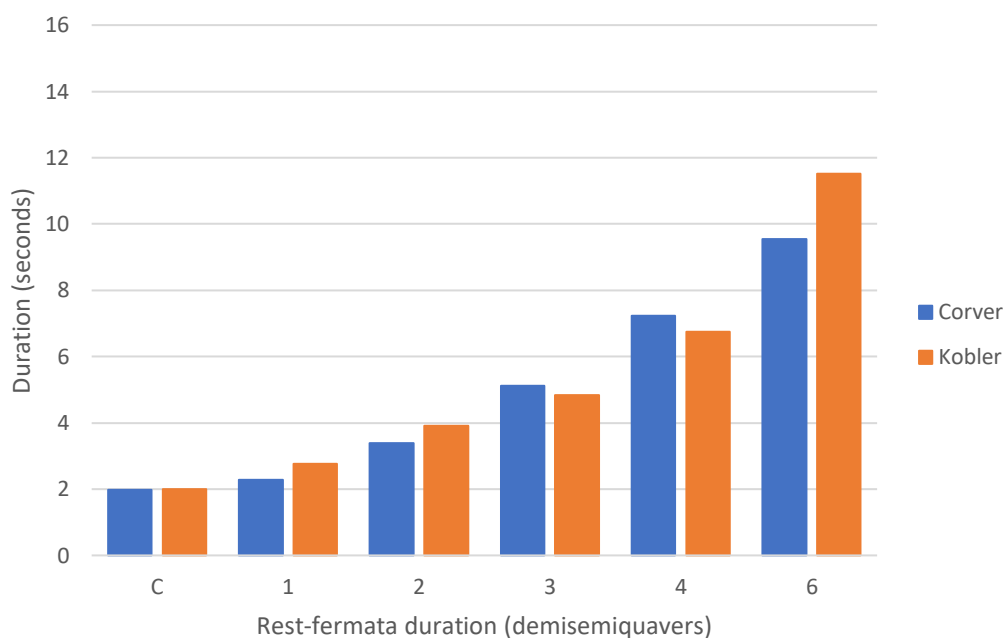


Figure 3.12 Corver and Kobler cyclical-group section rest-fermata proportions

The commonalities in practice between these performers, characterised by metronomic precision in tempo and a progressive sense of musical fragmentation, highlight a confluence of approach, which also extends to Mosell's recording, significantly exceeding the temporal similarities of Kontarsky and Henck. These likenesses may reflect a shared teaching tradition,¹⁵⁹ yet they are also suggestive of a literalist approach to the rhythmic notation, which, unlike that of *Klavierstück I*, affords an unambiguously direct translation. As a result, rhythmic differences between performances are reduced to the micro-aesthetic plane, with interpretative freedom restricted to the isolated appearance of small note groups and the more substantial interpolation of the small-note section.

3.4.4 Alternative informed practice: Schroeder, Wambach, and Schleiermacher

Marianne Schroeder, Bernhard Wambach, and Steffen Schleiermacher were all in some way influenced by Stockhausen's teaching, though to a lesser extent than the pianists surveyed so far, exhibiting some noteworthy alternative practices in their recordings of *Klavierstück VII*.¹⁶⁰

Schroeder's interpretation is significantly slower than those already discussed, as illustrated by a mean tempo of just ♩ = 29.1 in the opening section. Her corresponding standard deviation of ♩ = 5.4 is also considerably steadier than either Kontarsky or the roughly contemporaneous Henck. Her performance is further characterised by a distinctive approach to articulation, with a tendency to exaggerate the detachment of *staccatos* and the idiosyncratic habit of extending *sforzando-staccatos*, including the C#4 of E6 (0'33"–0'35"),

¹⁵⁹ Kobler was taught by Corver and Stockhausen at the 1998 Stockhausen Courses. Mosell, meanwhile, was taught by Corver, Kobler, and Stockhausen at the 2007 Courses.

¹⁶⁰ Of the three performers, Wambach received the greatest amount of coaching from the composer. See Krytska, *Klavierstück XI*, pp. 234–75 for more on Wambach's experience with Stockhausen.

the right-hand chord of E17 (1'36"–1'42"), the concluding chord of E26 (2'53"–3'02"), and the A4 of E48 (5'16"–5'22"). Elsewhere, her treatment of small notes and small-note groups is varied, ranging from the clearly distinguished pitches of E44 to the rapid bubbling of E45(4'35"–5'30"), aligning her practice broadly with that of Kontarsky. Overall, Schroeder's slower tempi emphasise the spacious, tranquil character of the music, allowing for imaginative interpretation and audience perception of local detail, particularly with respect to articulation and the execution of small notes, thereby highlighting the expressive possibilities afforded by slower, temporally precise interpretations.

Wambach's recording of Klavierstück VII is characterised by an attention to fine details, accompanied by a broader attenuation of dynamic contrasts. This can be heard in the contrast between his faithful execution of the double contours of E26, and his flat playing of E28 and E29 (2'09"–2'25"), as well as his relatively monochrome performance of the first resonance section (2'54"–3'40"). Nevertheless, he exhibits some moments of striking timbral imagination, including his nuanced half-pedalling over the course of the *ritardando* from E54 to E59 (4'48"–5'24"), a passage that I term the 'second resonance section'. Where other performers—most notably Kontarsky—appear to limit the indicated use of pedal here, presumably to avoid excessive muddiness in the lower register, Wambach embraces the indeterminacy of the resulting overtones, engendered by a combination of pianistic touch, subtle control of the damper pedal, and the resonance of the open strings of the underlying, manually sustained pitches, recalling the similarly creative and sensitive use of the pedal in his recording of Klavierstück I. He also has an interesting take on the small-note section, radically reducing and ignoring the differences in length of the inter-group rest-fermatas (3'47"–4'20"). This downplays the separation of each group, supporting the impression of a

larger, freely moving *Gestalt*, isolated as a whole by the sustained resonances that surround the section.

Schleiermacher's recording of Klavierstück VII is strikingly muscular and forthright throughout. This effect is exaggerated by the technical management of the recording, which captures a rich variety of resonance effects at the occasional expense of tonal subtlety, as exemplified by the jarring harshness of the *forte* chord at E52 (5'12"). As a consequence, delicate moments are generally played up with a distinctive foreground clarity. In terms of mean averages, Schleiermacher's tempi are generally accurate, with the $\text{♩} = 41.3$ of his opening section very close to the precision of Henck. His local variation, however, is significantly higher, with a corresponding standard deviation of $\text{♩} = 12$. This flexibility is maintained throughout the performance, as exemplified by his slower handling of the paired phrasings at E33 and E 34 (2'30"–2'38"), and his broader tendency to tighten two-note groups and extend surrounding rests. At E61 this imbues the cross-keyboard *fortissimo* figuration with a sense of anxious tension (5'49"–5'55"), in maximum contrast to Kontarsky's more deadpan performance (5'19"–5'27"). During the subsequent cyclical-group section, Schleiermacher's extension of intra-group rests and tightening of *pianissimo* and *piano* two-note groups weakens the sense of group separation created by inter-group rest-fermatas (6'10"–6'50"). The result comes close to a single line, rhythmically deviant, yet accurately differentiated in terms of its cycling dynamics. His interest in continuity is reflected elsewhere in the mechanically audible use of damper pedal to connect disparate material and forge *legato* links between sections, a trait he shares with Corver and others, albeit less subtly. Overall, his performance exhibits a significant degree of freedom, underpinned by a broader

adherence to sectional tempi, and a robust sense of personal interpretation, favouring timbral resonance and musical continuity over the pointillistic separation of material.

The recordings of Schroeder and Schleiermacher in particular represent clear alternatives to canonical practice, characterised respectively by tranquil precision and muscular freedom. Together, they highlight the latent malleability of the musical material, the limits of which are further tested in independently prepared performances by Klein, Massimiliano Damerini, Tudor, and Liebner.

3.4.5 Independent practice: Klein, Damerini, Tudor, and Liebner

As with her recording of Klavierstück I, Klein's Klavierstück VII features high tempi in combination with a very flexible approach to rhythm. This is reflected in her standard deviation of ♩ = 18 from a mean tempo of ♩ = 51.4 in the opening section, imbuing the music with an unusual and, to my taste, not altogether successful urgency, characteristic of the performance as a whole. This hastiness reaches its peak in the cyclical-group section, whose rhythmic, durational, and dynamic distinctions are all but ignored in an uninterrupted cycle of undifferentiated pitches that surpasses the *Gestalt* continuity of Schleiermacher's recording (5'05"–5'26"). Her performance thus tests the limits of recognisable accuracy, while highlighting the inherent resistance of Klavierstück VII to performance at quicker tempi, in maximum contrast to Schroeder's measured approach.

Damerini's 1987 recording was released as part of a retrospective programme of twentieth-century piano music, ranging from Bartók to Ferneyhough, which sets it apart from

the rest of the selected recordings.¹⁶¹ His performance is characterised by a combination of dynamic arching and expressive *rubato*, as reflected by a standard deviation of $\text{♩} = 11.1$ in the opening section. This expressive sensibility is particularly evident in his flexible phrasing of material from E26–E34 (2'16"–3'12") and the rhetorical delay of the final chord of E48 (5'02"–5'06"). Elsewhere, he exhibits great dynamic sensitivity and timbral variety, as illustrated by the subtle range of colours he elicits from E15–E17 (1'02"–1'17"). This broadly successful prioritisation of dynamic variety and freedom of rhythmic expression over metronomic precision brings to mind Robin Maconie's comparison of *Klavierstück V*'s similar notational idiom and the 'elaborate, expressive distortions of classical and nineteenth-century slow movements', such as those found in Stravinsky's *Piano Sonata* (1924) and Bartók's *Out of Doors Suite* (1926),¹⁶² hinting at the broader viability of an alternative performance practice, inspired by the interpretative demands and expressive traditions of earlier twentieth-century music. This style of playing is further explored in my own Version B, to be discussed in due course.

As might be expected, given his direct influence on Stockhausen's writing of the piece, Tudor's performance, the earliest on record, features great dynamic and timbral subtlety, allied with a creative approach to articulation. This is immediately illustrated by the graduated shortening of the three *C#4 staccatos* of E1–E3 (0'00"–0'09"), and the delicate execution of bass notes at E19 (1'16"–1'25"). As in *Klavierstück I*, his tempo is generally flexible. This flexibility is underpinned, however, by a rhythmic dynamism that reaches its peak in the

¹⁶¹ Bärtschi's recording of *Klavierstück VII*, appearing alongside music by Cage, Cowell, Scelsi, is another such example.

¹⁶² Maconie, *The Works of Karlheinz Stockhausen*, p. 83.

explosive tempo shift at E31, brought into greater relief by the relatively subdued playing of neighbouring material (2'25"–2'32").

Elsewhere, Tudor's performance of small notes is unique within the recording corpus, with virtually every grouping played as fast as possible, further exemplifying the experimental approach to rhythmic execution heard in cruxes in his recording of Klavierstück I.¹⁶³ The contextual integration of this practice is, however, quite different. Without the even distribution of crux material and the mediation of differing levels of density found in the earlier piece, Tudor's experimentalism becomes compartmentalised, contrasting starkly with the spacious aesthetic of the piece as a whole, and his precise performance of the opening section in particular. This lends the small-note section the quality of an *Einschub* or insert (3'45"–4'22"), recalling methods of composition used in the roughly contemporaneous *Zeitmaße*, whereby independent serial systems are inserted within the context of overarching structures to create a deliberate sense of interruption, with parallels to the splicing techniques used in the production of early electronic music.¹⁶⁴ In terms of Stockhausen's temporal theory, the physically mediated time stratum is uniquely isolated in Klavierstück VII, with Tudor's intense performance and non-observance of inter-group rest-fermatas further accentuating the small-note section's sense of aesthetic and performative foreignness.

In summary, Tudor's interpretation mediates characteristically between tranquillity and action, a musical approach that may owe a debt to his pianistic training under Irma

¹⁶³ As in Klavierstück I, playing at this speed leads to some fluffed pitches (hear for example his imprecise execution of the leap at E47).

¹⁶⁴ See Jerome Kohl, *Karlheinz Stockhausen: Zeitmasse* (New York: Routledge, 2017) for in-depth discussion of Stockhausen's insert process in *Zeitmaße*, and Gusatvo Oliviera Alfaix Assis, 'Structure and Exception: Evaluating the Concept of *Einschub* in Stockhausen's Compositional Process', in *The Musical Legacy of Karlheinz Stockhausen: Looking Back and Forward*, ed. by M. J. Grant and Imke Misch (Hofheim: Wolke, 2016), pp. 79–89 for broader discussion of Stockhausen's use of insertion techniques.

Wolpe, and her teaching of Dalcroze eurhythmics, with its emphasis on the unified harmony between rhythm and bodily movement, as well as Tudor's study of Antonin Artaud's notions of dramatic violence in preparation for performance of Boulez's Second Piano Sonata (1948).¹⁶⁵ In Klavierstück VII, this manifests itself in a downplaying of the stillness inherent in much of the later material, seemingly stimulated by the visceral activity of the central sections. This affects a sense of linear drive, propelling the piece towards its conclusion, and setting his interpretation apart from those of the other pianists, who have tended to project either the global equilibrium and stasis of the piece (Schroeder), or its dynamic devolution from continuous line to detached fragmentation (Henck and Corver).

Sabine Liebner's performance of the Klavierstücke was also made following devotion to music of the New York School. However, where Tudor appears to harness the more dynamic and virtuosic qualities of compositions such as Cage's *Music of Changes*, Liebner's playing evokes the spacious aesthetic of pointillist compositions such as Feldman's *Intermissions* (1953) and *Three Pieces for Piano* (1954).¹⁶⁶ This would certainly help to explain and contextualise her extended performances of Klavierstücke VI and X (see Chapter 4 for discussion of the latter), as well as her spacious interpretation of the arguably more apposite Klavierstück VII.

As with these pieces, Liebner's mean tempo of ♩ = 27.4 for the opening section of Klavierstück VII is the slowest on record, creating an atmosphere of stillness and tranquillity that foregrounds the timbral subtlety of her finely shaded playing. As Figure 3.13 shows, her opening section exhibits a slightly greater degree of tempo flexibility than that of the similarly

¹⁶⁵ Austin Clarkson, 'David Tudor's Apprenticeship: The Years with Irma and Stefan Wolpe', *Leonardo Music Journal: Composers inside Electronics: Music after David Tudor*, 14 (2004), 5–10.

¹⁶⁶ See for example Morton Feldman, *Early Piano Pieces*, Sabine Liebner, piano (Wergo, WER 6747 2, 2012).

slow Schroeder, with a standard deviation of $\text{♩} = 9.3$, indicative of the sensuous, impressionistic character of her playing. Liebner's initial change of tempo at E26 is far closer to the specified $\text{♩} = 63.5$; her tempo then slows, and the transition from E28 to the $\text{♩} = 57$ tempo of E29 is ignored, fostering an extended sense of line by contravening Stockhausen's nominal sectional division (2'55"–3'22"). The division between E30 and E31 is similarly attenuated, with the dramatic dynamic profile of the final pitches underplayed (3'23"–3'33"), affecting a sense of repose and reflection, in stark contrast to the violent disjunct of Tudor's interpretation.

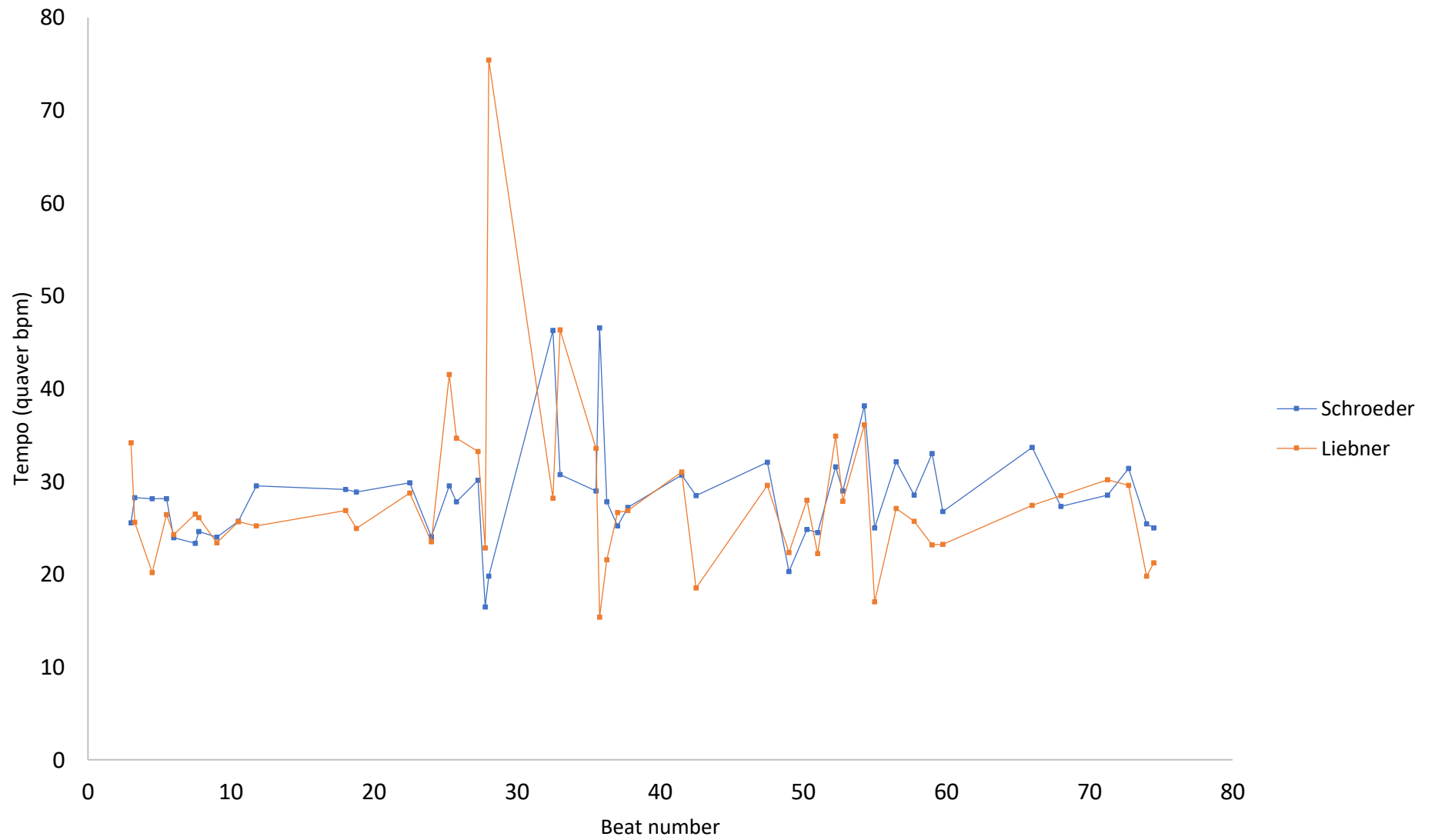


Figure 3.13 Schroeder and Liebner ♩ = 40 section tempo variation

Liebner performs the six groups of the small-note section with greater rhythmic variety than any other performer, ranging from the deliberate articulation of E42 to the *leggiero* rapidity of E47 (4'52"–5'55"). In some ways, her sharply terraced dynamics and discrete changes of tempo suggest an exaggeration of earlier interpretations, allowing for clearer registration of intervallic profiles and the projection of novel melodic facets within each group of small notes. Her dramatic underplaying of the climactic *sforzando* that appears at the end of E65 is yet more iconoclastic, undermining the intuitive expectation of the listener following fully accurate realisation of the preceding dynamic contours (7'27"–7'40"): an effect whose impact is significantly heightened by one's familiarity with existing recordings, suggesting a sense of play with tradition.

All in all, I find Liebner's pointillist style well suited to Klavierstück VII, with her prioritisation of colour and flexible approach to tempo contributing to the emergence of a non-linear, static aesthetic. In this sense, it is the performance that corresponds most clearly to Grant's analysis, illustrating, together with Schroeder's recording, the suitability of Klavierstück VII to performance at slower tempi.

3.4.6 Summary

As the foregoing analyses have shown, a sense of linearity—whether evolutionary or devolutionary—may be projected in performances of Klavierstück VII through the treatment of rest-fermatas, connection and separation of material, and the projection of certain motivic intervals, thereby lending support to Harvey's analytical reading. Indeed, this is the overriding impression offered by the majority of recordings, including temporally literalist ones such as those of Corver and Kobler. This points to the inherent linearity of the composition, with the

type of static performance aesthetics observed in recordings of Klavierstück I—particularly in my own experimental versions—only expressible via transgression of Stockhausen’s notational demands. Therefore, while such musical meaning *can* and *has* been projected through performance, the affordances and authority of the score resist such meanings. In this sense, the dynamic performance aesthetics of Klavierstück VII illustrate a clear move away from the pointillist equilibrium of early serial performance aesthetics, arguably providing as much information about shifts in serial aesthetics *tout court* as typically cited developments in theory and compositional practice. Regardless of this fact, the confluence of Corver, Kobler, and Mosell’s interpretations signals a practical impasse within the Stockhausen tradition, engendered by the simplified affordances of the piece. This situation is further interrogated via the model of my own literalist version, accompanied by critical consideration of the interpretative possibilities of the small-note section, and the ramifications of these possibilities for the formal ontology of the piece.

3.5 Version A

I began learning Klavierstück VII with a consciously literal approach to the notation, consistently checking my tempi against variable metronome settings; carefully measuring rhythms and note lengths; taking care to grade every dynamic contour with precision; performing pedal directions exactly as marked; and executing all manual and flageolet suspensions, including stratified applications and releases, as accurately as possible. I then took the piece to perform at the 2019 Stockhausen Courses, where I received daily coaching from Corver and Kobler. While a significant amount of attention was directed towards rhythmic and metronomic precision, their coaching was principally oriented around the

timbral qualities of the piece, including a strong focus on variety of articulation, dynamics, and fine nuances of pedalling.

As noted above, the principal interpretative choices in Klavierstück VII relate to the execution of small-notes and the determination of rest-fermata durations. At the time of the 2019 Stockhausen Courses, I performed small-note groups irregularly, aiming for a state of maximum heterogeneity both within and between groups in the small-note section. My rest-fermatas were also broadly proportioned, though this proportioning remained relatively arbitrary. Returning to the piece in Autumn 2021, and in light of the findings of my performance analysis, I began methodically testing different possibilities, using different base rest-fermata durations, in combination with practice based on: (1) the ‘as fast as possible’, experimental style of Tudor; (2) the ‘analytical’ style of Henck; and (3) further refinement of the ‘irregular’ style of Kontarsky, including stricter consideration of the relationship between rhythmic execution and intervallic distribution of material.

I decided to use base values of two, four, and eight demisemiquavers for the rest-fermatas of the small-note system with the following results:

Rest-fermata duration (demisemiquavers)	1	2	3	4	5	6
Counted duration (demisemiquavers)	2	4	6	8	10	12
	4	8	12	16	20	24
	8	16	24	32	40	48

Table 3.2 Small-note section additive rest-fermata durations

As part of my experimental approach, I decided to test new combinations of durations and playing techniques. For example, Video Recording 3.1 shows the results of performing each group as fast as possible with the longest rest-fermata base duration of eight demisemiquavers. In contrast to Tudor's hurried interpretation, this leaves time for reflection between groups, placing an individual spotlight on each moment of extreme physical action, while fostering a greater affinity with the spacious aesthetic of the piece as a whole.

Video Recording 3.2 shows the results of my analytical approach to the small-note section, characterised by my distinction of sub-groups through contrasts in dynamic and speed. This is exemplified by my execution of the third group (E44), wherein I perform the first, three-note *mezzo-piano* sub-group rapidly, before slowing considerably to achieve an even execution of the six-note *forte* sub-group. Unlike Henck, I opt for a relatively short base duration of four demisemiquavers, allowing for more direct comparison of the complexion of higher-order groupings, while maintaining a greater sense of coherence across the passage.

Finally, Video Recording 3.3 shows my adoption of the irregularity aesthetic. This is combined with the shortest base rest-fermata duration of two demisemiquavers, with the aim of promoting a more continuously aperiodic *Gestalt*. In the foregoing video demonstrations, you will notice that I redistribute pitches between the hands to allow for the most reliable execution possible. In the 'as fast as possible' version (see Video Recording 3.1), this affords maximum speed of execution, while obviating the inaccuracies heard in Tudor's recording, likely engendered by a less idiomatic arrangement of material between the hands, such as that presented in the score (see in particular the final sub-grouping of the sixth group). For this version, I aimed to convey a sense of Stockhausen's prescribed 'differentiation of entry' by maintaining the original arrangement, taking the majority of groups in the right hand

alone. This affected a natural irregularity that I was then able to exaggerate, serving to convey the physical mediation of the rhythmic results in live performance, while also introducing a strikingly different visual impression.¹⁶⁷

My literalist performance of Klavierstück VII (Version A) is presented in Video Recording 3.4. For this version, I opted to include the analytical approach to the small-note section presented in Video Recording 3.2. This was, in fact, a relatively arbitrary choice; in theory, I would consider switching practice from performance to performance, in addition to further experimentation with rest-fermata duration, lending the piece an element of performative indeterminacy, albeit restricted to the small-note and cyclical group sections. This process also led me to the conclusion that, while the length of rest-fermatas may have a significant impact on the structural integration or otherwise of the small-note section, the section itself will retain a fundamentally alien, inserted character in the context of the piece, regardless of the performer's contribution, acting as a forum for different styles of performance, with differing relationships to Stockhausen's temporal theory and serialisation of musical elements. Beyond this significant area of interpretative freedom and performer agency, I otherwise adhere to the literalism of Corver and Kobler, resulting in a performance that is similarly characterised and distinguished by its micro-aesthetic variety. Version B offers an alternative to this practice, informed by score analysis, and the freedom of approach witnessed in Damerini and Liebner's recordings.

¹⁶⁷ Incidentally, Corver and Kobler both cautioned against excessive simplification of this passage, citing the need for an element of natural and perceptible struggle in performance.

3.6 Mirrors within mirrors: score analysis of Klavierstück VII

3.6.1 Introduction

The following analysis invokes a range of methods and critical contexts, including serial-analytic ‘de-coding’ of the compositional process, used sparingly here when deemed relevant to performance; the use of symmetry, in relation to Stockhausen’s contemporaneous discussion of Webern’s use of reflection and mirrored pitch arrays;¹⁶⁸ the influence of information theory, introduced to Stockhausen prior to the composition of Klavierstück VII by Werner Meyer-Eppler;¹⁶⁹ and the use of traditional formal labels, such as those found in Harvey’s analysis of Klavierstück V. I ultimately offer a reconciliatory synthesis of Harvey’s and Grant’s readings in support of a coherent performance strategy that seeks to project the interconnected dialectics of dynamism and stasis, and order and entropy that underscore the composition.¹⁷⁰ My score analysis makes no attempt at providing an ‘authentic’ recuperation of the composer’s process. Instead, I posit a creative interpretation, building on certain known contexts, in support of an alternative to the contemporary ‘Stockhausen model’ of

¹⁶⁸ Karlheinz Stockhausen, ‘Experiential Time’, trans. by Leo Black, in *Die Reihe: A Periodical Devoted to Developments in Contemporary Music. II Anton Webern*, (Bryn Mawr: Theodor Presser, 1958), pp. 64–74. See Grant’s chapter, ‘Webern and Debussy’ in *Serial Aesthetics*, pp. 103–130 for further discussion of Webern reception at the 1950s Darmstadt New Music Courses.

¹⁶⁹ See Christoph Both, ‘The Influence of Concepts of Information Theory on the Birth of Electronic Music Composition: Lejaren A. Hiller and Karlheinz Stockhausen, 1953-1960’ (unpublished doctoral dissertation, University of Victoria, 1995) for in-depth discussion of Meyer-Eppler’s influence and Stockhausen’s use of information theory. See also Chapter 2 for discussion of the foreshadowing of this theory and its musical applications in Klavierstück I.

¹⁷⁰ Entropy in this context refers to the dissolution of systematic order, as conveyed by certain serial processes in Klavierstück VII. Grant touches on the notion of entropy in her discussion of information theory. Grant, p. 29. More specific discussion of entropy in relation to music, however, has thus far remained the preserve of music-scientific research. See for example Gregory Cox, ‘On the Relationship Between Entropy and Meaning in Music: An Exploration with Recurrent Neural Networks’, *Proceedings of the Annual Meeting of the Cognitive Science Society*, 32 (2010), and Barbra Gregory, *Entropy and Complexity in Music: Some Examples* (unpublished doctoral dissertation, University of North Carolina: 2005) for a mathematical analysis of perceived entropic processes in Boulez’s *...explosante-fixe...* (1971–93). To my knowledge, mine is the first systematic application of this concept to performance.

performance, exemplified by the ossified similarities of Corver's and Kobler's recordings, and my own Version A.

3.6.2 Analysis

The material of Klavierstück VII can be divided into three main categories. The first includes fixed-register repeated tones, described by Stockhausen as 'tonal nuclei' (see for example the opening repeated C#4s, E1–3);¹⁷¹ these nuclei provide the overall structural framework and linear drive of the piece, including the formation of an exposition, development, false-recapitulation, recapitulation, and coda, to be detailed in due course.

The second category includes reflected 'pitch arrays'—with their precedent in the music of Webern—and larger-scale serial-algorithmic systems.¹⁷² In the context of Klavierstück VII, 'pitch arrays' refer to localised groups of tones that are reflected across an axial tone or tones, accompanied by the wholesale transformation of multiple musical parameters, such as dynamic, attack type, pedalling technique, or vertical versus horizontal presentation (see for example E10–11, wherein G#6 functions as the axial tone). Serial-algorithmic systems may be thought of as more systematic and extensive arrays or self-contained sections that carry out some form of set process (see for example E36–41).

The final category includes 'entropic material'; this refers to all materials not belonging to the previous categories, appearing either as isolated pitches, motifs, or small-

¹⁷¹ Karlheinz Stockhausen, *Klavierstücke I–XI*, Aloys Kontarsky, piano (CD liner notes) (Winterthur: KGH, 1965) p. 16.

¹⁷² The use of reflection and symmetry in Webern's music has been widely discussed. See for example Robert Clifford, 'Multi-Level Symmetries in Webern's Op. 11, No. 1', *Perspectives of New Music*, 40. 1 (2002), 198–215, which includes a concise overview of twentieth-century research on the topic.

note groupings. These materials are either interpolated with materials from the first and second categories, interrupt their progression, or affect their progressive disordering. In doing so, they exert an entropic influence on the systematic and formal stability of the piece. As my analysis will show, the structural deployment of this material has an important bearing on the overall coherence and linear impulse of the form.

These three categories of material are explicated in the opening ♩ = 40 section (E1–E25) and subsequently developed and resolved over the course of the piece. I therefore interpret this opening section as a functional exposition. As Figure 3.14 shows, I do not read all fourteen repetitions of C#4 in the exposition as tonal nuclei. Rather, I interpret the section as a double exposition of five C#4s, accompanied by serially permuted dynamic markings (Exposition 1, E1–E13; Exposition 2, E15–E25), with the remaining four C#4s forming part of a pair of pitch arrays (Array 1, E8–E13; Array 2 E18–E20). As illustrated, Expositions 1 and 2 are divided by an axial A7 at E14 and asymmetrically interrupted by Arrays 1 and 2. Each exposition also features the notable interpolation of isolated tones (A and A# respectively), which I term secondary nuclei. Exposition 2 is further interrupted by fully independent entropic material (Motif X1, E21; Group Y1, E23). It is important to note here that Array 1 and Array 2 are systematically ‘complete’, exhibiting wholesale variation of parameters and rhythmic disposition of pitches across an axial tone. In combination with the systematic repetition and dynamic permutation of C#4 nuclei, these ordered pitch arrays contribute to the systematic equilibrium of the bipartite exposition.

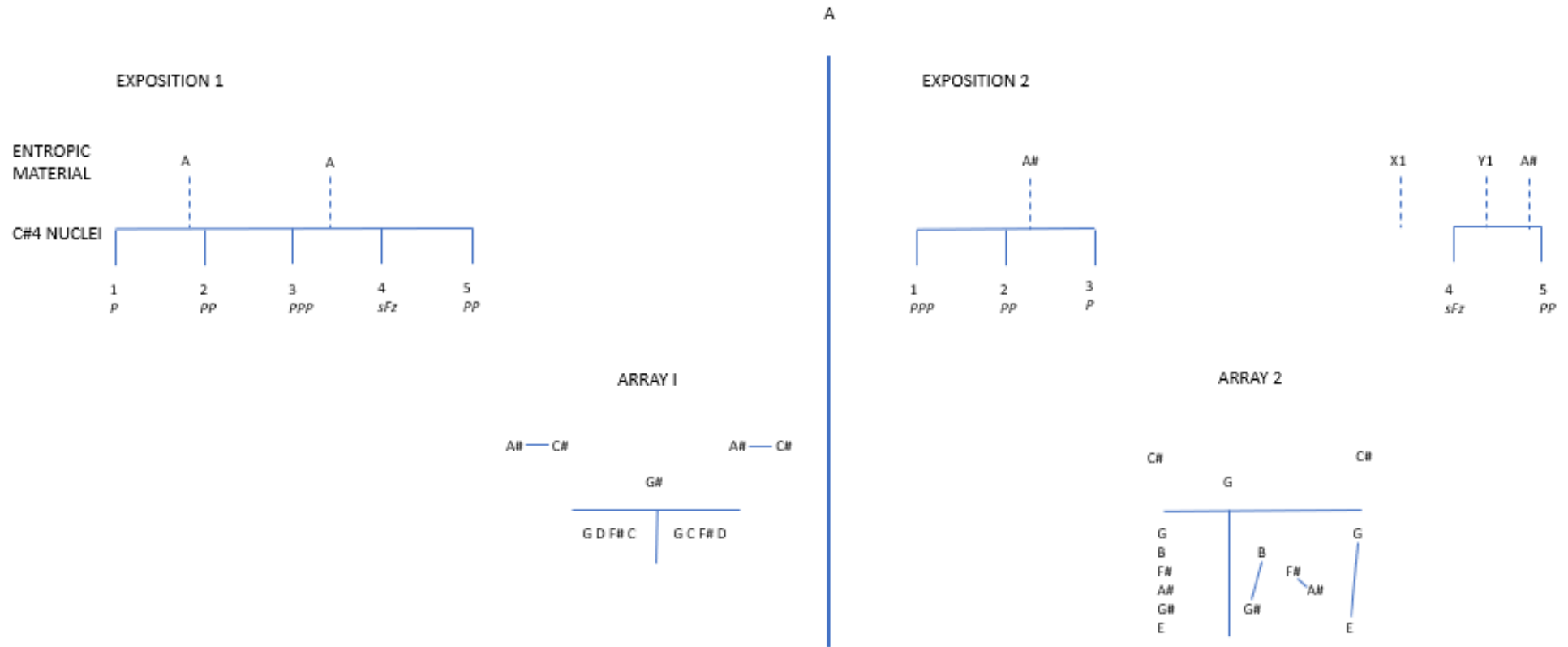


Figure 3.14 Formal diagram of Exposition 1 and Exposition 2

The passage from E26–E35 develops the reflective pitch arrays of the exposition at the new tempo of $\text{♩} = 63.5$, thus initiating an extended development section. As Figure 3.15 illustrates, this passage consists of a series of consecutive pitch arrays (Arrays 3–6, E26–32), each tending towards greater entropy, with ‘information’ lost, distorted, overlapped, or interrupted across symmetrical divisions. This leads to the first serial-algorithmic system of the piece, prefaced by the brief Array 7 (E35). I will now formally label this section Resonance Section 1 (E36–E41). As well as extending and further systematising the concept of reflective arrays, this section develops the tonal nuclei of the exposition through the repeated pairing of C#1 and A#0, anticipated by Array 7, with the latter A# tonal centre also prefigured by the interpolation of entropic material in Exposition 2 (see Figure 3.14). The perfect reflective balance of musical elements in this system represents an ordered antithesis to the preceding entropic episodes. This balance is dictated by six serialised dynamics and durations, arranged in mirrored *crescendo* and *diminuendo* pairings, with articulation transformed from *staccato* to *staccato-legato* in the second set of iterations, as schematised in Figure 3.16.

The following serial-algorithmic system, or small-note section, which I now label Group Section 1, is built around varied repetitions of an A4 nucleus, also prefigured by the interpolation of entropic material in Exposition 1 (see Figure 3.14). This system is considerably more complex than Resonance Section 1, lacking a coherent arrangement of dynamics and register, with Stockhausen’s interest in sextuple groupings incorporated on multiple levels, as illustrated in Figure 3.17. This includes the three-fold sub-grouping of one- to six-note groups, the serialised, additive interruption of the six rest-fermatas, and finally, an incomplete six-fold super-grouping. Array 8 (E48–49), which follows, acts as a framing pair with Array 7 (E35),

further associated by the shared presence of alien, entropic dissonances (B1 in Array 7 and Eb5 in Array 8).

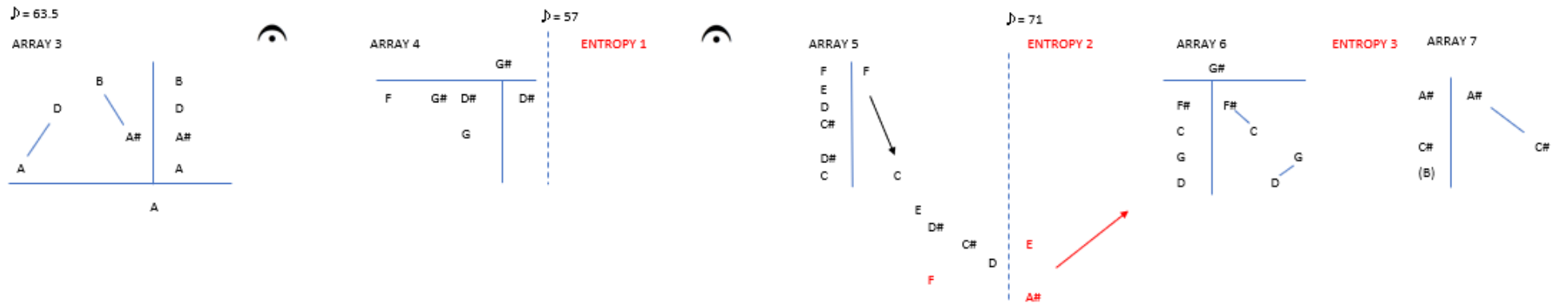


Figure 3.15 Development; formal diagram of Arrays 3–7

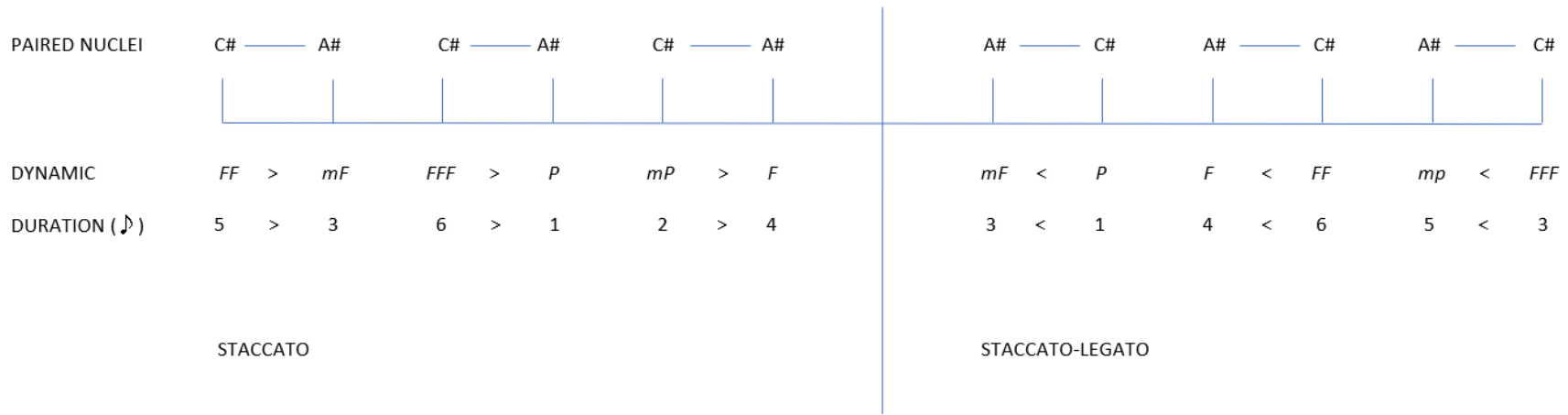


Figure 3.16 Development; formal diagram of Resonance Section 1

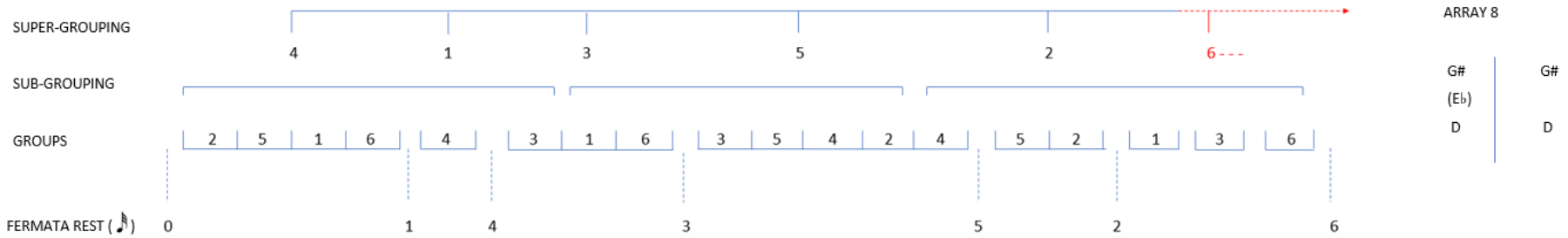


Figure 3.17 Development; formal diagram of Group Section 1 and Array 8

The following section, marked by a change to the final tempo of $\text{♩} = 50.5$ at E50, introduces three isolated A#2s, accompanied by subtly varied quiet dynamic markings and attack types. I interpret this brief section as a false recapitulation, as it suggestively echoes the stylistic presentation of the opening C#4s of the exposition—with a shift to the secondary nucleus of A#—without completing their corresponding five-fold repetition. Instead, the passage is interrupted by the three-fold repetition of a complex network of D#, C, B and C# tonal nuclei (E51–E53), as illustrated in Figure 3.18. This is followed by the algorithmic system of Resonance Section 2 (E54–E59), which is schematised in Figure 3.19. Unlike the ordered perfection of Resonance Section 1, this system is interrupted, prior to its completion, by a *subito sfz* chord at E60; the entire passage is also accompanied by an extended *ritardando* and half-pedal marking, which further convey a sense of entropy. The *subito* chord itself marks the beginning of the imperfect, register-sweeping, and ‘information-dense’ Array 9 (E60–62), which is immediately followed by the expanded Motif X2 (E63). This carefully placed motif heralds a hyper-condensed double recapitulation (E64–E65), in which a D#5 nucleus undergoes two five-fold repetitions—aggravated by an accompanying C#5—that now fully mirrors the spacious double exposition of the opening section’s C#4 repetitions, as illustrated in Figure 3.20.

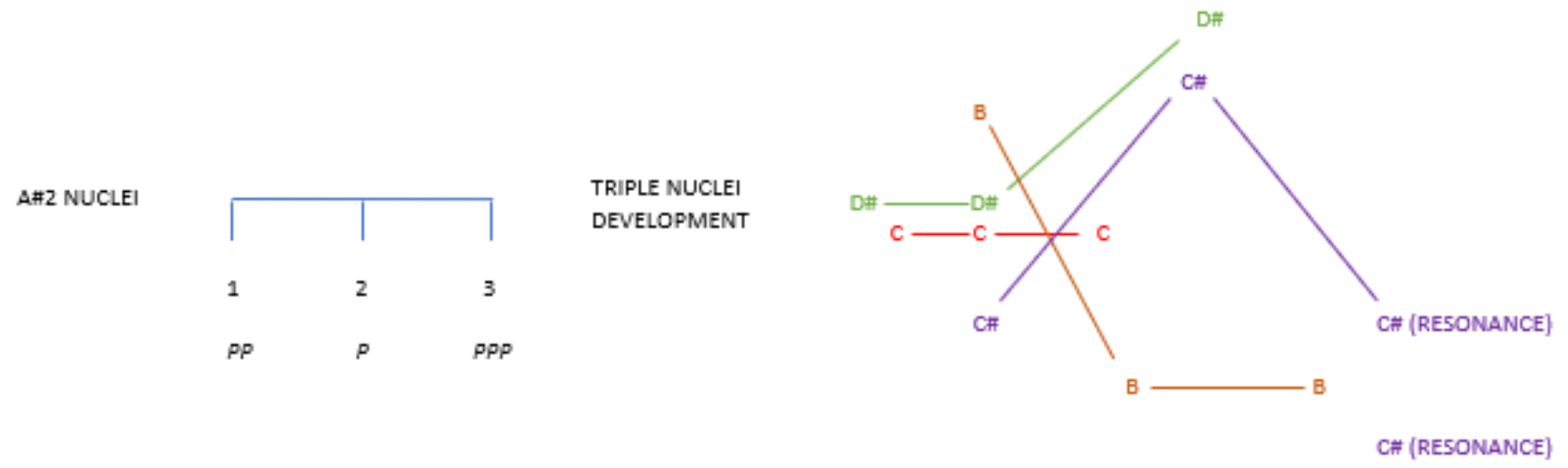


Figure 3.18 False Recapitulation; Nuclei Development

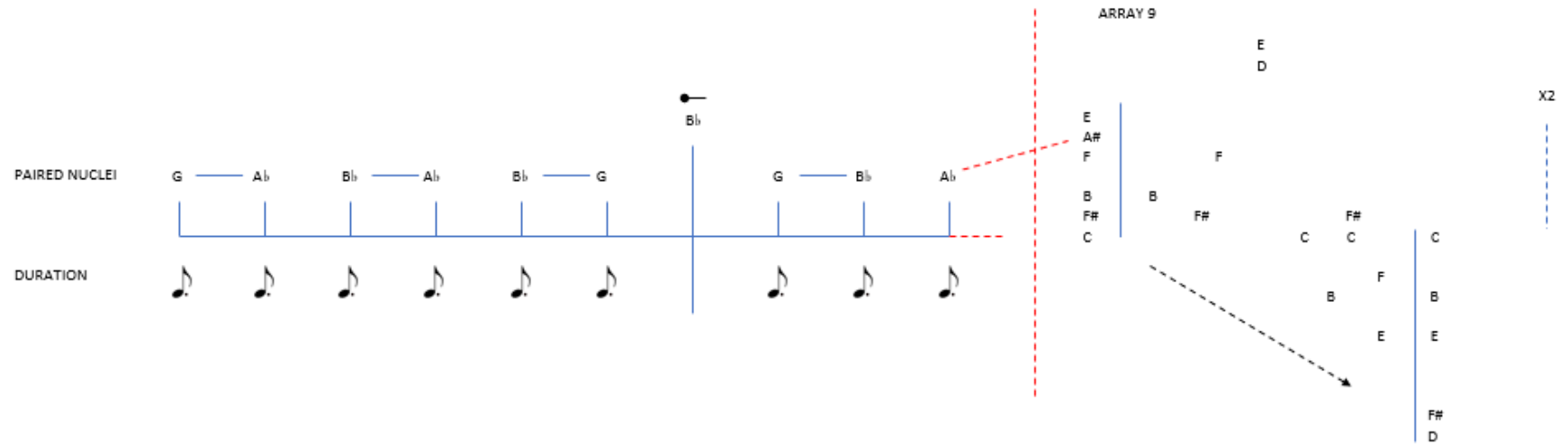


Figure 3.19 Development; Resonance Section 2; Array 9

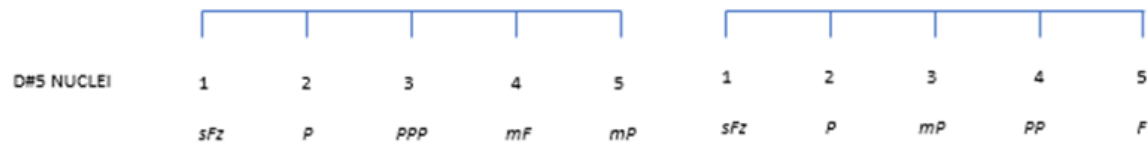


Figure 3.20 Double recapitulation

This recapitulation is followed by a coda, so-labelled because it follows the completion of the recapitulation's ten-fold nuclear repetitions, while serving to resolve the tonal and process-oriented tensions of the piece. The coda begins with the second serial-algorithmic system, or cyclical-group section, which I now label Group Section 2 (E66–E70). Unlike the entropic tendency of Group Section 1 and Resonance Section 2, Group Section 2 *begins* with the presentation of material in an entropic state, which subsequently stabilises, transforming into the purest systematic process of the piece. As the final column of Table 3.2 shows, Stockhausen manipulates his material so that the dynamic of the final tone of each group decreases incrementally, while the duration of the final tone of each group and the intervening rest-fermatas *increase* incrementally, affecting a procedural fragmentation and dynamic diminution of material that will be naturally conveyed in literalist performances, foreshadowing the serial manipulation of materials in Klavierstück X (see Chapter 4). Once this system has run its course, an entropic small-note flourish— which I label Group Y2 (E71), paralleled by the entropic Group Y1 of Exposition 2 at E23—appears, with its own internal axis of symmetry, as illustrated in Figure 3.21. This precedes the thematic and tonal resolution of an unhindered D#7, approached by D6: a rising ninth motif that is foreshadowed at E34 and E53; together, these gestures constitute a third group of motifs, which I term Z1, Z2, and Z3.

Group 1	Pitch	F1	A0	G2	D#5	G#5	F1	Rest-fermata
	Dynamic	<i>P</i>	<i>F</i>	<i>mP</i>	<i>mF</i>	<i>FF</i>	<i>sFz</i>	-
	Duration (demisemiquavers)	4	4	2	5	3	1	Caesura
Group 2	Pitch	-	G2	D#5	G#5	F1	A6	-
	Dynamic	-	<i>PPP</i>	<i>mP</i>	<i>PP</i>	<i>P</i>	<i>mF</i>	-
	Duration	-	5	3	1	4	2	1
Group 3	Pitch	-	G#5	F1	A6	A6	G2	-
	Dynamic	-	<i>PP</i>	<i>P</i>	<i>mF</i>	<i>PPP</i>	<i>mP</i>	-
	Duration	-	1	4	2	5	3	2
Group 4	Pitch	-	G#5	F1	A6	G2	D#5	-
	Dynamic	-	<i>mF</i>	<i>PPP</i>	<i>mP</i>	<i>PP</i>	<i>P</i>	-
	Duration	-	2	5	3	1	4	3
Group 5	Pitch	-	F1	A6	G2	D#5	G#5	-
	Dynamic	-	<i>mP</i>	<i>PP</i>	<i>P</i>	<i>mF</i>	<i>PPP</i>	-
	Duration	-	3	1	4	2	5	4

Table 3.2 Group Section 2 cyclical materials

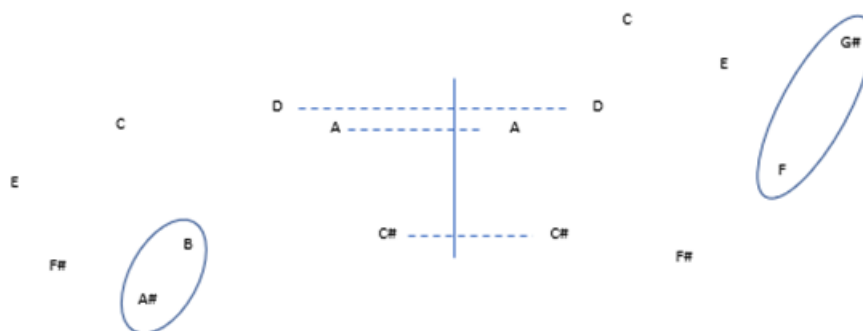


Figure 3.21 Distribution of pitches in Group Y2

3.6.3 Context and interpretation

Where in *Klavierstück I*, Stockhausen began composing parametrically and qualitatively in terms of groups, in *Klavierstück VII* he composes in terms of groups and arrays of points, seemingly influenced by his recent introduction to information theory and his contemporaneous interpretation of Webern's music. As he writes in *Die Reihe* with reference to Webern's *String Quartet*, Op. 28:

We see how symmetries of the most various origin and form, occurring simultaneously and moulding the flow of experiential time, must be brought together before they fulfil their true function, that of coinciding only approximately and thus introducing into the work a variable degree of indistinctness such as is typical of any symmetry that occurs naturally.¹⁷³

¹⁷³ Stockhausen, 'Experiential Time', p. 74.

As the foregoing analysis has demonstrated, Klavierstück VII contains many symmetrical arrays and mirrored systems, which together contribute to a degree of formal stasis. This stasis is, however, belied by the 'variable degree of indistinctness' that appears both within and between these arrays and systems, ultimately giving rise to the linear impulse of the piece. The balance, progression, and relationships between these tonal centres, sections, arrays, systems, and motifs is summarised in Table 3.3. As the tabulation shows, I interpret Klavierstück VII in terms of a four-part form, with some of the traditional labels and connotations adopted by Harvey in his discussion of Klavierstück V. This scheme is notable for its modular construction, reminiscent of the fundamental cut-and-paste insertion and assembly processes of contemporaneous tape music. It also conveys the structural balance and sense of stasis achieved through mirrored or distorted pairings, from the small-scale connection of tones—exemplified by the alternation of C# and A# tonal centres in Resonance Section 1—to the large-scale pairing of expositions, motifs, small-note groups, recapitulations and serial-algorithmic systems.

CATEGORY	EXPOSITION			DEVELOPMENT														RECAPITULATION		CODA									
	EXPO 1 C#		EXPO 2 C#																	FR A#	N DEV					RECAP 1 D#	RECAP 2 D#		
NUCLEI																													
SECONDARY NUCLEI	A		A#								A#	A																	
MOTIFS			X1 Y1						Z1									Z2			X2							Y2	Z3
ENTROPY					EN1		EN2		EN3																				
ARRAYS		A1	A2	A3 A4		A5		A6		A7	A8									A9								
SYSTEMS											RS1	GS1								RS2							GS2		

Table 3.3 Formal overview of Klavierstück VII

As in Webern's String Quartet, stasis is ultimately overcome, first, by the integration of entropic processes, and second, by the underlying development of primary and secondary tonal centres. In this way, the particularly alien quality of Resonance Section 1 and Group Section 1 (see previous discussion) is mitigated by the presence of secondary tonal centres (A# and A respectively), which are established in the double exposition. The result is an overriding linearity, predicated not on the harmonic tension of traditional sonata form, but on the tension between isolated tonal centres and the relative order and disorder of musical materials. The key formal and aesthetic difference between this piece, and Klavierstück I and other early serial works is the resolution of these tensions within the space of the musical architecture.

3.7 Version B

The following performance suggestions and demonstrations, inspired by my analysis of the performance tradition and informed by my heuristic experience of preparing Version A, seek at all times to foreground the features and processes identified in my score analysis.

As Figure 3.14 illustrates, the dynamic profile of the three opening *staccato* C#4 nuclei in Exposition 1 (E1–E3) is mirrored by their *legato* re-iteration in Exposition 2 (E15–E16). These two passages exemplify Stockhausen's non-idiomatic use of the *una corda* pedal, deployed here under the louder dynamics of E16 and E17, and thereby weakening the symmetrical effect of the respective *diminuendo* and *crescendo*. To counteract this, I wait until E3 to deploy the *una corda* and, conversely, apply it earlier than specified at E15, in order to maximise the delicacy and timbral nuance of the *ppp* markings, before removing it to allow for sharper performance of the final nucleus at E17. To further accentuate these dynamic profiles and the

effect of the *una corda* reversals, I significantly exaggerate the volume of *piano* markings at E1 and E17 to approximately *mezzo forte*.

As a guiding principle, I aim to play all tonal nuclei with metronomic precision, as close to Stockhausen's specified tempi as possible. This is intended to contrast with the relative temporal freedom that I allow for performance of entropic material, beginning with the interpolation of non-systematic pitches at E2. Here I take particular care to emphasise the A4 that begins the small-group preceding E2, feeling it as a slight *tenuto* downbeat. An echo is then established by the agogic delay, dynamic exaggeration, and tenuto touch of the *piano* A4 at E5. These pitches find their parallels in Exposition 2, as illustrated in Fig. 3.15, shifted to A#4 and mirrored, so that the long, isolated A#4 now precedes the A#4 of the four-note small-note group at E25. To highlight these parallel relationships, I repeat the practice of Exposition 1. By emphasising these secondary A and A# tonal nuclei, I seek to establish their structural significance, both for the exposition and for the piece as a whole, heralding their recurrence in reverse order as the tonal centres of Resonance Section 1 and Group Section 1.

Elsewhere, I clarify the discrete structure of Array 1 (E8–E13) through slight exaggeration of the separation between E7 and E8. As illustrated in Figure 3.14, Array 1 is framed by repeated pairings of A#0 and C#4. I accentuate the connection of the initial pairing by exaggerating the spacing of the first two intervening small notes, as suggested by Stockhausen's caesura, before hastening the third, in contrast to the *allargando* approach of most performers. This introduces a sense of linear drive towards the C#4 of E9, implied by the raising profile of the small-notes, which subtly foreshadows the rhythmic arrangement of E10. As my diagram shows, E10 and E11 mark the first of several occasions where pitches are re-ordered across a central axis, with wholesale parametric alterations, in this instance from

sforzando demisemiquavers to *piano* small notes across an axial *sforzando* G#6. To clarify this process in performance, I take care to play the *sforzandos* as metronomically and as forcefully as possible, slightly dulling the timbral sharpness through observance of Stockhausen's mitigatory *una corda* direction, before introducing a *subito* change of touch, dynamic, and expression in the small-notes, allowing more time for execution than in my literalist performance (hear also Corver and Kobler's relative freedom at this moment). Finally, I minimise the caesura between the following A#0-C#4 pairing, thereby foregrounding the framing connection with the previous pairing. I then slightly delay and maximise my attack of the subsequent A7, highlighting its status as the axis of the double exposition, and as a tonally significant, registrally opposed pole to the A#0 framing tones of Array 1

Unlike Array 1, Array 2 (E18–20) *interrupts* the five-fold C#4 repetitions of Exposition 2, as illustrated in Figure 3.14. To signal this interruption, I make a deliberate separation between the sustained C#4 of E17 (here D♭4 for notational convenience) and the opening C#4 of E18, in contrast to the pedalled elision of the preceding C# nuclei (E15–17). Taking inspiration from Corver, I then bring out the top G3 of the following *sforzando* small-note chord, aiming for transparency in the lower register, thereby highlighting the descending tritone, and allowing for clearer perception of the mirrored pitch repetitions of E19. As shown in Figure 3.14, the G4 dotted minim serves as the axis of this array. To emphasise this fact, I significantly play up the *piano* indication and slightly delay the accented attack.

As an independent gesture, structurally paired with the penultimate small-note group of E71 (Group Y2), the small-note group interruption at E23 (Group Y1) offers a range of interpretative possibilities, beyond those suggested by Stockhausen's directions (see discussion of small-note practice above). In Version A, I play these groups evenly and rapidly,

in line with the performance practice adopted for groups within the small-note section (Group Section 1). In Version B, I seek to bring out motivic elements within these groups, in line with my developmental interpretation of the piece. In the case of Group Y1, this involves dynamically isolating the rising ninth of the upper G6 and G#7 and playing the subsequent F5 and E6 *piano-quasi-misterioso* in transgression of Stockhausen notated *sforzandos*, thereby foreshadowing the motivic recurrence of this interval (Motif Z1, Z2, and Z3), while recalling the practice adopted for the transformation of materials in Array 1.

As mentioned previously, I slightly emphasise the opening A#4 of the small notes at E25 in parallel with my emphasis of the A4 at E2. This draws attention to the structural parallelism of the groupings and the large-scale, palindromic construction of the exposition, whilst highlighting the secondary tonal shift from A to A# that will underpin later sections. This small-note group precedes the exposition's closing primary tonal shift from C#4 to D#4, foreshadowing the conflict of these nuclei in the re-capitulation and the ultimate assertion of D# as tonal centre at E72. To highlight the significance of this moment, I slightly exaggerate the implied non-idiomatic *crescendo* from *pianissimo* to *piano* at E25 to suggest a sense of cadential interruption. This ensures that the structurally balanced opening section feels like an exposition in need of development and resolution, rather than a self-sufficient system. My realisation of the practice discussed thus far is presented in Video Recording 3.5.

The extended development section (E26–E63) begins with a varied progression of arrays that tend towards entropy, as illustrated in Figure 3.15. To clarify the completion and axial reflection of Array 3, I agogically delay and dynamically distinguish the axial A0. Aside from this local flexibility, I broadly follow the indicated $\text{♩} = 63.5$ tempo of the passage, since it establishes an adequate contrast with the previous section, while allowing just enough time

for the technical management of silent key depressions and damper pedal deployment. However, I find the subsequent ♩ = 57 change—coinciding with the structurally significant interruption of Array 4—too subtle for my interpretative aims, attenuating the effect of this interruption and granting insufficient technical and musical leeway for the *accelerando* of E30. Consequently, I begin this section with a gradual *ritardando*, designed to convey the entropic dissolution of material, in maximum contrast to the metronomic precision with which I perform Arrays 3 and 4. I then resume a steady tempo of ca. ♩ = 50 at the onset of Array 5, allowing for greater perception of the layered release of tones and a more dramatic *accelerando* into the subsequent section.¹⁷⁴ It is worth noting that these structural priorities, mirroring decisions taken by some other performers, appear to conflict with those of the composer, whose notation and officially sanctioned literalist practice attenuates the effect of sectional divisions, encouraging a sense of developmental *Gestalt*, which my performance strategy seeks to avoid.

In the subsequent section, I adhere to Stockhausen's relatively brisk ♩ = 71 marking, lending the implied pairing of the Array 6 tones a playfully exaggerated slurring. This establishes a thematic connection with the paired tones of Array 2, while anticipating the nuclei pairings of Resonance Section 1. I then perform the subsequent entropic dissolution with an increased sense of expressive, rhythmic freedom—consistent with earlier practice—which is designed to contrast with the playful, yet metronomically strict performance of Array 6. This allows for the isolated projection of the G#6 and A7 pairing of the Z1 motif, echoing

¹⁷⁴ The stratified chord that begins Array 5 may appear impossible to realise. However, a solution can be reached by capturing the silent cluster in the sostenuto pedal, allowing the left hand to play the quiet C5, D#5, and D6, and the right hand to accurately voice the louder C#6 and F6, before retaking the silent cluster in the left hand, thereby creating a distinct voicing and eliciting greater resonance from the silently held lower cluster. The only compromise involved in this strategy, employed in both Versions A and B, is the inevitable brief suspension of the preceding C2 resonance, which in practice is difficult to perceive.

my projection of the rising minor ninth figure contained within Group Y1, and further recalling the semitonal tension between the secondary A and A# tonal centres established in the double exposition.

The reflected, paired groupings of Resonance Section 1 exhibit perfect parametric balance, as illustrated in Figure 3.16. In order to convey this perfection, I count with extreme precision, ensuring that the six dynamic levels are clearly represented. The contrast of this literal precision—corresponding to my earlier execution of ‘perfect’ arrays—with the greater freedom and subjective expression afforded to entropic material, is designed to support the underpinning dialectic of order and disorder identified in my analysis.¹⁷⁵ In this particular version I opted to use my combination of ‘as fast as possible’ execution of small-notes and eight demisemiquaver rest-fermata base duration for Group Section 1, as demonstrated in Video Recording 3.1. This decision was once again fairly arbitrary, taken here simply to demonstrate the effect of this configuration in the context of the piece as a whole. While it fails to convey the incomplete super-grouping illustrated in Figure 3.17, I ultimately found this novel combination of extremes (i.e., fast groups and long rest-fermatas) enigmatic and satisfying to perform. My realisation of this practice in the first half of the development is presented in Video Recording 3.6.

During the false recapitulation at E50, I take great care to distinguish between the *pp*, *p*, and *ppp* dynamic markings of the A# tonal nuclei, in recognition of their reconfiguration

¹⁷⁵ Depending on the instrument, it is sometimes necessary to take a slightly slower tempo from E41 than the specified $\text{♩} = 71$, while maintaining a metronomic pulse, to allow for full registration of the retaken quaver C#1 of E39 and for audible cut-off and manual management of releases, particularly in the complex pairing of E40, as exemplified by both Corver and Kobler. Resonance Section 1 also features awkwardly arranged C#1 *fff* markings of E37 and E41, underplayed by Corver and others. To achieve maximum impact and distinction from neighbouring *ff* markings, I play both C#1s with the right hand. This involves temporarily sacrificing the F#2 upper resonance prior to E37 and, conversely, over-sustaining the A#0 of E41. Both side-effects are negligible when compared with the dynamic benefit offered by the rearrangement, which I employ in both Version A and Version B.

from the opening iterations of Expositions 1 and 2. I also adhere to Stockhausen's directed $\downarrow = 50.5$, which affects a subtle sense of propulsion and fitting exaggeration of the exposition tempo, analogous to the upwards primary and secondary tonal modulations (i.e., C# to D# and A to A#) that underpin the global formal architecture. At E51, I reduce volume and lighten my touch for the resolution of the slurred minor third, with added resonance elicited from the damper pedal, thereby drawing parallels with the dynamic contours and relationships of Resonance Section 1.¹⁷⁶ I then repeat my practice of agogically delaying and dynamically isolating the Z2 motif, this time outlining a major ninth from C#6 to D#7, which recalls the C#-D# intervallic closure of the double exposition, while anticipating the subsequent clash of these tones in the double recapitulation (see Figure 3.20).

Resonance Section 2 parallels the aesthetic of Resonance Section 1 with some structurally significant differences that can be brought out in performance. As shown in Figure 3.19, the sequence of reflected pairs is violently interrupted at E60. Prior to this interruption, a sense of entropy is suggested by the long *ritardando* marking and use of half-pedal. Whereas Stockhausen indicates the use of half-pedal from the outset, I only begin to depress the pedal following the axial B \flat , gradually increasing its deployment until full depression at E59, thereby accentuating the effect of entropic process, while maximising timbral variety across the passage.¹⁷⁷ I also take great care to grade and exaggerate the *ritardando* to the point of virtual standstill, emphasising contrast with the metronomic regularity of Resonance Section 1, while maximising the effect of the strict *a tempo* at E61.

¹⁷⁶ This contravenes Stockhausen's direction, uniformly observed by supervised performers, which calls for carefully elided, *legato* performance of slurs without dynamic variation. Stockhausen, 'General Foreword', *Klavierstück VII*.

¹⁷⁷ Maconie description of the effect of Resonance Section 1 as 'tape-recorded music gradually being slowed down' might be more aptly applied to this section. Maconie, *The Works of Karlheinz Stockhausen*, p. 85.

As the only *sffz* marking in the piece, I play the chord at E60 as loudly as possible and with little preparation, in observation of Stockhausen's *subito* marking, thereby signifying the interruption of the entropic process. I then maintain an even *fortissimo* throughout Array 9, introducing a slight *accelerando* to heighten the latent drama of the figuration, followed by a gradual *ritardando*, designed to convey the relative entropy of the system. This then sets the stage for the registrally expanded appearance of Motif X. Whereas this motif appears in Exposition 2 (Motif X1) accompanied by a crescendo from *ppp*, its reappearance at the end of the development (Motif X2) is accompanied by a uniform *pp*. To establish a greater sense of connection and parallelism between these motivic repetitions, I opt to ignore this latter dynamic marking, introducing a mirrored diminuendo to Motif X2. My realisation of this practice in the second half of the development is presented in Video Recording 3.7.

From the *accelerando* at E64 to the subsequent *a tempo*, three different types of accompanying resonance (interrupted full-pedal, flageolet, half-pedal), as well as the textural arrangement of C#5s and D#5s, suggest three distinct groups. However, as Figure 3.20 illustrates, I parse this passage as two groups of five D#5 iterations—complementing my parsing of the opening section—aggravated by neighbouring C#5s, and heralded by *sforzando* markings. To highlight the status of this passage as a double recapitulation, I begin my *accelerando* at the *sforzando* chord of E65 (the first D# of the second group), after a slight *ritenuto* during the preceding iterations. This allows more time to achieve and aurally register the technical release and silent reapplication of accompanying tones,¹⁷⁸ while foregrounding the division of this material into two groups of five.

¹⁷⁸ While audible to the performer, such timbral details would be better captured in a professional studio recording, using the recording techniques adopted by Kobler and described in footnote 32. Unfortunately, such a recording exceeded the financial means of my PhD.

Group Section 2 represents progress from a state of entropy to rational organisation, as illustrated in Table 3.2, mirroring the process at work in Group Section 1. To convey this progression, I play the first group (E66) with an expressive *allargando* and *legatissimo* connection. I then play the following groups with cool detachment, including precise measurement and careful distinction of the five, muted dynamic levels. To exaggerate the mechanical, algorithmic quality of this section, I take my hands away from the piano during the rest-fermatas—which I measure precisely, with a long base duration, corresponding to the long base duration taken in Group Section 2—being as economical as possible with my movements (note the contrast with my lingering hands in Version A).

My parsing of Group Y2 as two five note-groups, either side of an imperfect symmetrical axis of D6, A6, and C#6, illustrated in Figure 2.22, suggests a number of interpretative possibilities. Ultimately, I opted to emphasise the repeated C#s, brought into relief by the fleeting, delicate execution of the surrounding tones. I then ignored the proportional duration of the final rest-fermata, executing the final rising D6 to D#7 gesture after only a brief pause, with special prominence given to the D#, thereby foregrounding the tonal relationship between C# and D#, prefigured at the end of the exposition, and developed through the recurrence of Motif Z. My special emphasis on the final D# signals its status as the final tonal resting place of the piece, resolving the conflict of these tones in the double recapitulation. My realisation of this practice in the recapitulation and coda is presented in Video Recording 3.8. My complete recording of Version B is presented in Video Recording 3.9.

3.8 Conclusion

While Stockhausen's writing in *Klavierstücke V–VIII* may have been influenced by Cage and Tudor, these pieces remain distinctive and influential in their own right. This influence can be particularly felt in the work of the group of Italian pianist-composers who attended and taught at Darmstadt from the mid-1950s, with *Klavierstück VII*'s spacious aesthetics, isolated groupings of material, small note configurations, and serially integrated use of resonance particularly recognisable in Franco Evangelisti's *Proiezioni sonore* (1956) and Niccolò Castiglioni's *Inizio di movimento* (1958). Aldo Clementi's *Composizione No. 1* (1957), arguably the most well-known of this small and sadly neglected repertoire, even features a repeated C# tonal centre, with rhythmic notation that also draws inspiration from Stockhausen's *Klavierstück I–IV*.¹⁷⁹ Beyond this group, the sophistication of Helmut Lachenmann's *Echo Andante* (1962) points towards the subsequent development of this style of piano writing, with increasing specificity of damper and sostenuto pedal markings and complexity of manually controlled harmonic transformations.¹⁸⁰

In terms of meaning, the predominance of resonance in *Klavierstück VII*, accompanied by a dramatic reduction in interpretative affordance, and a corresponding reduction in bodily movement, draws attention away from the irrationality of the performer, and towards the irrationality of the instrument. This development calls for a shift in listening practice, with greater attention paid to the contingency of the instrument's physical construction on the

¹⁷⁹ Roberto Prosseda cites the 'central role' of 'the repeated C# that opens the first movement', without recognising the prominent repetition of this tone in *Klavierstück VII*, going so far as to assert that 'repeated notes within series [are] absent in the music of Stockhausen'. Roberto Prosseda, 'Aldo Clementi: The Works for Solo Piano', *Contemporary Music Review*, 30 (2012), 299–315 (p. 299).

¹⁸⁰ See Ian Pace's discussion of this style of writing and its pianistic demands in Lachenmann's music, with specific reference to the 'meticulous choreography of fingering and hand distribution for almost every note [in the *Echo Andante*], in order to maintain the fantastically complex play of sonorities'. Pace, 'Lachenmann's *Serynade*', p. 102.

musical aesthetic, foreshadowing Lachenmann's conception of 'instrumental *musique concrete*', where sound is conceived 'as a message conveyed from its own origin' and 'as experience of energy'.¹⁸¹ Sadly, the standardisation of concert grand piano construction today, and the market dominance of Steinway & Sons in particular, minimises the opportunity to hear this music on the less consistently regulated and more tonally diverse instruments of the past.¹⁸² Regardless, the recording tradition itself captures a fairly wide range of instrumental variety, further mediated by the technique and physique of the pianist; their interpretative choices, and their broader musical sensibility; as well as the technical management of each recording, allowing for relatively extensive comparison of tonal quality and instrumental agency.

In terms of Stockhausen's temporal theory, Klavierstück VII represents perhaps the tightest control of performance variables among the Klavierstücke, giving rise to an overriding convergence of temporally literalist performances over time. While this places greater emphasis on the agency of the instrument, appreciation of these micro-aesthetic nuances relies on a level of audience connoisseurship, which may render future recordings in this tradition obsolete, leading at worst to a stagnation of tradition. Thankfully, this confluence is limited to performers (including myself) who perform or have performed Klavierstück VII according to the strict performance practice advocated at the present-day Stockhausen Courses—that is, the contemporary Stockhausen tradition. In reality, my performance analysis identified a wide variety of responses to the notation, chiefly characterised by choice of tempo, realisation of expressive details, and rhythmic flexibility. Due to the spacious nature

¹⁸¹ David Ryan, 'Composer in Interview: Helmut Lachenmann', *Tempo*, 53 (1999), 20–25 (pp. 20–21).

¹⁸² See for example the rich diversity of tone in the pianos surveyed in Tang, *Shifting Ideals of Tone in Grand Pianos*. Stockhausen's quixotic request in the earliest version of *Punkte* for Orchestra (1952) for one piano with a softer tone, such as a Blüthner, and one piano with a harder tone, such as a Bechstein, highlights his own sensitivity to piano tone in the 1950s. Early edition held in the SSK.

of the piece, this latter freedom can be difficult to perceive, with the similar flexibilities of Kontarsky and Henck, and the greater rhythmic freedom exhibited by Schleiermacher and Damerini, brought into greater relief by the ‘model’ performances of Corver, Kobler, Mosell, and myself. Indeed, it is this very spaciousness, in comparison with the ubiquitous durational proportioning of Klavierstück I, that makes this piece more amenable to rhythmic flexibility, which, in the case of Liebner, may sway audiences towards static readings, or, in the case of Tudor, towards more linear readings.

While contributing to a confluence of approach in literalist performances, the transparency and relative simplicity of Klavierstück VII’s notation and compositional structure also affords performance-applicable analysis, more difficult to imagine in the case of complex serial pieces from the 1950s such as Klavierstücke I or VI. Unlike Berry’s performance suggestions in relation to Brahms and Debussy, which principally deal with the interpretative leeway left by what Stephen Davies might term relatively ‘thin’ works, analytically informed performance of ‘thick’ works such as Klavierstück VII involves, perforce, conscious transgression of the composer’s markings.¹⁸³ Version B thus exemplifies the prioritisation of my analytical interpretation of the score over its authorial prescriptions. What I hope to have demonstrated in this chapter are the processes involved in such critical transgression, and their role in moving beyond the potential ossification of music whose affordances stand at the threshold of execution and interpretation.

¹⁸³ Stephen Davies, *Musical Works and their Performance: A Philosophical Exploration* (Oxford: Clarendon Press, 2001), pp. 3–4.

Chapter 4: Interpreting Klavierstück X

4.1 Introduction

Formally speaking, Klavierstück X can be interpreted in a number of ways. Ian Pace, for example, posits ‘a sharply characterised ‘cosmic explosion’ (itself with a high degree of inner variegation) which recedes a little so as to allow greater apprehension of the various categories of fragments (or atomic dust, if one likes) that emerge out of such an explosion.’¹⁸⁴ Henck, meanwhile, recognises a piece that ‘mediates statistically between two extremes, a chaotic state of the greatest possible breadth and disorder to begin with and a state of maximum discernability, clarity and isolation of shapes at the end’, whereby ‘order comes into being through the resolution of chaos.’¹⁸⁵ These programmatic readings suggest an affinity with the quasi-sonata-formal teleology of Klavierstück VII, as well as the opposition of periodicity and aperiodicity that informs the linear thrust of Klavierstück IX.¹⁸⁶ This situation is, however, somewhat complicated by Klavierstück X’s extended length—matched only by the statistical form of Klavierstück VI—and the peculiarity of its serial aesthetics.¹⁸⁷

Klavierstück X is also notable for its unique rhythmic scheme, which calls for performance of a wide range of material within the time space of traditional durational values, placed above the stave. As with Klavierstücke V–VIII, these values derive from an additive scale of demi-semiquavers, ranging here from a single unit to sixty-four crotchets in

¹⁸⁴ Pace, ‘Notation’, p. 182.

¹⁸⁵ Henck, *Klaviercluster*, p. 68. ‘Das Werk vermittelt statistisch zwischen zwei Extremen, einem chaotischen Zustand größtmöglicher Dichte und Unordnung zu Beginn und einem Zustand maximaler Erkennbarkeit, Durchhörbarkeit und Isolierung der Gestalten am Ende. Ordnung entsteht aus der Auflösung des Chaos.’

¹⁸⁶ See Henck, *Karlheinz Stockhausens Klavierstück IX* for a detailed analysis of this process.

¹⁸⁷ See Richard Toop, ‘Last Sketches of Eternity: The First Versions of Stockhausen’s Klavierstück VI’, *Musicology Australia*, 14 (1991), 2–24 for more on the compositional background to Klavierstück VI.

length. The material itself is arranged into serialised groups and sub-groups of small notes, recalling the implementation of small notes in the preceding pieces. These groups are then subjected to internal tempo variation, with ascending beams dictating *accelerandi*, descending beams dictating *ritardandi*, and horizontal beams dictating a steady execution, reminiscent of the fluctuating tempo line of Klavierstück VI. Finally, as with Klavierstücke I–IV, the performer is directed to perform the piece ‘as fast as possible’, invoking similar performance considerations and questions of priority with respect to tempo maintenance and determination. This affects a prevailing conflation of Stockhausen’s psychological and measured time strata, whereby measured durations, now extrinsic to the flow of material, are constantly mediated by the ability of the performer to maintain a consistent tempo. The degree to which each of these modes of temporal determination dominates will depend on a number of factors, including the quantity and quality of material governed by each note value—which may in turn be influenced by aspects of physically dependent temporal execution—as well as the performer’s approach to rhythmic preparation, prioritisation of metric proportions, and choice of base tempo. As with Klavierstück VII, the teleological drive of the piece is thus conditioned by its underlying statistical processes, though with a radical increase in performer agency, afforded by the complexity of its rhythmic notation, and the technical demands of its musical materials, including the unprecedented integration of a wide range of clusters and cluster techniques.¹⁸⁸

¹⁸⁸ Keyboard clusters had already been used in a number of works by Darmstadt composers, such as Boulez’s Third Piano Sonata (1955–7), Evangelisti’s *Proiezioni sonore*, Kagel’s *Transición II* (1958), and Stockhausen’s own *Kontakte* (1959–60). Regardless, Klavierstück X is the first piece to assimilate clusters as compositional materials on such a grand scale. See Henck, *Klaviercluster* for an overview of the history and compositional use of keyboard clusters. See also Mauricio Kagel, ‘Tone-Clusters, Attacks, Transitions’, trans. by Leo Black, in *Die Reihe 6: Reports; Analyses* (Bryn Mawr, Theodor Press: 1959) for discussion of cluster techniques and their compositional application in *Transición II*. There is currently very little discussion of the performance practice of keyboard clusters in the literature: a lacuna which this chapter aims to address.

The piece also shares an affinity with the fragmentary composition of Klavierstück XI. However, where in the earlier piece fragments were distributed across a single page and performed in a theoretically random order, accompanied by wholesale shifts in tempo, touch, and dynamics, in Klavierstück X they appear in a fixed order and with set attributes.¹⁸⁹ They are also separated from one another in the main body of the piece by various periods of silence, or, more precisely, inaction on the part of the performer, since most are accompanied by some form of sustained resonance. The presence of these self-sufficient musical vignettes, in addition to the piece's over-arching assimilation of musical materials, suggest the relevance of a third analytical context: that of Stockhausen's 'moment form', a supposedly new way of thinking about music, predicated on a non-linear conception of musical time, pre-eminence of the musical 'now', and an appreciation of form as process.¹⁹⁰

The degree to which the teleological, serial-statistical, and moment-formal characteristics of the piece come to the fore, and how they interact with one another in performance, will depend heavily on the performer's realisation of the technical demands and affordances of the notation. Following the model of my previous case studies, this chapter uses the small yet extremely diverse recording corpus, presented in Table 4.1, as a

¹⁸⁹ See Krytska, *Klavierstück XI*, for in-depth analysis of recordings of Klavierstück XI, including discussion of its relationship with Cage's music. While valuable, discussion of the relationship of Klavierstücke IX–XI to the aesthetics and performance practices of American experimentalism, as well as Tudor's ultimate rejection of Klavierstücke IX and X, lies beyond the scope of the current chapter. It is, however, of historical note that Tudor did perform Klavierstück X while on tour with Cage in Japan in October 1962, seemingly without Stockhausen's knowledge, including a performance on 10 October, the same day that Frederic Rzewski gave the reported premiere in Palermo, Italy. The live recording that was released in 2012 is included in my corpus for analysis.

¹⁹⁰ Stockhausen's moment form is typically associated with the works *Kontakte*, Carré (1959–60), and *Momente* (1961–4). See for example Roger Smalley, "Momente': Material for the Listener and Performer: 1', *The Musical Times*, 115.1571 (1974), 23–8; Roger Smalley, "Momente': Material for the Listener and Performer: 2', *The Musical Times* 115.1574 (1974), 289–95; and Jonathan D. Kramer, 'Moment Form in Twentieth Century Music', *The Musical Quarterly*, 64.2 (1978), 177–94. Stockhausen's theory is chiefly explicated in Karlheinz Stockhausen, 'Momentform' in *Texte I*, pp. 189–210. The qualifying 'supposedly' here reflects the unacknowledged debt that Stockhausen's moment form theory owes to Cage's musical philosophy.

lens through which to view this practice, and to assess the aesthetic and formal relationships of Klavierstücke I and X in particular.

Performer	Date	Context
David Tudor	1962	<ul style="list-style-type: none"> - Live recording made in Osaka, Japan, 10 November 1962 - Original dedicatee of Klavierstücke IX and X
Frederic Rzewski	1964	<ul style="list-style-type: none"> - Drafted in to give premiere in 1962 - Only recorded piano work by Stockhausen - Temporary dedicatee of Klavierstück X
Aloys Kontarsky	1965	<ul style="list-style-type: none"> - Final dedicatee of Klavierstücke IX–X
Herbert Henck	1986	<ul style="list-style-type: none"> - Analyst of Klavierstücke IX and X
Bernhard Wambach	1988	<ul style="list-style-type: none"> - See Table 2.1
Ellen Corver	1997	<ul style="list-style-type: none"> - See Table 2.1
Benjamin Kobler	2014	<ul style="list-style-type: none"> - See Table 2.1
Sabine Liebner	2016	<ul style="list-style-type: none"> - See Table 2.1

Table 4.1 Complete recording corpus for Klavierstück X

I begin by considering the relevance of my three analytical contexts to Henck's comprehensive exposition of the piece's materials and serial processes. This is followed by consideration of the technical demands and affordances of the notation, including matters, specific to Klavierstück X, pertaining to dynamics, melodic lines, clusters, rhythmic execution, and tempo. My performance analysis then proceeds in three distinct stages, moving from a macro- to a micro-apprehension of the piece's performative features. First, I present global tempo data to illustrate in the broadest sense how performances may support or detract from the teleological readings of Pace and Henck. I then pursue a series of qualitative performance analysis case studies, which are principally orientated around an interpretation of the piece's

fragmentary materials as moments, including consideration of the presence of styles identified in recordings of the other Klavierstücke, thereby coming to terms with the varied complexions and interrelationships of the piece's many vignettes. Finally, I use close empirical analysis—Cook's augmented listening—to investigate the precise relationship of the piece's temporal notation and the sounding reality of existing recordings in a range of technical contexts, shedding further light on the moment formal characteristics serial aesthetics of the piece.

In the final section, I evaluate my production of a metrically refined version of the piece: a 'top-down' approach, whereby note value proportions are 'corrected' on a case-by-case basis in response to empirical timing data, in contradistinction to the 'bottom-up' approach to tempo determination and rhythmic refinement used in the generation of my experimental recordings of Klavierstück I (see Chapter 2). As well as lending greater depth to my analytical findings, this creative process reveals a resistance on the part of Klavierstück X to bottom-up tempo determination. This is cited as an indicator of the shift in aesthetics, notational dialectics, formal characteristics, and temporal processes embodied by these pieces, marking the respective start and end points of Stockhausen's 1950's investigations into the temporality of human performance.

4.2 Score analysis

4.2.1 Materials and formal processes

Henck's analysis of Klavierstück X expositis seven categories of material, which Stockhausen terms 'characters'. These characters are principally defined by their vertical density, existing

in chord and cluster form, ranging from individual tones and corresponding clusters of a major second (Character 7) to seven-note chords and corresponding clusters of two octaves and a major seventh, to be performed using both forearms (Character 1). Characters are further defined by their predominating dynamic, register, and varieties of movement. The principal attributes of each character are summarised in Table 4.2.¹⁹¹

Character	Notes per chord	Cluster ambitus	Dynamic
7	1	Major second	<i>ppp</i>
6	2	Perfect fourth	<i>pp</i>
5	3	Major sixth	<i>p</i>
4	4	Major ninth	<i>mf</i>
3	5	Octave + major sixth	<i>f</i>
2	6	Two octaves + minor third	<i>ff</i>
1	7	Two octaves + major seventh	<i>fff</i>

Table 4.2 Principal character traits

The piece is composed of an introductory phase (Phase 0) and seven principal phases (Phases 1–7), each of which contains seven serialised base durations, ascending in the geometric series: 1, 2, 4, 8, 16, 32, 64 crotchets.¹⁹² Each character is allocated a base duration within each of the principal phases in a ‘magic square’ configuration, which ensures that each character is paired with each base duration once. Meanwhile, in Phase 0, every character appears within each base duration, in a microcosm of the serial ordering of the entire piece.

¹⁹¹ See Henck, *Klavierstück X*, pp. 45–8 for a full description of these attributes. While it may seem confusing that the seven-note chordal character is identified as Character 1, and vice versa, these labels have been preserved to maintain the direct interrelationship of other serial parameters, which correspond more logically to the numbering system.

¹⁹² Henck, *Klavierstück X*, pp. 14–21. The manifold series of sevens used in *Klavierstück X* may be traced back to the series of seven degrees of comprehensibility used in *Gesang der Jünglinge* (1955–6), with similar aesthetic implications. Karlheinz Stockhausen, ‘Gesang der Jünglinge’, in *Texte II*, pp. 60–1. ‘Phase 0’ is my own term for what Henck calls ‘the beginning phase’.

The order in which base durations and their associated characters appear is determined according to permutations of the fundamental series 7, 1, 3, 2, 5, 6, 4. This scheme is summarised in Figure 4.1, highlighting Stockhausen's coercion of Character 4 base durations to appear at the ends of phases, the repetition of character order in Phases 1 and 7, and the sequential ordering of base durations in the final phase.¹⁹³ Allocation of the colour white to Phase 0 and the colours of the visible light spectrum to the characters of Phases 1–7 is designed to convey my personal vision of the refraction and gradual purification of undifferentiated light through a series of 'prisms'.

¹⁹³ Base durations are presented here in additive rather than geometrically proportioned blocks to preserve the clarity of the scheme.

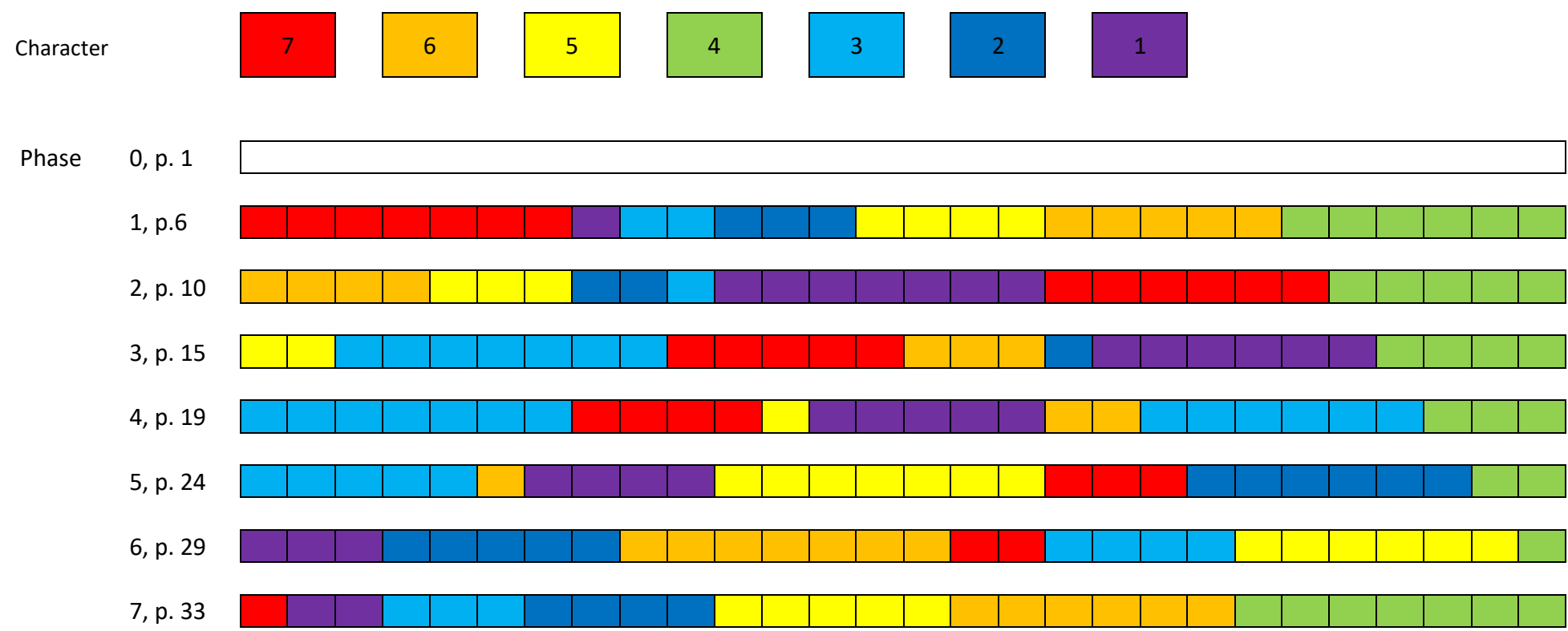


Figure 4.1 Klavierstück X, formal scheme

In Phase 0, there is no separation between character materials or base durations. In Phases 1–7, meanwhile, each base duration has a set action duration, in which active material appears, and a set rest duration, in which the performer is inactive, with occasional interjections breaking up longer rest durations. Each action duration is divided into series of note values, which correspond to the character number. Each action duration of Character 7 will thus contain seven values, and so on, regardless of the length of the base duration.¹⁹⁴ Short Character 7 base durations will therefore have the most precisely determined rhythmic scheme, while long Character 1 base durations will be the least rhythmically determined. The number of groups of small notes contained within each note value is also determined by the degree of density, with the lowest degree of density corresponding to a single attack; the second corresponding to two groups, one with one attack and one with two attacks; the third corresponding to three groups, with one to three attacks etc..¹⁹⁵ Crucially, Stockhausen manipulates the ordering so that the lowest degree of density is reserved for Phase 7.¹⁹⁶ As a result, character materials become increasingly aligned with the rhythmic scheme of the note values as the piece progresses.

A set number of attacks within each note value are also replaced by character material from the following base duration. The number of attacks to be replaced is determined by seven ‘degrees of order’, ranging from no replacements, affecting the ‘pure’ appearance of a single character, to the replacement of one in three attacks, affecting a state of maximum interpolation. This process only takes place in Phases 1–7, with character materials in each of the base durations of Phase 0 appearing in ‘pure’ blocks. Once again, the lowest level of

¹⁹⁴ Henck, *Klavierstück X*, pp. 22–7.

¹⁹⁵ *Ibid.*, pp. 27–8. As with every element of the notation, the ordering of these groups is serially permuted.

¹⁹⁶ *Ibid.*, p. 29.

disorder is reserved for each character in Phase 7, thus affecting what Henck calls a 'purification of the characters'.¹⁹⁷

4.2.2 Analytical contexts

As Henck's analysis makes clear, Klavierstück X's teleology extends considerably beyond the surface impression of a 'cosmic explosion' from which 'categories of fragments emerge'. The salience of the statistical processes that dictate this transformation will, however, depend significantly on the inherent attributes of the materials and the contribution of the performer. For example, in practice, the appearance of the Character 4 base duration at the end of each phase becomes increasingly difficult to perceive. This is due to the progressive diminution of base duration length—from thirty-two crotchets in Phase 1 to one crotchet in Phase 6, with the longest base duration of sixty-four crotchets reserved for Phase 7 (see Figure 4.1)—and the corresponding diminution of rest durations, naturally attenuating the separation of later Character 4 base durations and their ensuing base durations, particularly when high degrees of interpolation are involved. Due to its median attributes, Character 4 is also the most difficult to distinguish when heard in context, with the extreme attributes of Character 7 and Character 1 offering clearer structural signifiers to the uninformed listener.¹⁹⁸ Perception of the over-arching purification of characters is also contingent on the performer's projection and distinction of character attributes, while transmission of the diminishing density of attacks, and the increasing alignment of musical materials and durational values will also

¹⁹⁷ Ibid., pp. 39–40.

¹⁹⁸ See for example Harvey's recognition of Character 7 materials as structural signifiers in his attempt to analyse Klavierstück X as a work of sonata form. Harvey, *Works of Stockhausen*, pp. 42–7. The muddled and convoluted results of this analysis, and Harvey's general antipathy towards the piece, highlight Klavierstück X's unsuitability to thinking in these terms, and its essential formal difference to Klavierstück VII.

depend on the performer's skill and prioritisation of such details. Moreover, the performer's ability to distinguish the attributes of the characters and to articulate the nuances of the rhythmic scheme, as well as the audience's ability to perceive these subtleties, will rely heavily on their choice of speed, as my subsequent performance analyses will demonstrate.

It is important to note that these statistical processes only become teleological when apprehended between base durations. Within each base duration, the serial premises of the composition give rise to a wide variety of self-sufficient musical ecosystems. In this sense they could be interpreted as moments, in line with Aaron William Smith's description of 'self-contained entities, [...] defined by internal consistencies that may be diverse in presentation (i.e., harmonic, rhythmic, dynamic, textural), which promote contemplation of the present and mitigate any sense of teleological motion.'¹⁹⁹ This is partly a question of perspective: of focusing on the individual 'worlds' contained within each base duration, or of consciously attuning oneself to the associations between them. As with the tension between Klavierstück VII's static and dynamic characteristics, however, the performer's interpretative choices will still play a strong hand in guiding the listener towards one perspective or the other.

The performer also has an important role to play in the characterisation and internal complexion of base durations, which may be usefully described in terms of Stockhausen's classification of moment types. In his moment form theory, Stockhausen posits not just moments, but also partial moments, and moment groups. The former come about when 'one

¹⁹⁹ Ashley William Smith, *Redefining Moments: Interpreting Flexible Moment Form in the Late Solo Works of Franco Donatoni* (unpublished doctoral thesis, University of Western Australia, 2020), p. 16. Smith's recent dissertation offers a critical overview of contributions to moment form theory by Stockhausen, Kramer, Smalley, and Rebecca Wheeldon, among others. In addition to the sources cited above see Jonathan D Kramer, *The Time of Music: New Meanings, New Temporalities, New Listening Strategies* (New York: Schirmer, 1988), and Rebecca Wheeldon, *Debussy's Late Works*, (Bloomington: Indiana University Press, 2009).

or more of [a moment's] characteristic attributes' are altered.²⁰⁰ As noted, characters in Klavierstück X have a number of attributes, which may be subjected to change from note value to note value within each base duration. For example, in the opening base duration of Character 7 in Phase 0 (see Example 4.1), there is a shift from the single-note to the cluster form of the character at the third note value, while the rest of the character attributes (dynamic, register, type of movement) remain the same, thus delineating two partial moments, in line with Stockhausen's theory. As with the broader statistical process of the piece, these localised structural features may be projected—either through literalist attention to detail, or by other means of expressive signification—or obscured in performance.

Moment groups occur when consecutive moments are related to one another via shared attributes, while maintaining their own 'personal characteristics'.²⁰¹ This somewhat vague description may seem irrelevant to Klavierstück X, given the discrete dynamic, registral, and pitch attributes of each character and the modular arrangement of base durations. However, in instances where base durations of contiguous (and thus closely related) characters with a high level of interpolation are separated by brief rest durations, the impression of a moment group (that is, of the elision of two subtly distinguished base durations) may emerge, particularly when dynamic distinctions are attenuated or neutralised by the performer, either consciously, unconsciously, or as a result of the technical limitations imposed by very high tempi.

²⁰⁰ Stockhausen, *Momentform*, p. 200. 'Wird ein Moment durch Änderung einer oder mehrerer seiner charakteristischen Eigenschaften gegliedert, so nenne ich die Glieder Teilmomente.'

²⁰¹ Ibid.. 'Mehrere aufeinanderfolgende Momente, die durch eine oder mehrere Eigenschaften miteinander verwandt sind, ohne ihre persönliche Charakteristik in Frage zu stellen, nenne ich eine Momentgruppe.'

dicke Noten betont (*pp,p* oder *mf*) *mf*

Example 4.1 Klavierstück X, p. 1: Character 7 in Phase 0

In formal terms, Stockhausen writes that ‘a moment can be a *Gestalt* (individual), a structure (dividual), or a mixture of both.’²⁰² In other words, it can be perceived as a holistic form, or as a form with divisible components. Meanwhile, ‘in temporal terms’, a moment may appear in ‘a static state, or as a dynamic process, or as a combination of both.’²⁰³ These definitions can once again be usefully applied to the base durations of Klavierstück X. Whether or not a base duration, taken as a moment, is perceived as individual or dividual will depend chiefly on degrees of density and interpolation. For shorter note values with a high degree of density, it will naturally be more difficult to discern individual components at speed, thus contributing to a higher level of *Gestalt* formation in the earlier stages of the piece. This is counterbalanced, however, by the progressive purification of characters, which, as Henck notes, ultimately contributes to an increased state of homogeneity within base durations, with the interpolation of disparate characters in particular affecting clear structural signposts within base durations earlier in the piece.²⁰⁴ These impressions, tying back to matters of perception, and the teleological and statistical dimensions of the piece, will once again be conditioned by the performer’s approach to rhythm and tempo, and their distinction of character attributes.

While the temporal characteristics of base durations may be similarly affected by aspects of performer interpretation, they will also be partly determined by the inherent attributes of the character or characters in question. Character 7, for example, typically appears in the central register of the piano with the narrowest range and greatest variety of

²⁰² Ibid., p.201. ‘Ein Moment kann – formal gesehen – eine Gestalt (individuell), eine Struktur (dividuell) oder eine Mischung von beiden sein; und zeitlich gesehen kann ein Zustand (statisch) oder ein Prozeß (dynamisch) oder eine Kombination von beiden sein.’

²⁰³ Ibid.. ‘Zeitlich gesehen kann [ein Moment] ein Zustand (statisch) oder ein Prozeß (dynamisch) oder eine Kombination von beiden sein.’

²⁰⁴ Henck, *Klavierstück X*, p. 19.

movement (see Example 4.1). In this sense, it is less likely to enact a 'dynamic process', or to suggest a dramatic narrative than the virtuosic cross keyboard movements associated with Character 1 (see Example 4.2). At the same time, the single note form of Character 7, in addition to its flowing lines, and large volume of attacks and suspensions, offers the greatest scope for melodic polyphony, lending its base durations an inherent linearity, which may be further projected or attenuated by the performer. As with my previous case studies, understanding the manifestation of these phenomena in performance, and the resulting balance between Klavierstück X's teleological, statistical, and moment formal characteristics, first requires consideration of the technical demands and affordances of the notation.

CH5 + CH2 CH2 + CH3 CH3 + CH1 CH1 →

dicke Noten betont *p/ppp*

Triller etwas länger

Example 4.2 Klavierstück X, p. 11: Characters 5, 2, 3, and 1 in Phase 2

4.3 Technical demands and affordances

4.3.1 Dynamics

The performer's interpretation of dynamics in Klavierstück X will have a significant influence on the piece's aesthetic and formal characteristics. This influence is contingent on the level of disorder within base durations and the dynamic contrast between interpolated characters. The 'pure' base duration of Character 6 that appears in Phase 6, for example, should be performed at a consistent *pianissimo* (see Example 4.3). In practice, however, this can be difficult to achieve, due to the density and assimilation of cluster and chordal attacks, with the performer called upon to compromise between speed, pitch precision, articulation of suspensions, and dynamic consistency. Achieving fine dynamic distinctions when contiguous characters are interpolated can also be challenging. This is particularly true when quieter dynamics are juxtaposed, as exemplified by the base duration of Character 5 and its interpolation with Character 6 in Phase 1 (see Example 4.4).²⁰⁵ Meanwhile, strong distinctions, occurring when more disparate characters are interpolated, are easier to realise. This is especially true when manual and forearm clusters are juxtaposed, with the contrasting techniques naturally lending themselves to the prescribed dynamic contrasts, as exemplified by the base duration of Character 5 and its interpolation with Character 2 in Phase 2 (see Example 4.2). The configuration of dynamics, and their realisation in performance, will thus have a significant effect on the respectively heterogenous, or homogenous quality of each base duration, with Stockhausen's management of material contributing to an even

²⁰⁵ Similar issues arise in distinction of the loudest dynamics. To combat this, Henck helpfully suggests using the *una corda* when performing *fortissimo* Character 2 material, allowing for an increase in volume and intensity for *fff* Character 1 material when it is released. Henck, *Klavierstück X*, p. 67.

distribution and diversity of combinations, tending towards greater homogeneity as the piece progresses.

Example 4.3 Klavierstück X, pp. 29–30: Character 6 in Phase 6

Example 4.4 Klavierstück X, p. 8: Character 5 interpolated with Character 6 in Phase 1

In a global sense, dynamic consistency, particularly in the context of base durations with low levels of disorder, may affect the audience's perception and non-linear relation of recurring characters between phases, and thus the impression of the piece's moment form. As noted, lack of dynamic distinction between base durations that are separated by minimal rest durations may contribute to the perception of moment groups, extending across base durations. For example, the appearance of Character 4 that concludes Phase 4, featuring dynamic contrasts of *piano*, *mezzo piano*, and *forte*, is separated by a crotchet rest duration from the predominantly *forte* Character 3 base duration that follows (see Example 4.5). Given the virtuosic arrangement of material in the Character 4 base duration, and the rapid alteration of dynamics, it may be difficult to achieve the notated contrasts at quicker tempi, resulting in an attenuation of the discreet separation of the subsequent base duration. The manifestation of these phenomena in the recording corpus will be discussed in due course.

CH4 + CH3 CH3 + CH6

The image displays a musical score for piano, divided into two sections: 'CH4 + CH3' and 'CH3 + CH6'. The score is written for piano and includes dynamic markings such as *mf*, *pp*, *f*, *p*, and *pp*. The notation features complex rhythmic patterns and dynamic contrasts. The first section, 'CH4 + CH3', shows a transition from a *mf* dynamic to a *pp* dynamic, followed by a *f* dynamic. The second section, 'CH3 + CH6', shows a transition from a *f* dynamic to a *pp* dynamic, followed by a *f* dynamic. The score includes various musical notations such as notes, rests, and dynamic markings.

Example 4.5 Klavierstück X, p. 24: Character 4 in Phase 4 and Character 3 in Phase 5

4.3.2 Melodic features

Melodic lines in Klavierstück X are chiefly dictated by the configuration of ‘principal attacks’. Those with large note heads are to be given dynamic emphases, either specifically prescribed by the composer, or determined by the performer relative to the prevailing character dynamic. These configurations are frequently accompanied by layered suspensions—typically involving the emphasised principal attacks—giving rise to a variety of polyphonic textures, with technical implications relating to each character. The principal attacks of Character 7 are further accompanied by quasi-chromatic groupings of subordinate attacks, which are to be performed as fast as possible (see Example 4.1). As with traditional repertoire, the clarity and expression of these melodic lines will be determined by the performer’s approach to articulation, voicing, pedalling, and rubato, the latter of which is theoretically contingent on Klavierstück X’s rhythmic notation.

Polyphonic lines are far more prominent in Klavierstück X than in any of the other Klavierstücke. Realising suspensions, however, is often challenging, relying upon creative fingering, arrangement of hands, and precise use of the *sostenuto* pedal. The latter is rarely indicated though often implied, occasionally calling for extreme dexterity (see in particular the exigences of Examples 4.3 and 4.4). Projection of polyphonic lines in certain instances thus becomes highly contingent on the performer’s choice of base tempo, with implications for the rhythmic execution of groups, to be discussed in due course. Taken together, prioritisation of line (including higher order projection of emphasised tones) and voicing of clusters will have a significant impact on the sense of linear process that each base duration encapsulates.

4.3.3 Clusters

The technical management of clusters, alluded to in the preceding section, will further contribute to the aesthetics of individual base durations and the distinction of character materials, as well as their interrelationships across the course of the piece. Each of the seven cluster types affords multiple means of execution, each with their own practical and aesthetic advantages and drawbacks. For purposes of concision, and to provide the necessary context for the subsequent performance analysis case studies, I focus here on the possibilities afforded by the cluster forms of Characters 4 and 3.

Character 4 clusters typically appear in groups of alternating white and black keys, which end with a chromatic principal cluster (see Example 4.6). The simplest way of performing such groups is to lay the hands perpendicular to the keys, with the heel of each palm to the tip of each middle finger spanning the cluster ambituses (see Figure 4.2). This allows for rapid alternation of white- and black-key clusters and fairly full and consistent realisation of their pitch content. This technique is pianistically intuitive, particularly in isolation, but it also has its drawbacks. First, turning the hands perpendicular to the keys takes vital preparation time, which can lead to problems when chordal attacks are interpolated. Second, it is difficult to execute accurately the chromatic content of the final clusters of some groups using in-turned palms. Above all, the technique lacks pianistic finesse, with the unorthodox position of the forearms making it difficult to control arm weight, and the palms of the hands offering a crude surface from which to voice clusters and regulate touch and tone quality.

The image displays a musical score for a piano piece, consisting of two systems of staves. The first system includes a treble clef staff with dynamics *mf/pp*, *mf*, and *f*, and a bass clef staff with dynamics *mf* and *pp*. The second system features a treble clef staff with dynamics *f/ppp*, *pp*, *f*, and *mf*, and a bass clef staff with dynamics *pp*, *f*, *pp*, *p*, and *f/ppp*. A bracket labeled "langsam" spans the final measures of the second system. Performance instructions include "dicke Noten" (thick notes) and "mit Unterarm Tasten stumm niederdrücken" (press keys dumbly with the forearm). A piano keyboard diagram is shown at the bottom, with dynamic markings *p* and *P* indicating fingerings and dynamics.

Example 4.6 Klavierstück X, p. 9: Character 4 interpolated with Character 6 in Phase 1



Figure 4.2 Character 4 clusters: perpendicular palm technique

A second technique involves splitting the white-key clusters between the heels of the hands, and playing the black-key clusters with the fingers in a rocking motion (see Figure 4.3). This is relatively ergonomic, allowing for consistently full realisation of the black- and white-key cluster ambituses; full realisation of chromatic clusters, which can be executed with a controlled combination of palms and fingers; and smoother transitions to and from chordal attacks. However, these benefits come at the cost of speed and comfort, with ease of execution, and by extension clarity and reliability, contingent on register, the specific

arrangement of white and black keys, and positioning in relation to the interpolation of other characters.



Figure 4.3 Character 4 clusters: rocking palms technique

A third technique involves playing white-key clusters with the flat outstretched fingers of one hand, while playing black-key clusters with the other in a spider-like configuration (see Figure 4.4). This is the least intuitive method, and the most difficult to master; it is also only possible to play a maximum five of the seven black keys of each upper cluster, with execution of the major ninth ambitus only possible for those with very large hands. Nonetheless, this technique has significant aesthetic benefits, allowing for rapid alternation of white- and black-key clusters, precise realisation of chromatic clusters, a high level of tonal control, and rapid and reliable movement between cluster groups, and to and from chordal attacks.



Figure 4.4 Character 4 clusters: interlacing technique

The octave-and-a-major-sixth cluster form of Character 3, appearing in its most challenging iterations in Phase 3 (see Example 4.7), is the first to require performance using the forearm, though manual means of execution are also possible, and in some instances necessary. For most pianists, the ambitus of this cluster will correspond to the span from the tip of the elbow to the corner of the wrist. To play Character 3 accurately in its cluster form therefore requires precise placement of the arm and inward turning of the clenched fist (see Figure 4.5). This is relatively manageable for white-key clusters; however, when the ambitus ranges from a white to a black key, or vice versa, the pianist must depress the arm awkwardly in a diagonal position, resulting in very approximate pitch content. Character 3 materials are also frequently accompanied by upward or downward arpeggiations, which are difficult to execute when applied to clusters, requiring a counterintuitive relaxation of the forearm muscles.

CH5 + CH3 CH3 →

dicke Noten betont

d. verlangsamen

sehr verlangsamen

Example 4.7 Klavierstück X, p. 15: Character 5 and Character 3 in Phase 3



Figure 4.5 Character 3 clusters: forearm technique

In the case of Example 4.7, I found it extremely difficult, and in some instances impossible, to accurately play the upper and lower pitches of Character 3 clusters, or to achieve a consistently audible arpeggiation in the notated direction at speed using the forearm. This led to me to consider alternative techniques. The first of these involves performing the clusters using two outstretched palms (see Figure 4.6), allowing for accurate pitching, fuller voicing, clear arpeggiation, improved tonal control, and for the keys to be released with precision. The second technique involves replacing the cluster with a rapid glissando spread of the ambitus, creating the illusion of a rolled cluster when combined with the damper pedal at high speed (see Video Recording 4.1).

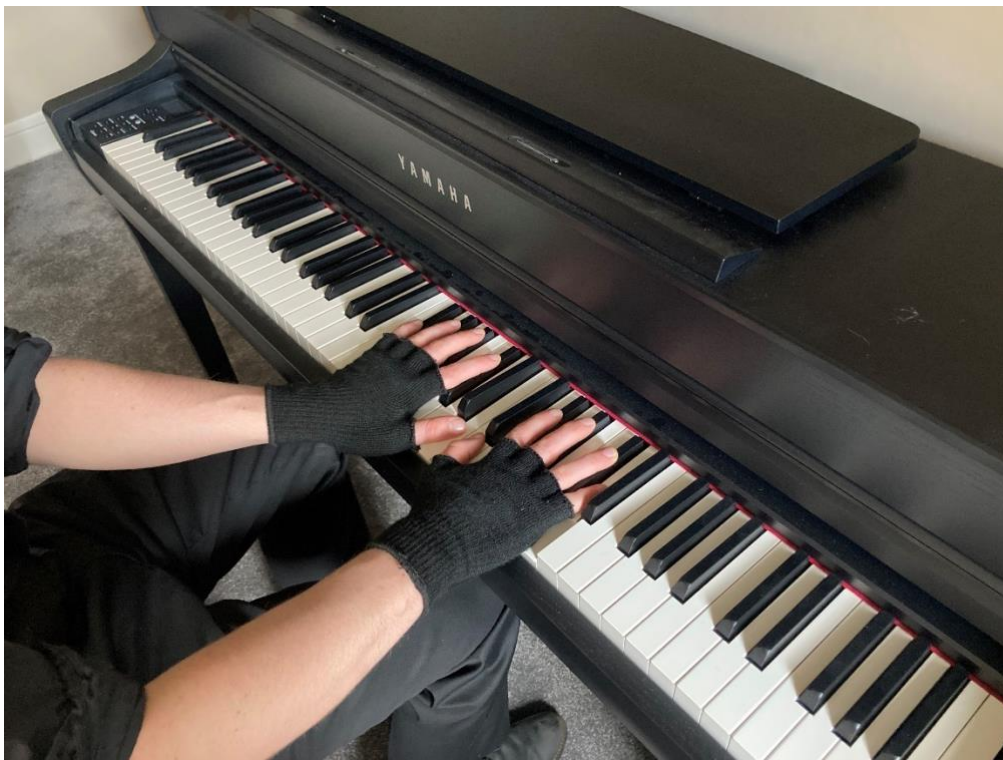


Figure 4.6 Character 3 clusters: spread palms technique

Following much trial and error, I reached a solution for the passage in Example 4.7 using a combination of these techniques, thereby achieving an ergonomic and reliable compromise between cluster content, cluster ambitus, speed of alternation, dynamic control, and clarity of arpeggiation. As with each of Klavierstück X's cluster types, the aural and visual aesthetics of such base durations become more-or-less heterogenous depending on when and where each method is adopted, affecting both the aesthetic consistency of individual base durations, and the salience of their relationships with one another. Within the broader context of the piece, each technique for each cluster form has its place, highlighting the variety and subtlety of the practice engendered by Stockhausen's writing.

Together, these practical case studies highlight the reduced significance of pitch and pitch accuracy in Klavierstück X. This could not have been deduced through score analysis alone, relying on analysis of the affordances of the notation, as illustrated by comparison of Harvey's text-oriented criticism of 'a high-handedness in the detailed treatment of pitch', and Pace's performance-oriented recognition of a harmonic language that 'perhaps does not require such a high degree of attention to every pitch as would be required in a tonally or post-tonally organised work.'²⁰⁶ Together, these considerations provide an important context for the assessment of pitch accuracy in performances and recordings of the piece, and for my own creative approach to metric refinement.

4.3.4 Rhythm and tempo

The degree to which the equilibrium of Klavierstück X's temporal strata can be maintained depends on the relationship between the physical demands of the materials and the theoretically proportioned note values by which they are governed. As with Klavierstück I, the 'as fast as possible' tempo is contingent on the performer's priorities with respect to expression, precision, and reliability. However, determination of tempo according to the smallest note values, whether approximate or empirical, is no longer straightforward, with the performer required (theoretically at least) to consider the relationship between the

²⁰⁶ Harvey, p. 46. Pace, 'Notation', p. 188. Harvey also attacks the 'simplistic impression' of clusters in Klavierstück X, which 'bulldoze all musical relationships away and have many degrees fewer of significance than a simple triad', citing Boulez's similar assertion that such 'quickly parcelled material is no guarantee of great acuteness of conception, [suggesting] on the contrary, a strange weakness for being satisfied with undifferentiated acoustic organisms'. Harvey, p. 46. These statements, appearing in 1975 and 1971 respectively, bely a lack of understanding about the subtlety and complexity of cluster techniques engendered by Klavierstück X—as reflected in the diverse body of recordings that have since been produced.

duration of the superordinate note values, and the quantity, technical difficulty, and particularity of the materials they govern.

Most performers will begin with an arbitrary base tempo, according to which all of the note values can be counted.²⁰⁷ All *accelerandi* and *ritardandi* can then be planned and transcribed into additive series of demisemiquavers and smaller subdivisions thereof—in accordance with Stockhausen’s approximate time-space notation—and then practised according to the base tempo.²⁰⁸ The base tempo can then be incrementally increased until an ‘as fast as possible’ limit is reached. As Kobler’s annotation of page 6 illustrates (see Example 4.8),²⁰⁹ determination of local tempo variation calls for an element of pre-performance strategy, or what might be considered composition on the part of the performer, not accounted for by Stockhausen’s theory of the mid-1950s, recalling the considerably more complicated creative role of the performer in realising the temporal exigencies of contemporaneous works by members of the New York School.²¹⁰ In practice, the performer’s interpretation, prioritisation, and consistency of approach with respect to localised tempo variation will have a significant impact on the temporal, melodic, and formal aesthetics of the piece, belying Harvey’s assertion that ‘any rhythmic or durational argument must [...] come through only in [the] boundary-defining durations above the stave.’²¹¹

²⁰⁷ In my case this was ♩ = 60, the same starting tempo that Henck advocates. Henck, *Klavierstück X*, p. 63.

²⁰⁸ Henck details his measurement of these proportions with a ruler, while cautioning that not all *accelerandi* and *ritardandi* are true to scale. Henck, *Klavierstück X*, p. 63. Pace similarly warns that ‘the spatial distribution of the score by no means necessarily corresponds to the intended durations.’ Pace, ‘Notation’, p. 184.

²⁰⁹ I am very grateful to Kobler for allowing me to include this reproduction.

²¹⁰ See for example Tudor’s compositional role in the realisation of Cage’s *Variations II* (1961). James Pritchett, ‘David Tudor as Composer/Performer in Cage’s “Variations II”’, *Leonardo Music Journal*, 14 (2004), 11–16. It is possible that the relatively limited and comparatively simplistic creative responsibilities of the performer in *Klavierstück X* may have contributed to his ultimate rejection of the piece.

²¹¹ Harvey, p. 43.

Phase I, Charakter 7, Aktionsdauer 7, Dichte 7

äußerst leise *ppp*

fppp

Pause *ppp*

in

27

STATISCHE HOCHSCHULE FÜR MUSIK
11615

Nochklang
1, Dissonanzrelation 6

16

äußerst leise

Hauptcharakteristikum Phase 1:
Nur Cluster, Charaktere am unklarsten

keine Cluster!

7 Hauptnoten *ppp*

(MK 2)
OP 5

Example 4.8 Klavierstück X, p. 6 with Kobler's rhythmic annotations and fingerings

The performer must also consider how to interpret periodic groups of attacks. In certain instances, such as the passage at the top of page 3 (see Example 4.9), the possibility of performing attacks periodically becomes contingent on tempo, echoing the practice of periodic cruxes in *Klavierstück I*. As with the earlier piece, should speed be prioritised, then the resultant aperiodicity will naturally attenuate contrast with neighbouring material, governed here by *accelerandi* and *ritardandi*.²¹² Elsewhere, the performer must decide the extent to which periodic sub-groups should be separated. Henck sees this as an opportunity for creativity, arguing on the basis of Stockhausen's guidance that 'liberty should [...] be taken with the timing, in order to create small caesuras resulting from slightly variable distribution of attack groups under the durations', resulting in a performance that is 'additionally articulated and has a livelier interpretation.'²¹³ The extent of this creativity, recalling Stockhausen's directions to Tudor with respect to the execution of periodic values in crux contexts in the early *Klavierstücke* (see Chapter 2), will, however, be dictated by the nature and quantity of the character material, and the length of the note value by which it is governed. Should periodic groups be disrupted in this way, either deliberately, or as a result of some other aspect of musical priority, be it tempo, projection of suspensions, or precise realisation of clusters, then the salience of the serialised groupings, outlined in Henck's analysis, as well as the salience of the statistical process from disorder to disorder that the groupings enact, will be obscured to a greater or lesser extent. It is also worth noting, that the articulation of groups is contingent on the technical demands of the character in question, and the configuration of its chordal and cluster forms within each base duration, with the

²¹² See also Pace's description of the inevitable compromises in clarity that result from performing this particular passage at speed. Pace, 'Notation', pp. 186–87.

²¹³ Henck, *Klavierstück X*, p. 65.

large clusters of Characters 2 and 1, and the single note groupings of Character 7 posing the fewest obstacles in this respect.

Musical score for the first system of Klavierstück X, p. 3. The score is written for three staves (treble, middle, and bass) and includes performance instructions and dynamic markings.

- Staff 1 (Treble):** Features complex rhythmic patterns with dynamic markings: *mf*, *pp*, *mf*, *fff*, *mf*, and *f/ppp*.
- Staff 2 (Middle):** Contains the *Unterarm* (forearm) part with dynamic markings *p*, *mf*, and *f*.
- Staff 3 (Bass):** Contains the *Hände flach nebeneinander* (hands flat side-by-side) part with dynamic markings *mf*, *mf*, *ff*, and *mf*.
- Performance Instructions:** "Unterarm" and "Hände flach nebeneinander".
- Dynamic Markings:** *mf*, *pp*, *p*, *mf*, *fff*, *f/ppp*, *f*, *ff*, *mf*.
- Rhythmic Diagrams:** Located below the staves, showing pulse patterns with labels like *3.P* and *mf*.

Musical score for the second system of Klavierstück X, p. 3. The score is written for three staves and includes performance instructions and dynamic markings.

- Staff 1 (Treble):** Features complex rhythmic patterns with dynamic markings: *fff*, *ppp*, *fff*, *ppp*, *mf*, *fff*, *ppp*, *fff*, *ppp*, *f*, *fff*, *ppp*.
- Staff 2 (Middle):** Contains the *Arm* (arm) part with dynamic markings *mf*, *fff*, *ppp*, *fff*, *ppp*, *mf*, *fff*, *ppp*, *f*, *fff*, *ppp*.
- Staff 3 (Bass):** Contains the *beidermig* (both hands) part with dynamic markings *fff*, *ppp*, *fff*, *ppp*, *fff*, *ppp*, *mf*, *fff*, *ppp*, *f*, *fff*, *ppp*.
- Performance Instructions:** "Arm" and "beidermig".
- Dynamic Markings:** *fff*, *ppp*, *mf*, *f*.
- Additional Markings:** "möglichst *ppp*" and "s".
- Rhythmic Diagrams:** Located below the staves, showing pulse patterns.

Example 4.9 Klavierstück X, p. 3

Finally, Stockhausen includes the direction that the tempo, and by extension the proportioning of note values, may vary in the ratio 2:3. This could be interpreted as an allowance for the inevitably imprecise proportioning of note values in virtuosic contexts. Yet Henck also cites Stockhausen's strategic practice of lengthening values 'up to double the original value' in order to give certain figurations 'more "room" [and] greater meaning.'²¹⁴ While it is impossible to know for certain whether extension of note values within the recording corpus is strategic, inadvertent, or contingent on the physical demands and technical affordances of the material, their treatment, in addition to the performer's realisation of localised tempo fluctuations and groupings of attacks, will have a significant effect on the internal delineation and complexion of each base duration, with implications for their interpretation as moments, and for the serial aesthetics of the piece as a whole.

4.4 Performance analysis

4.4.1 Trends in global and phase tempo

The global tempi of the pianists are illustrated in ascending order in Figure 4.7 and in chronological order in Figure 4.8. In contrast to the non-correlated tempi of *Klavierstück I* recordings (see Figure 2.2) these albeit limited data highlight a gradual slowing of the piece over time. It is therefore possible to hear Liebner's forty-five-minute version as an extreme culmination of this trend.²¹⁵ For the listener, these varied responses to Stockhausen's 'as fast as possible' tempo indication offer an immediate and striking point of comparison.

²¹⁴ *Ibid.*, p. 66.

²¹⁵ This ignores Pace's recording of *Klavierstück X*, which has not been commercially released, and is therefore not included in my corpus. The tempi of his live performances and his reported 'basic quaver pulse of

Broadly speaking, faster global tempi tend to favour linear readings of the piece, lending greater drama and cohesion to the ‘cosmic explosion’ of Phase 0 and the salience of its relationship with the fragments of Phases 1–7, while slower performances tend to favour non-linear readings. Analysis of tempo variation between phases adds depth to this distinction. Rzewski, for example, performs Phase 0 at a considerably higher average tempo than subsequent phases, as illustrated in Figure 4.9. Conversely, Tudor progressively increases his average tempo, with Phase 7 the fastest of all, as illustrated in Figure 4.10. Despite exhibiting a slower global tempo than Tudor ($\text{♩} = 91$ compared with $\text{♩} = 102$), Rzewski’s performance may thus be *perceived* as faster, due to the extreme intensity of his performance of the non-fragmentary materials of Phase 0, thereby affecting a greater sense of formal teleology. Tudor’s gradual acceleration, meanwhile, in combination with the marginally slower tempo he adopts for Phase 0, weakens the latent teleology of the piece, with precise, detailed execution of virtuosic material in the earlier phases, giving way to a more matter-of-fact execution of the simpler affordances of material in the later phases: rather than progressively dissipating, the energy ‘released’ from the opening is thus galvanised as the piece reaches its conclusion, bringing to mind Tudor’s similar treatment of tempo in his recording Klavierstück VII, and its analogous formal impact.

somewhere between 96 and 120’ do not conform to this trend, marking a return to the rapid tempi of the early tradition. Pace, ‘Notation’, p. 188.

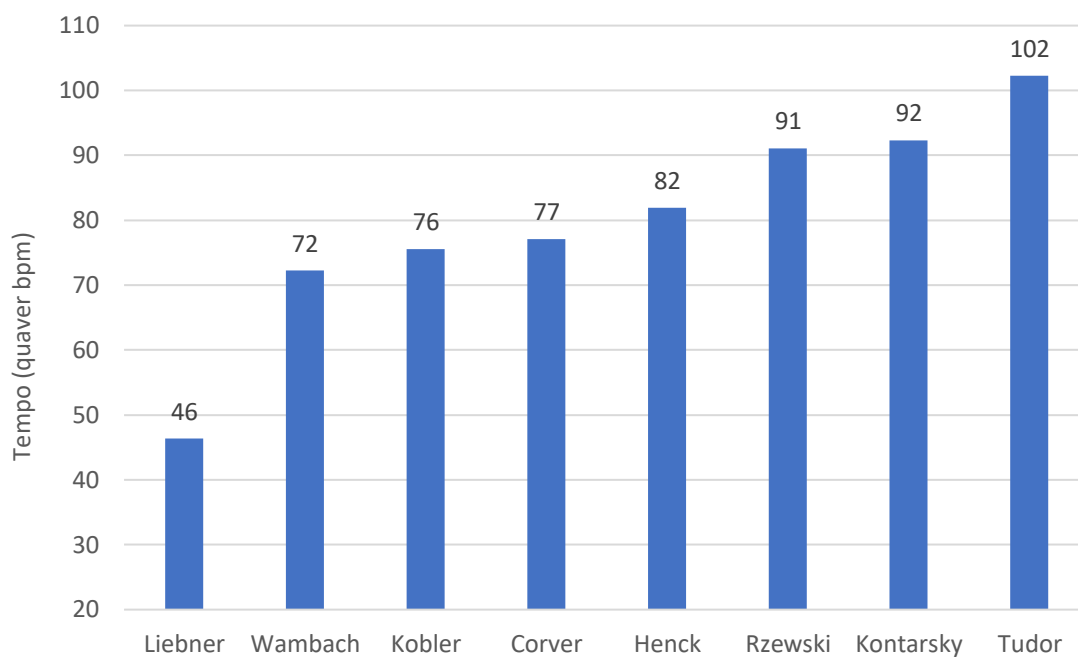


Figure 4.7 Global tempo comparison in ascending order

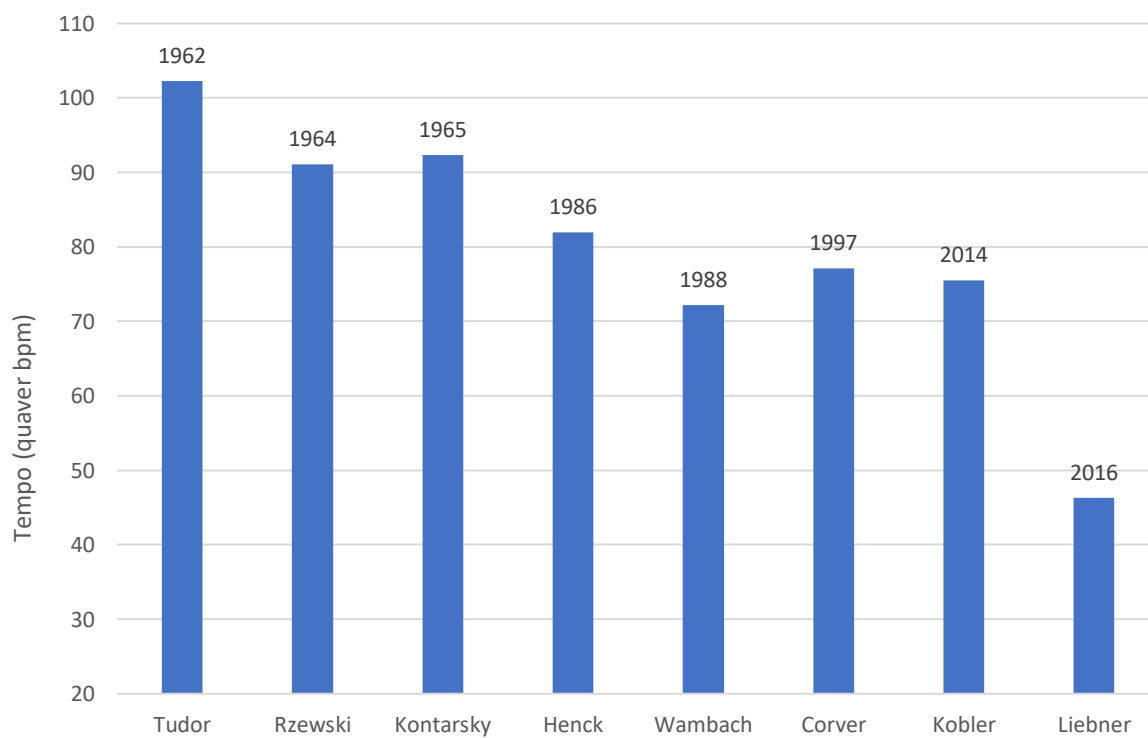


Figure 4.8 Global tempo comparison in chronological order

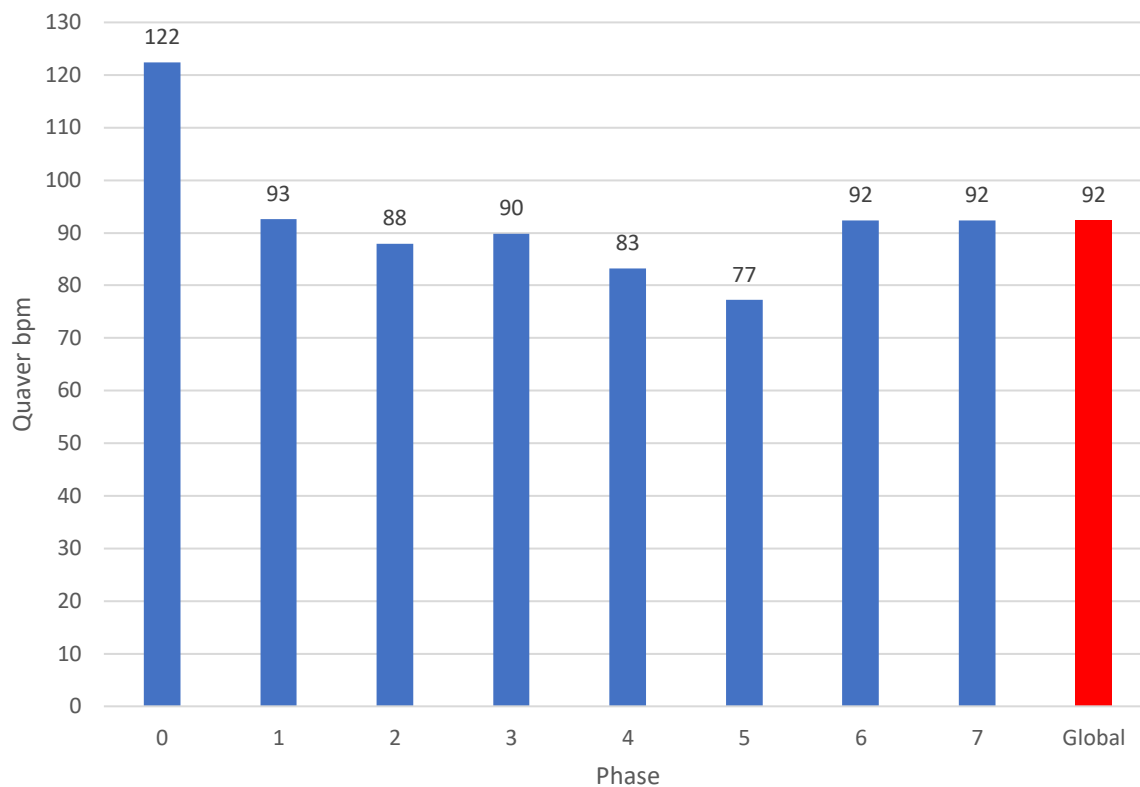


Figure 4.9 Rzewski tempo variation between phases

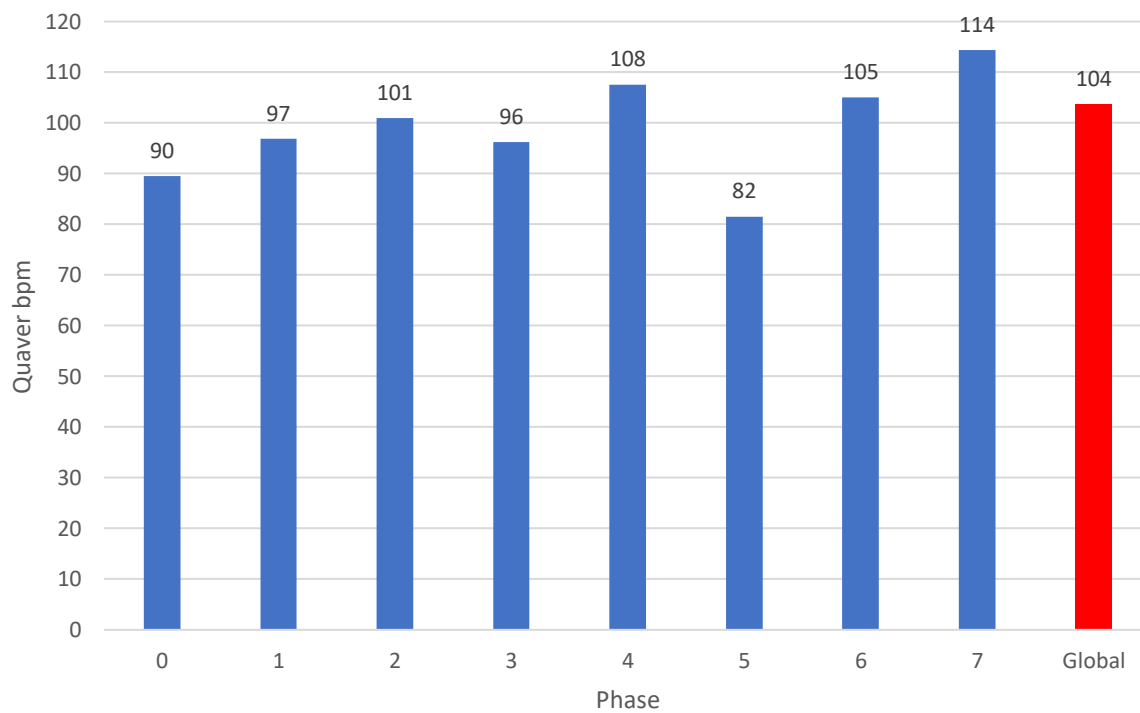


Figure 4.10 Tudor tempo variation between phases

In terms of slower performances, Kobler is the most consistent, as illustrated in Figure 4.11, recalling his attention to tempo consistency in Klavierstück VII. By contrast, analysis of Liebner's recording shows a gradual increase and decrease in tempo, with Phase 4 almost twice the speed of Phases 0, as illustrated in Figure 4.12. In practice, however, these latter trends are difficult to perceive. This is particularly true in Liebner's case, where the massive extension of temporal proportions obscures any possible sense of linear tempo relationships between phases. This serves to illustrate the conditional applicability of global tempo data for meaningful analysis, and the contingency of sectional tempo perception on global tempo. As the subsequent case studies and final stages of empirical analysis will illustrate, localised tempo consistency will have a far greater impact on the aesthetics and formal characteristics of the piece.

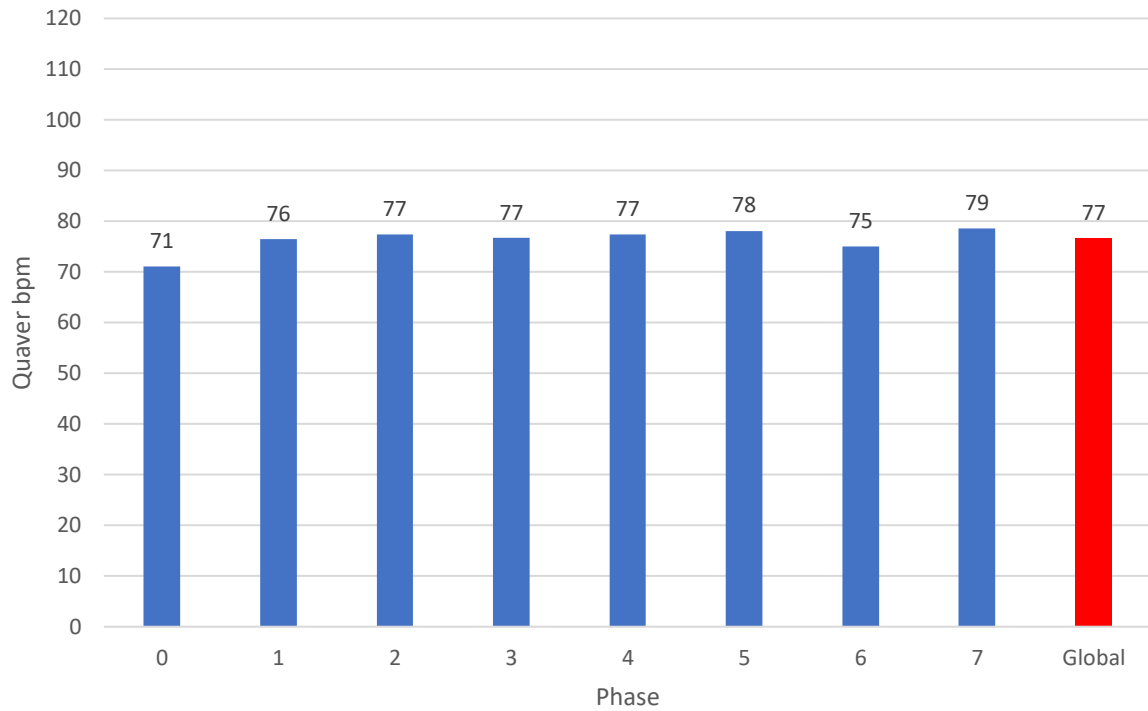


Figure 4.11 Kobler tempo variation between phases

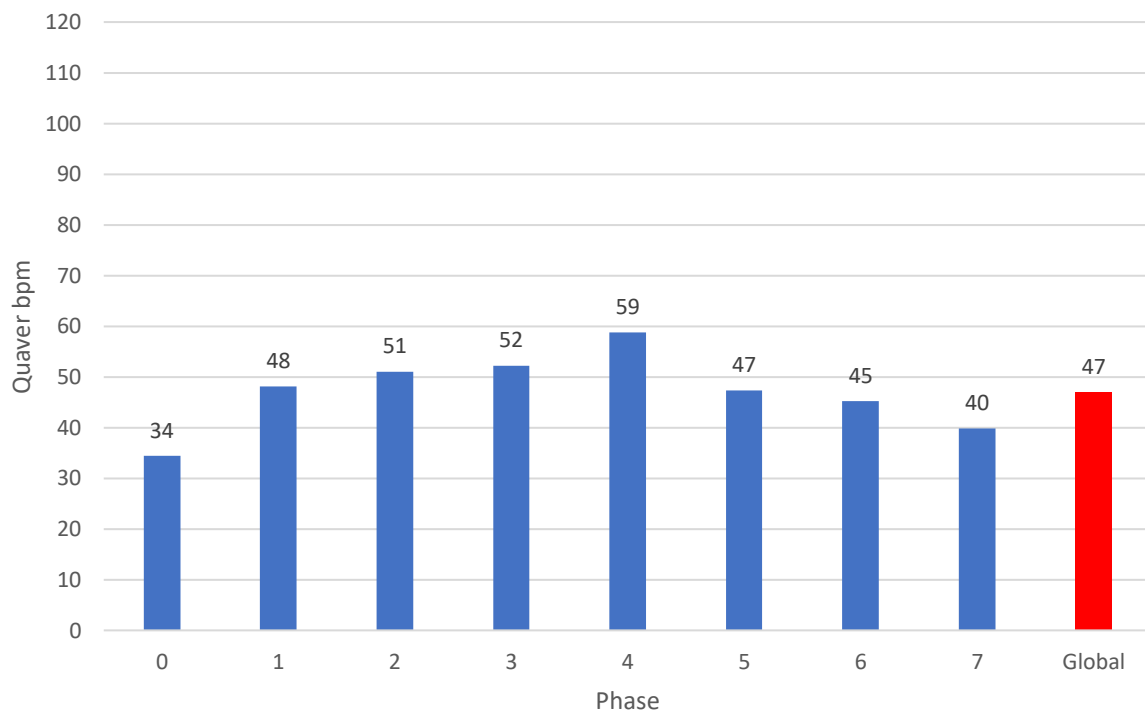


Figure 4.12 Liebner tempo variation between phases

4.4.2 Qualitative analysis case studies

4.4.2.1 Character 7

Rzewski's performance of the opening Character 7 base duration of Phase 0 is notable for its extreme speed (see Example 2.1).²¹⁶ Together with his attenuation of dynamic contrasts—clear *mezzo-forte* execution of the first emphasised principal attack being a notable exception—this gives rise to a homogenous aesthetic, with fleeting rhythmic and textural nuances affecting a propulsive bubbling, redolent of the science-fiction sound-worlds of computer communication. Kontarsky, on the other hand, is more varied in his touch and articulation (hear for example his non-legato execution of the concluding gesture of the second note value, and his *quasi-sforzando staccato* execution of the emphasised D# principal attack of the seventh note value). These instances are brought into greater relief by his less regular and fluent elision of subordinate and principal attacks, affecting a comparatively heterogenous overall aesthetic. Corver's recording, meanwhile, exhibits a clear sense of line, engendered by her flexible use of rubato, attenuation of dynamic contrasts, lyrical execution of subordinate attacks, and subtle projection of emphasised principal attacks. While quite different, all three performances convey the impression of a singular moment, characterised in Rzewski's case by aesthetic homogeneity, in Kontarsky's case by aesthetic heterogeneity, and in Corver's case by a prevailing lyricism.

²¹⁶ References to this case study should be made from the start of the recordings. Subsequent references will be accompanied by time stamps, corresponding to the start of the passage in question.

Tudor is more forthright in his projection of emphasised principal attacks, with groups of subordinate attacks played in flowing glissandi, possibly aided by use of damper pedal (the resonance captured in the live recording may also be attributed to the acoustics of the concert hall). This imbues the passage with a similar sense of dynamism to that heard in Corver's recording. Unlike Corver, however, Tudor lingers over the gesture governed by the third note value of the piece, marking the introduction of the major-second cluster form of Character 7 with a distinct shift in mood, thus drawing attention to the delineation of a partial moment, as discussed in my foregoing score analysis. Henck's performance, meanwhile, is striking for its exploitation of the rhythmic variety afforded by the various *accelerandi* and *ritardandi*, and the non-metric status of subordinate attacks. These are typically directed towards principal attacks in sweeping glissandi, accompanied by subtle *crescendi*, thereby establishing a sense of higher-order melodic emphasis, while attenuating the effect of *subito* punctuation heard in Tudor's recording. The *accelerandi* and *ritardandi* governing non-emphasised principal attacks are also exaggerated, affecting a prevailing rhythmic irregularity and sense of improvisation, which is further supported by his varied approach to touch and articulation. This contributes to a weaker sense of through line than that heard in Tudor or Corver's recordings. Henck also introduces structural breaks, lingering, like Tudor, on the gesture governed by the third note value, and pausing briefly prior to the recommencement of single note principal attacks at the beginning of the second system, thus delineating three partial moments.

Liebner's iconoclastic recording merits special attention. Her playing in this passage, and throughout the piece, is characterised by consistently irregular groupings, stark dynamic contrasts, and an occasional lack of pitch definition (hear for example her incomplete rendering of the four-note gesture that follows the opening attack). Her approach to localised

tempo variation is particularly striking, far exceeding the aperiodicity heard in Kontarsky and Henck's recordings, with groups of subordinate attacks typically broken into further un-notated sub-groups. This may be informed by the implied division of pitches between the hands, such as the arrangement of subordinate attacks between the E and D# emphasised principal attacks of the second note value, accompanied in this instance by a specific fingering. While most would read this as a pianistic arrangement without rhythmic implications, Liebner treats this and other such instances as intermediary stopping places, affecting a further fragmentation of the musical material. Perception of this passage as either a singular moment or as a series of partial moments is thus precluded.

4.4.2.2 Characters 6 and 5

Rzewski's performance of the base duration of Character 6 and its interpolation with Character 5 in Phase 2 (see Example 4.10) is notable once more for its extreme tempo (5'02"). As a corollary, this and other similar passages are performed louder than notated, with little distinction between dynamic levels, and little salience of polyphonic lines; his tempo also makes it difficult to distinguish between the closely related Character 6 and Character 5 clusters. This gives rise to an impressionistic aesthetic, foregrounding the physicality and technical mastery of the performer while theatrically exaggerating the irruptive quality of the passage in the context of the surrounding silence. As with the opening, and indeed the majority of base durations in Rzewski's performance, the passage thus coheres as a single static moment.

The image shows a musical score for Klavierstück X, p. 10. It consists of three staves: a treble clef staff at the top, a middle treble clef staff, and a bass clef staff at the bottom. The score is divided into four measures by vertical dashed lines. Above the first measure, there are two groups of notes with dynamic markings *mf* and *pppp*. Above the second measure, there are two groups of notes with dynamic markings *mf* and *pppp*. Above the third measure, there are two groups of notes with dynamic markings *mf/ppp* and *pp*. Above the fourth measure, there are two groups of notes with dynamic markings *mf/ppp* and *pp*. Below the first measure, there is a dynamic marking *pp*. Below the second measure, there is a dynamic marking *ppp*. Below the third measure, there is a dynamic marking *mf/ppp*. Below the fourth measure, there is a dynamic marking *pp*. At the bottom left, there is a performance instruction: "dicke Noten *p* (wenn nicht *mf*)".

Example 4.10 Klavierstück X, p. 10; Character 6 interpolated with Character 5 in Phase 2

This base duration is played at variously slower tempi by the other pianists, allowing for clearer perception and projection of its internal details. Tudor, for example, clearly observes dynamic contrasts, with *subito* differentiation of *mezzo-forte* and *pianissimo* attacks echoing his practice with respect to principal attacks and emphasised principal attacks in the opening case study (5'41''). Internal groupings and polyphonic lines are also clearly discernible in his performance. The passage as a moment thus gains a sense of dividual structure. Henck, meanwhile, places a strong emphasis on the high C#–F# and the low C#–B \flat clusters that demarcate the first grouping of the fourth note value (6'09''), affecting a sense of phrase arching, which in turn lends more drama to the unexpected vigour of the upwards glissando of the final note value. Together, this imbues the moment with a sense of linearity and formal process. Wambach, meanwhile, takes an alternative approach by separating the opening

glissandi, in line with Stockhausen's notated *staccato*, marking a change from the phrasing of earlier recordings (7'20"). His clear dynamic contrasts also foreground the difference in characters, with occasionally abrupt *staccato* attacks drawing attention to underlying suspensions (hear in particular how the B \flat of the fourth note value is brought into relief by his crisp release of the underlying cluster). In combination with his slower average tempo, this affects an even greater sense of dividual structure than that heard in Tudor's recording.

Kobler exhibits some similar traits, including a consistently clear enunciation of clusters (7'30"). Elsewhere, his measured execution of the final three-chord group—corresponding to a reduced density of attacks in relation to the double-dotted-quaver note value—provides the moment with a clear sense of formal closure. His extremely light, almost imperceptible performance of cluster glissandi, executed by the performer with the aid of fingerless gloves, is also notable, reflecting Stockhausen's directions in the general foreword that 'glissandi may be played so rapidly that not all of the keys actually speak; they should always be played one degree softer, so that they do not become more important than chords or single notes.'²¹⁷ Corver's glissandi, meanwhile, are considerably more prominent, as evidenced by her elision of the opening 'down-up' gestures—in maximum contrast to Wambach's approach—and her clear enunciation of the downwards glissando that begins the fourth note value (7'10"). This secondary attribute, shared by Characters 6 and 5, thus takes centre stage in demarcating the dividual structure of the passage.

In contrast to Corver's refined articulation, Liebner plays the opening glissandi in vigorous *forte* swipes (13'27"). This sets up a clear contrast with the ensuing *pianissimo* material, which is brought into greater relief by her slow tempo. Indeed, this is the only

²¹⁷ Karlheinz Stockhausen, 'General Foreword', *Klavierstück X*.

recording of this passage in which all pitches, attacks, and cluster types can be parsed in audition. However, her slow tempo also draws attention to the persistently irregular rhythmic execution of the notated groupings, as exemplified by her uneven performance of the four attacks of the third and fourth groups of the fourth note value (the suspension of the upper major second cluster, which might otherwise have been projected at this speed, is also omitted), thereby avoiding exposition of the serial surface. While certain character attributes are clearly defined, her inconsistent and unpredictable approach to rhythmic execution thus weakens the coherence of the passage as a singular moment.

4.4.2.3 Character 4

All of the pianists observe the *langsamer* marking over the final five-cluster group of the virtuosic base duration of Character 4 and its weak interpolation with Character 6 at the end of Phase 1 (see Example 4.6) to a greater or lesser extent, save Tudor and Rzewski (5'01"; 4'20"). This suggests that the latter may have been working with manuscript copies, which did not yet include this direction (or that both were inclined to ignore it). Regardless, their interpretations lack the sense of formal closure afforded by this slowing. By contrast, the measured regularity of the final isolated clusters in Wambach's and Kobler's recordings draw the greatest attention to the structural shift away from cluster groups (Wambach, 6'26"; Kobler, 6'38"). Kobler also exhibits a reduction of tempo for the groups governed by the final semibreve note value—corresponding once more to a reduction in attack density—which fosters a progressive sense of formal closure by anticipating the yet slower execution of the final attacks.

Performances of the passage as a whole are characterised by speed of execution, cohesion and separation of groupings, and melodic clarity. Rzewski, Tudor, Henck (5'22''), Corver (6'19''), and Kobler, for example, all play rapidly, with clearly defined groupings, which, while separated from one another to greater or lesser extents, are uniformly directed towards the emphasised principal clusters. The transparency and upper voicing of the clusters in Corver's recording is particularly striking, suggesting use of the 'interlacing technique', and minimal use of the damper pedal. This gives rise to a distinctive melodic clarity (hear in particular her clear execution of the upper C# of the five-attack group that follows the opening cluster), lending the passage a similar sense of line and process to that witnessed in her performance of the opening case study.

Kontarsky, Wambach, and Liebner (12'14'') are all less consistent, exhibiting greater contrasts in rhythmic execution, dynamics, and articulation. Wambach, for example, tends to delay his arrival at the final chord of each group, perhaps reflecting his technical management of the alternating clusters, either via the 'perpendicular palm technique' or the 'rocking palms technique' (see Figures 4.2 and 4.3). In combination with his expansive separation of groups, and diverse approach to articulation, this lends the passage an impulsive character, attenuating its inherent linearity. Liebner, meanwhile, tends to play Character 4 base durations at more orthodox tempi, with an increased sense of cohesion, possibly influenced by the relative textural simplicity of such passages, as well as the technical demands of the major-ninth cluster groups, with the means of execution outlined above naturally supporting fluent execution.

As a whole, the passage lends itself to interpretation as a singular moment, with a clear sense of dividual structure, dictated by the block-like arrangement of the Character 4

clusters, and the similarly block-like integration of the non-contiguous Character 6 clusters, conditioned by varying degrees of coherence, linearity, and formal closure on the part of the performer.

4.4.2.4 Character 3

Tudor and Rzewski once more play through the final note value of the extended base duration of Character 3 in Phase 3 (see Example 4.7) with no reduction in tempo (Tudor, 8'09"; Rzewski, 7'53"). By omitting this expressive signifier, they once more deny the passage a sense of formal closure, though in this instance, the inherent change to chordal attacks preserves some sense of structural transition. By contrast, Corver exhibits a pronounced *ritardando*, drawing out the 'caesura-fermatas' between the final groups in a progressive dissipation of the frantic energy of the previous groups (Corver, 10'20"). In combination with her dynamic distinction of material in the introductory Character 6 base duration, this imbues the passage as a whole with a sense of tripartite structure and formal closure, in maximum contrast to Rzewski and Tudor's holistic interpretations.

Rzewski's performance is otherwise quite different to that of Tudor, with a consistent *fortissimo* maintained throughout, at odds with the prevailing *mezzo-forte* direction. This enables extremely rapid, periodic execution of groups, recalling Rzewski's execution of cluster groups in the Character 4 base durations of the preceding phases. This affinity is further strengthened by his avoidance of Character 3 cluster arpeggiations, and the overall consistency of his playing, suggesting exclusive use of the 'forearm technique' (see Figure 4.5). This 'levelling out' of character attributes gives rise to a wider range of associations across

base durations, enhancing the global coherence and linear thrust of the performance, while limiting the inherent diversity of musical materials.

Wambach and Kobler exhibit a similarly lucid articulation of groups (10'41"; 10'44"). This is achieved at a much slower tempo in Kobler's recording, allowing for a true *mezzo forte*, and an unrivalled execution of spreads (hear in particular the upper attacks of the group beginning the final note value of the first system). This draws greater attention to the serial ordering of the Character 3 groups and the distinct characterisation of musical materials, contributing in turn to the dividual structure of the passage. Tudor, Kontarsky, and Henck, meanwhile, perform the groups less periodically, suggesting use of a combination of the cluster performance techniques outlined above (Kontarsky, 8'21"; Henck, 9'18"). Combined with high tempi and varied approaches to touch, articulation, and dynamics, this lends their performances of the passage a somewhat chaotic aspect, affecting a corresponding reduction in structural clarity. By contrast, Corver exhibits a high level of continuity, with little separation between groupings. Together with her consistent *mezzo-forte* execution, this imbues the passage with a sense of linear process.

Finally, Liebner's interpretation is noteworthy for its dynamic distinction of cluster and chordal material, with the former played in jagged *forte* bursts and the latter in measured *piano* groups, thus drawing attention to the two aspects of the character (18'21"). While drawing attention to certain technical shortcomings, her tempo and separation of groups also allows for clear perception of suspensions: an underlying linear feature that becomes imperceptible or impossible to articulate at higher tempi.

4.4.2.5 Characters 2 and 1

Stockhausen indicates that for groups of Character 2 clusters ‘the underarms can be quickly alternated rather than playing together’, though ‘the number of attacks should remain as notated.’²¹⁸ Within the recording tradition, all pianists up to and including Henck use this technique, while all pianists from Wambach onwards use the double forearm technique, suggesting a possible change in taste from the composer, who supervised all of the performers save Liebner. This phenomenon is illustrated in the base durations of Characters 5, 2, 3, and 1 that appear in quick succession in Phase 2 (see Example 4.5).

Cluster alternations cannot be clearly discerned in Tudor’s performance of this particular case study, due to the rapidity of his execution and the quality of the live audio recording. They can, however, be clearly perceived in Rzewski’s performance, where they lend greater coherence to each group of attacks (Rzewski, 5’17’’; Tudor, 5’59’’). As with his treatment of Character 3 and Character 4 clusters, these groups are performed in loud, rapid bursts—corresponding accurately here to the prescribed *fortissimo* marking—thus contributing to a further reduction in material diversity across the piece. The alternation of Character 2 clusters is significantly clearer in Henck and Kontarsky’s recordings, which also feature alternation of Character 1 clusters in the final base duration (Henck, 6’27’’; Kontarsky, 5’57’’). This naturally softens the difference in character attributes, thereby weakening the distinction of the Character 1 base duration as a new moment. Overall, the acoustic dominance of the alternating cluster technique, and its strong interpolation within the

²¹⁸ Stockhausen, *Klavierstück X*, p. 4. ‘An solchen Stellen können die Unterarme kurz nacheinander statt gleichzeitig anschlagen. Die Zahl der Anschläge bleibt jedoch wie vorgeschrieben’.

Character 5 base duration creates what could be heard as a moment group, which in Kontarsky and Henck's case, extends to the Character 1 base duration.

As noted, Wambach is the first to play Character 2 clusters without alternations (7'41''); in combination with his significantly slower tempo, this gives rise to an increased sense of line, culminating in the directed *crescendi* of his Character 1 groups. Elsewhere, Corver plays the opening Character 1 groups significantly louder than their notated *pianissimo* and with minimal pedal. This establishes a sense of continuity with the preceding material, weakening the distinction of the Character 1 base duration as a new moment through voicing and a levelling out of dynamic attributes, as opposed to the levelling out of attack types witnessed in Kontarsky and Henck's recordings. Kobler, meanwhile, emphasises this latent separation, via full clearance of the pedal, clipped articulation of the final Character 3 cluster, and controlled *subito-pianissimo* articulation of the opening Character 1 clusters. He thus foregrounds the inherent diversity of the materials, while offering the clearest delineation of the base durations as distinct moments.

4.4.3 Summary

Most of the recordings of Klavierstück X exhibit a consistent sense of style, and a consistent approach to the interpretation and prioritisation of musical details, reflecting traits observed in the same performers' recordings of Klavierstücke I and VII.

Corver, for example, displays a familiar lyrical sensibility, more suited to the melodic configurations of Klavierstück X than to the disparate distribution of pitches in Klavierstück I or the isolated tones of Klavierstück VII. This is particularly evident in her treatment of

Character 7, though also apparent in her voicing of larger clusters, and general approach to phrasing. Together, this brings a sense of through line to many of the base durations, even those in which static elements may appear to dominate, contributing in turn to the forward momentum and broader aesthetic coherence of the form.

Tudor, Kontarsky, Wambach, and Henck, meanwhile, each exhibit highly personalised approaches to musical details. While less stylistically consistent than Corver, their performances all emphasise the piece's inherent diversity of materials, with parallels to the analytical styles of performance identified in recordings of *Klavierstück I*. In this sense, Tudor's playing is more controlled and less experimental than that witnessed in his recordings of the earlier *Klavierstücke*, despite his high global tempo. There is also a greater tendency, in Tudor, Wambach, and Henck's recordings in particular, to project latent divisions within base durations, giving rise to what might be termed partial moments, whose nuanced characterisations lend the broader mosaic of the piece a more multifaceted complexion. This is equally true in Kobler's more literalist interpretation, which shows an even greater sensitivity to the delineation of base durations, through close attention to shifts in attack density. His attention to detail and precise character distinctions also offer the clearest projection of the piece's underlying teleological processes, including the structural significance of the diminishing Character 4 base durations and the progressive 'purification of characters', explicated in Henck's analysis.

The complexion of individual base durations is significantly less varied in Rzewski's recording, which could be viewed as experimental in its relentless prioritisation of speed. This is partly a matter of performance practice, and partly a matter of perception. On the one hand, thinking in terms of moment form, Rzewski's levelling out of dynamic contrasts

weakens inter- and intra-moment distinctions. Yet in other areas his playing is remarkably precise and detailed. This is particular evident when the recording is slowed down. At speed, however, his 'moments' become overwhelmingly individual rather than dividual, weakening the global impression of statistical equilibrium and process heard in some of the other recordings. While thrilling, his interpretation thus detracts from the serial aesthetic and moment formal properties of the piece, lending greatest support to the programmatic readings of Pace and Henck.

In Liebner's recording, neither the teleology, nor the serial aesthetic, nor the non-linear coherence of moment form emerge. This results in what Evan Johnson has called 'an absolute subversion of the entire motivating idea of the piece's fundamental material,' whereby 'Stockhausen's entire structural, notational, and expressive thesis is ignored.'²¹⁹ As he observes, it is not her slow tempo per se that leads to this situation. Indeed, Liebner's Wergo label-mate Henck reports that Stockhausen had conceived of versions of *Klavierstück X* that could last forty-five minutes or even an hour, suggesting a possible source of inspiration for her interpretation.²²⁰ The possibility of a slow performance of *Klavierstück X* that abides by the 'motivating idea of the piece's fundamental material' thus remains. I return to this possibility, and its implications for the aesthetic, formal, and ontological dimensions of the piece at the end of the chapter. It is first necessary to consider what may be revealed, and what means of creation enabled, by empirical analysis of the score's rhythmic proportions in performance.

²¹⁹ Evan Johnson, 'Karlheinz Stockhausen: Klavierstücke I–XI. Sabine Liebner. Wergo 73412', *Tempo*, 73 (2019), 101–2 (p. 102).

²²⁰ Henck, *Klavierstück X*, p. 46.

4.5 Augmented listening

4.5.1 Version A

As with my experimental versions of Klavierstück I, I recorded three takes of my initial version of Klavierstück X (henceforth Version A) in the same recording session. Take 2 is presented in Video Recording 4.2; audio recordings of Takes 1 and 3 are included in Audio Appendices 4.1 and 4.2.²²¹ In preparing Version A, I took a broadly literalist approach to the notation, prioritising dynamic distinctions, maintaining and projecting suspensions, and consistently emphasising principal attacks. I typically prioritised ambitus over pitch content when performing clusters, seeking to establish melodic connections and preserve textural clarity where possible. I also opted to use the alternating technique for Character 2 clusters, which I found to be more ergonomic and dramatic, and the interlacing technique for Character 4 clusters in the majority of cases. As a rule, I aimed to project Stockhausen's serialised arrangement of groups via periodic execution and clear separation; there were, however, instances where clarity of grouping was overridden by concerns for tempo consistency and textural accuracy.

Following the stages of preparation outlined in my foregoing analysis of the temporal affordances of the notation, I reached a base tempo of $\text{♩} = 75$, roughly (and coincidentally) equivalent to that of Kobler. As Figure 4.13 illustrates for Take 2, this was quite precisely realised in my performances, with some variation across phases, including a notable reduction in speed for the challenging Phase 0 and the expansive Phase 7.

²²¹ Takes 1 and 3 both included small memory slips, which were factored into my data analysis.

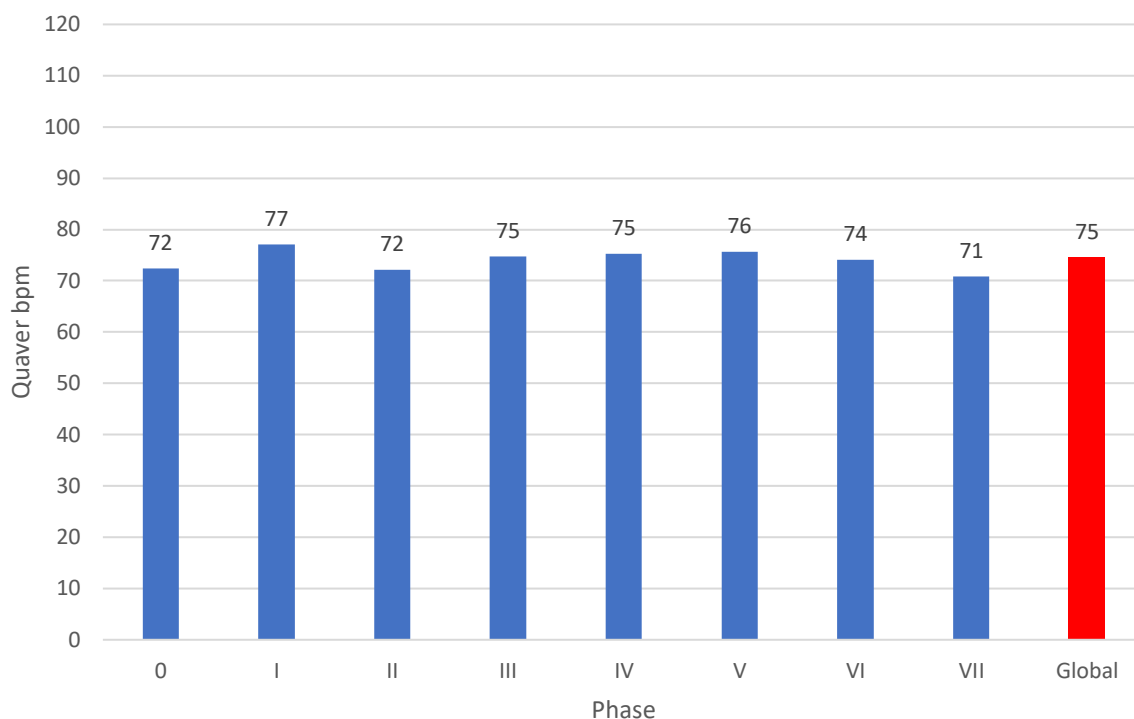


Figure 4.13 Version A Take 2 tempo variation between phases

4.5.2 Empirical analysis of note value proportions

As noted, Stockhausen occasionally encouraged extension of durational values beyond the 2:3 limitation prescribed in the general foreword. ‘This should not be some sort of carte blanche for rhythmical carelessness,’ Henck cautions, but ‘one should [...] consider where a slight stretching of the proportions would benefit the musical understanding and disclose something that others have overlooked or that appears less important to others’, concluding that ‘interpretation begins here, not with listening to records.’²²² This may be officially sanctioned practice; what Henck fails to consider, however, are the disclosures made possible

²²² Henck, *Klavierstück X*, p. 66.

by the reverse process, that is, by refinement of metric precision, and by close analysis of existing recordings, including one's own.

In my case, this process began with determination of IOIs for all note values using Sonic Visualiser.²²³ I then calculated theoretical tempo limits for each performer, 1.5 times lower and 1.5 times higher than their base tempo (i.e., in the ratio 2:3); a base tempo of ♩ = 75 would thus give a lower limit of ♩ = 50 and an upper limit of ♩ = 112.5. These limits were calculated for each phase, thereby allowing for global tempo fluctuation as an expressive strategy, while maintaining focus on proportional distortion of note values within individual base durations. I then tabulated the data, highlighting values that fell below each performer's lower limit in yellow and those that rose above their upper limit in red.

This led to some valuable insights. First, the data confirmed the high level of metric deviation that I had observed in the recordings, as well as unplanned deviation in my own recordings (unlike Henck, I had striven for durational precision throughout). It also confirmed the relative precision of certain performers over others, with Kobler's recording featuring the least transgressions. Comparison of individual data points also revealed the presence of consistently misrepresented values. In most cases, these were lower limit transgressions, signalling instances where the majority of performers slow down. This could be the result of either a technical crux, calling for a greater timespan in which to complete the notated action;

²²³ A full overview of data for Kobler's recording is provided as evidence in Appendix C. Data points that were consistently hard or impossible to perceive due to unclear durational cut-offs or a lack of textural clarity were omitted; these are highlighted in red, with no timing recorded, and the necessary adjustments to phase duration accounted for. A number of other data points were difficult to discern in certain recordings, either because of the quality of the recording, the imprecision of the performer, the inaudible onset of half- or full-pedalling, or the omission of material; these are highlighted in yellow, and factored into data processing for the relevant performers. These omissions had no effect on global tempo or phase tempo calculations. All note values accompanied by superordinate tempo directions, such as *langsamer* and *sehr verlangsamten*, or fermatas, were factored out of tempo calculations.

deliberate projection of a musical feature; or more encultured aspects of expressive interpretation, such as slowing to signify a point of perceived formal closure. Upper limit transgressions were far less common, suggesting either miscalculation, carelessness, or instances where the notation or the musical context somehow prompts an increase in speed. These factors are naturally contingent on the length of the individual note values, and the quantity and quality of the materials they govern, as illustrated by the following case studies.

4.5.3 Empirical analysis case studies

Table 4.3 presents tempo data for note values in the Character 7 case study (see Example 4.1). My performance of this passage in Take 2 is included in Video Recording 4.3. As the data show, there is an almost universal tendency to rush values four and five, lasting a crotchet and a semiquaver, and a dotted quaver respectively (this is particularly pronounced in Henck's recording). Only Kobler performs value four within his upper limit, and only Rzewski and I (in take 1) perform value five within our upper limits, with variation across my three takes betraying an unconscious lack of metric consistency. As noted in the foregoing analysis, the third value marks a stylistic shift in Character 7, with the onset of its major second cluster form in a series of alternating groups. It seems that performers instinctively mark this transition with an increase in energy, thereby projecting the latent delineation of a partial moment. The data also illustrate Tudor's rhetorical lingering on the third value, and Liebner's iconoclastic extension of values three and five.

Pianist	Phase 0 tempo			Page 1 note values							
	Average	Min	Max	1	2	3	4	5	6	7	8
Tudor	90	60	134	142	143	89	165	172	95	120	110
Rzewski	122	82	184	137	170	131	250	137	118	137	130
Kontarsky	100	66	149	81	124	223	250	169	93	127	110
Henck	92	61	138	120	92	93	246	306	78	154	80
Wambach	73	49	109	102	92	131	173	157	70	91	60
Corver	77	51	116	76	83	114	132	143	70	98	58
Kobler	71	47	107	73	76	114	103	127	78	78	75
Liebner	34	23	52	56	49	23	60	23	40	45	48
Version A Take 1	73	49	110	78	79	83	161	103	63	82	62
Version A Take 2	72	48	109	81	75	88	160	115	59	80	58
Version A Take 3	74	50	111	78	79	88	150	128	63	81	61

Table 4.3 Character 7 case study: note value tempi

Table 4.4 presents tempo data for note values in the Characters 6 and 5 case study (see Example 4.10). My performance of this passage in Take 2 is included in Video Recording 4.4. As the data show, I was the only performer to play the third value above my minimum tempo, with my performance in Take 3 the fastest on record by a small margin ($\text{♩} = 57$ compared with Kontarsky's $\text{♩} = 56$). This tendency to slow down for the brief third value coincides with a challenging leap from a Character 5 cluster to a Character 6 cluster in the right hand, accompanied by a precise cluster glissando in the left hand. This suggests the presence of a technical crux.

Pianist	Phase 2 tempo			Page 10 note values					
	Average	Min	Max	1	2	3	4	5	6
Tudor	101	68	152	61	73	33	49	147	91
Rzewski	88	59	132	252	80	35	99	125	118
Kontarsky	94	63	141	81	85	56	68	151	112
Henck	80	53	119	54	88	49	54	115	110
Wambach	75	50	112	45	52	29	39	60	112
Corver	79	53	119	105	73	51	61	92	94
Kobler	78	52	116	87	70	46	63	110	58
Liebner	51	34	77	56	32	16	17	57	45
Version A Take 1	74	49	111	56	65	52	40	78	75
Version A Take 2	72	48	108	59	60	52	35	78	71
Version A Take 3	72	48	109	55	63	57	41	83	74

Table 4.4 Characters 6 and 5 case study: note value tempi

To achieve the rhythmic proportioning of the third value in my performance, I made an anticipatory movement of my body from left to right, thereby arriving decisively on the upper cluster. As a corollary, I was relatively slow to set off on the subsequent downwards glissando. In combination with my efforts to accurately reproduce each cluster's full chromatic pitch content, and to manage the underlying suspensions via use of the *sostenuto* pedal and redistribution of material between the hands, this led to significantly slower execution of the fourth value, in contrast to most other performers. Precise rhythmic proportioning of the third value thus affected the rhythmic proportioning of the fourth. My complicated technical management of the material governed by the fourth value also made it unreliable, resulting more often than not in an ironic loss of pitch definition, dynamic control, and textural clarity (this can be witnessed in Video Recording 4.4). As noted in the foregoing analysis, at Rzewski's tempo ($\text{♩} = 99$), more than double that recorded for the fourth value in my performances, these details become as difficult to perceive as they are to realise.

If the gesture governed by the third value of the preceding case study constitutes a singular crux, then the diverse materials governed by the sequence of twenty-two values that span the second system of page 3 constitute a 'crux passage' (see Example 4.9). This is confirmed by the number of times that tempi for constituent values fall below each performer's lower limits in the recording corpus (see Table 4.5). This suggests that rhythmic execution in this passage is overwhelmingly dictated by the physical distribution of the materials and the unprecedentedly dense interpolation of chords, clusters, and cluster glissandi, rather than the prescribed proportions of the over-durations, recalling the physically mediated gestural interpretation of disparate materials in the cruxes of *Klavierstück I*. This holds true for my takes of Version A, which, while more consistent than some of the recordings, exhibit a high level of inconsistency, in spite of many hours of variable speed practice with the metronome (see Video Recording 4.5 for my performance of this passage in Take 2). The passage thus comes across as a variously nuanced, static moment, characterised by an overabundance of musical information. The characterisation and statistical quality of this and any other of the piece's component base durations, may, however, be affected by trial-and-error refinement of the discrepancies revealed by the data.

Pianist	Phase 0 tempo			Page 3, second system, note values																					
	Average	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Tudor	90	60	134	258	129	118	109	78	-	-	41	60	56	50	53	96	81	48	92	63	66	47	160	72	67
Rzewski	122	82	184	133	133	157	73	58	51	66	97	115	210	60	78	70	143	86	85	69	104	63	70	84	47
Kontarsky	100	66	149	148	118	141	40	91	36	64	71	95	164	52	39	67	112	73	82	47	65	55	84	96	72
Henck	92	61	138	80	143	115	37	53	41	54	67	103	76	39	43	59	115	67	64	34	73	57	70	84	56
Wambach	73	49	109	68	108	144	25	34	55	78	82	99	46	26	17	48	99	51	76	35	43	61	66	68	25
Corver	77	51	116	70	48	105	39	76	53	46	74	79	76	47	39	62	91	60	84	48	69	44	109	69	45
Kobler	71	47	107	88	77	102	85	78	79	64	94	72	85	66	35	63	92	76	83	61	70	62	77	74	40
Liebner	34	23	52	49	30	35		16	19	42	15	26	35	15	21	27	36	33	31	19	23	16	53	34	20
Version A Take 1	73	49	110	70	64	80	60	68	47	49	63	85	72	50	38	54	85	63	54	40	70	45	92	61	24
Version A Take 2	72	48	109	78	59	110	65	69	40	39	60	81	69	51	46	52	89	74	58	39	71	46	78	56	25
Version A Take 3	74	50	111	64	70	88	78	62	40	52	57	79	68	47	54	51	90	73	57	41	80	42	83	63	32

Table 4.5 Page 3, second system: note value tempi

4.6 Augmented performance practice: Version B

My single recording of Version B is presented in Video Recording 4.6. To create this version, I considered strategies for the adjustment of all transgressive values to within the limits of my global ca. ♩ = 75 base tempo.

As noted, the fourth note value in the base duration of the Characters 6 and 5 case study fell below my lower limit in Version A (see Example 4.10 and Table 4.4). To increase speed for this value, I began with a less emphatic arrival on the high cluster attack, allowing for more immediate downward movement with both hands. I then sacrificed the precision of the subsequent suspensions, using dabs of damper pedal, rather than *sostenuto* pedal, to create the fleeting illusion of sustained inner voices. I also increased speed and reliability by tactically omitting pitches from some of the Character 6 clusters that I had been playing with full fingerings, while bouncing my palm across the keys in an approximation of others. This finally brought me within my prescribed tempo limits, as confirmed by the data in Table 4.6 (note also my marginally increased average tempo here and in each of the case studies, signalling my growing familiarity and overall technical confidence with the piece). Though still relatively slow in comparison with the surrounding values, this contributed to a greater sense of *Gestalt*, as well as a more nuanced shift in density between the fourth and fifth values, subtly affecting the internal delineation of the passage as a moment; thanks to my simplified technical management, it was now also reliable in performance (see Video Recording 4.7 for my performance of this passage in Version B).

Pianist	Phase 2 tempo			Page 10 note values					
	Average	Min	Max	1	2	3	4	5	6
Version A Take 1	74	49	111	56	65	52	40	78	75
Version A Take 2	72	48	108	59	60	52	35	78	71
Version A Take 3	72	48	109	55	63	57	41	83	74
Version B	78	52	117	67	65	69	56	88	80

Table 4.6 Characters 6 and 5 case study: Versions A and B note value tempi

In some instances, individual gestures that fell below my lower tempo limits could be sped up simply through practice or alterations to my technical approach with no compromise in pitch content. The final value of page 3, for example—falling below every performer’s lower limit save Kontarsky and Henck (see Table 4.5)—could be sped up quite easily, with lighter execution of the cluster glissando, and preparatory movement to the right, allowing for timely execution of the subsequent Character 1 cluster in the highest register of the piano (see Video Recording 4.8 for my performance of this gesture in Version B). These data, and the ease with which this value could be adjusted, highlight an expressive tendency in the recording corpus to prolong this gesture, signalling both the end of the crux passage and the local Character 3 tempo arch. Precise realisation of the note value proportions, however, reveals a *defamiliarising* dimension to the rhythmic notation, in contrast to the familiar structural signification of *verlangsamen* markings at the ends of later base durations (see Examples 4.6 and 4.7). In the broader context of the phase, accurate proportioning here affects a continued transformation—as opposed to a dissipation—of energy across moment borders, and thus preservation of forward momentum.

Other gestures demand significant technical compromise to be played at speed, as exemplified by the leap from a spread Character 3 cluster to a pair of low Character 1 clusters in my Characters 2 and 1 case study (see note values ten to eleven in Example 4.2). As Table 4.7 shows, this was a crux gesture for the majority of pianists.²²⁴ To bring it into proportion in Version B, I simply omitted the lower half of the Character 3 cluster, playing from E to D# with the outstretched right hand, and then playing the Character 1 clusters with the outstretched left forearm, thereby projecting the notated iamb without reducing my global tempo.²²⁵ This is reflected in the radical difference in the data; the effect in performance, meanwhile, is subtle, yet distinct from the existing recordings, with the added drama of the movement lending greater contrast to the subsequent onset of the *pianissimo* Character 1 clusters (see Video Recording 4.9 for my performance of this passage in Version B).

²²⁴ The third value of this case study was factored out of analysis due to unclear perception of the brief rest duration onset in the majority of recordings.

²²⁵ This practice is potentially controversial, challenging the distinction between what pianist Philip Fowke has called 'justifiable enablement' and 'inappropriate facilitation'. Drawing on his own extensive experience of preparing performances of traditional concert repertoire, Fowke stresses the importance of exploring 'a wide range of physical choices' when negotiating these limits, arguing that 'to play with ease, comfort, and security requires a mind open to many possibilities, the sound and musical context always being the priority.' Philip Fowke, 'Part I Appendix: The Fingering of Benno Moiseiwitsch in Manuscript Illustrations', in Joseph Banowetz, *The Performing Pianist's Guide to Fingering* (Bloomington: Indiana University Press, 2021), p. 95. This has interesting ramifications when applied to a work like Klavierstück X. As a recent empirical study by Arvid Ong has shown, our auditory perception of clusters is relative, meaning that certain degrees of omission are either unlikely or impossible to be perceived by audiences. Arvid Ong, *Die Ähnlichkeit von Tonclustern* (Berlin: Wissenschaftlicher Verlag Berlin, 2019). This is particularly true in a case such as that described here, where brief duration, use of damper pedal, and the low register of the clusters, all serve to disguise the omission of pitches, thus justifying this practice in terms of pitch content versus comfort, reliability, and rhythmic proportioning at speed.

Pianist	Phase 2 tempo			Page 11 note values						
	Average	Min	Max	7	8	9	10	11	12	13
Tudor	101	68	152	80	109	-	49	59	61	101
Rzewski	88	59	132	108	125	-	41	77	55	80
Kontarsky	94	63	141	82	94	-	43	51	24	82
Henck	80	53	119	57	84	-	24	43	34	72
Wambach	75	50	112	56	71	-	30	57	40	53
Corver	79	53	119	90	101	-	26	60	48	80
Kobler	78	52	116	79	82	-	36	50	64	72
Liebner	51	34	77	35	47	-	35	24	30	53
Version A Take 1	74	49	111	76	68	-	36	60	32	71
Version A Take 2	72	48	108	79	64	-	32	55	28	67
Version A Take 3	72	48	109	94	60	-	38	62	37	71
Version B	78	52	117	96	62	-	82	65	53	82

Table 4.7 Characters 2 and 1 case study: note value tempi

Similar strategies of pitch approximation and tactical omission allowed for execution of all note values in the crux passage of page 3 within my tempo limits, as illustrated in Table 4.8. This significant increase in consistency contributed to a greater sense of rhythmic definition, recalling the changing statistical complexion of cruxes in my slower versions of Klavierstück I, with the increased drama of the extreme gestures governed by the sixth and seven note values in particular providing a point of structural orientation in the context of the comparatively restrained surrounding material. The passage as a moment thus became marginally more dividual, with a greater emphasis in performance on Stockhausen's measured time stratum, as opposed to his psychological or physically mediated time strata. The singular coherence of the passage is, nevertheless, preserved by my consistently high tempo (see Video Recording 4.11 for my performance of this passage in Version B).

Pianist	Phase 0 tempo			Page 3, second system, note value																					
	Average	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Version A Take 1	73	49	110	70	64	80	60	68	47	49	63	85	72	50	38	54	85	63	54	40	70	45	92	61	24
Version A Take 2	72	48	109	78	59	110	65	69	40	39	60	81	69	51	46	52	89	74	58	39	71	46	78	56	25
Version A Take 3	74	50	111	64	70	88	78	62	40	52	57	79	68	47	54	51	90	73	57	41	80	42	83	63	32
Version B	76	51	114	74	78	72	69	87	89	75	66	83	87	53	82	60	76	95	91	52	82	69	65	58	77

Table 4.8 Page 3, second system: Versions A and B note value tempi

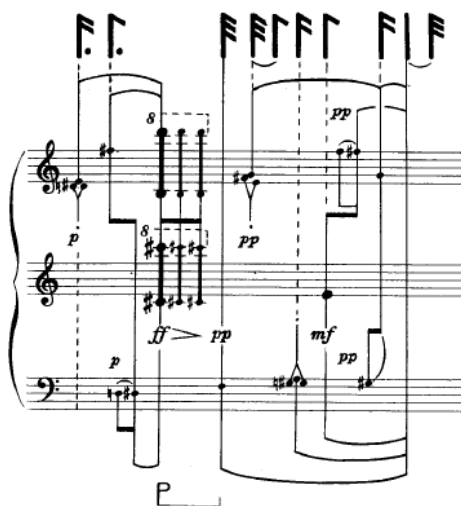
Finally, I addressed values that strayed above my upper tempo limit, beginning with adjustment of the fourth and fifth note values of the Character 7 case study, as illustrated in Table 4.9. When played in proportion, this sequence takes on a more pensive character, enhanced by more gradual and perceptible articulation of the notated *accelerandi*, marking a striking contrast with the recorded tradition (see Video Recording 4.10 for my performance of this passage in Version B). Precise execution of these values also draws further attention to the change from individual tones to major second clusters, and the subsequent integration of these two forms, thereby foregrounding the latent tripartite delineation of the moment. In contrast to Henck's similar delineation, my literalist approach places greater emphasis on the diversity of the character material itself, rather than its modulation through shifts in tempo.

Pianist	Phase 0 tempo			Page 1 note values							
	Average	Min	Max	1	2	3	4	5	6	7	8
Version A Take 1	73	49	110	78	79	83	161	103	63	82	62
Version A Take 2	72	48	109	81	75	88	160	115	59	80	58
Version A Take 3	74	50	111	78	79	88	150	128	63	81	61
Version B	76	51	114	84	80	64	71	68	65	81	66

Table 4.9 Character 7 case study: Version A and B note value tempi

Looking at the entire data set, it is noteworthy that most upper limit tempo transgressions relate to Character 7, typically the most straightforward character to perform. This is particularly true in later phases, where individual attacks and gestures are increasingly governed by individual note values. Adjustments to passages such as the base duration of Character 7 in Phase 5 thus called for tighter metric feeling, as dictated by the underlying demisemiquaver pulse (see Example 4.11). As a consequence, the consistently measured

proportions of these passages become foci for listening, in maximum contrast to the physically mediated temporality of passages in which groups of virtuosic materials are governed by longer base durations, recalling the statistical performance aesthetics of crux and non-crux materials in Klavierstück I (see Chapter 2). The difference here is that these statistical extremes no longer exist in a state of formal equilibrium, but rather serve a teleological progression, ultimately providing the piece with a sense of formal closure. As my empirical performance analysis and Version B's refined spectrum of rhythmic relationships illustrate, the salience of Klavierstück X's teleological processes, and their interaction with the non-linear aspects of the piece's composition—that is, with the complexion of base durations as self-sufficient moments—remains highly contingent on performance practice.



Example 4.11 Klavierstück X, p. 28: Character 7 interpolated with Character 2 in Phase 5

4.7 Conclusion: Version C

In my Klavierstück I recordings, base tempi were determined by the speed of execution of the smallest note values according to certain criteria of possibility. As my case studies of top-down refinement in Version B have shown, the defining criterion of possibility with respect to tempo in Klavierstück X is the degree to which all of the pitches within clusters can be performed. One possible approach to generating a more literalist slow performance might then be to measure the time needed to execute, say, the iambic gesture from Example 4.2 without sacrificing pitches in the Character 3 cluster. While the type of rigorous empirical investigation pursued in Chapter 2, and indeed the production of a full performance, lies beyond the scope of this chapter, some indication of a prospective tempo is provided by the recorded average of ca. ♩ = 35 for this gesture in my three takes of Version A (see Table 4.7). Were this to be taken as a lower limit then a base tempo of ♩ = 52.5 would be reached, somewhat higher than Liebner's ♩ = 46, though still significantly slower than any other interpretation on record.

Such a tempo, and its lower limit in particular, would afford a range of interpretative possibilities. For example, the diversity of materials could be brought into considerably sharper focus, with the tempo allowing for much clearer articulation and perception of the distinction between characters, particularly in their cluster forms. The tempo would, moreover, allow for more measured execution of all *accelerandi* and *ritardandi*, and the possibility of clearly articulating serialised groupings. Precise use of the *sostenuto* pedal would also be enabled in many places, allowing for the projection of suspensions and precise durational cut-offs, which are either impossible to achieve or simply obscured at quicker tempi.

To perform the piece at this speed and engage with the resulting affordances in this way would have significant aesthetic and formal consequences. While the teleological processes that underpin Phases 1–7 could be brought into yet greater relief, the broader teleological thrust of the piece would be radically weakened, not just because of the radically expanded timescale of the performance, and the implications of this timescale for perception, but also due to the structural clarity afforded to Phase 0 when performed accurately and with interpretative consistency at a very slow tempo. As Henck's analysis makes clear, the chaos of this phase is illusory: as one would expect from Stockhausen's compositional practice, the musical materials are in fact as strictly regimented here as anywhere else in the piece.²²⁶ Thanks to the non-interpolation of characters and absence of rest durations, this phase would thus come into focus as a series of many moments when performed with precision at a slow tempo, in maximum contrast to Rzewski's holistic, high speed interpretation. The piece as a whole might then sway towards more direct conformity with Stockhausen's early 1960s moment form theory.

The serial aesthetics of individual base durations would also undergo a shift in significance. As with Version C of *Klavierstück I*, certain crux gestures would remain at the limits of human performance, while surrounding materials would be performed with varying degrees of comparable repose, brought into even greater focus by the massively extended silences of the later phases. Due to this extended timescale and the limits of human perception, the opposition of embodied extremes would thus gain in dramatic significance, while forfeiting the inherent structural significance of such extremes in performances of *Klavierstück I*.

²²⁶ Henck, *Klavierstück X*, pp. 41–4.

This may shed light on the ontological difference between these pieces and the shift from serial to post-serial aesthetics that they embody. Performances of Klavierstück I at different tempi are given meaning by the *possibility* of performances at tempi yet slower and faster than those recorded; even if this responsibility were to be handed over to an electronic or a mechanical means of reproduction *à la* Nancarrow, the piece would still retain its serial-aesthetic identity: the dialectical tension between groups would persist. What makes it a Klavierstück, as opposed to a transcribed example of electronic music, are the practical limitations, specific to each performer who engages with the piece, and the irrationality of their manifestations in actual performances. Performances of Klavierstück X at higher tempi, meanwhile, bring the piece's teleological construction into sharper focus, much in the way that the isolated images of a zoetrope take on the illusion of forward motion when rotated at a certain speed (see Figure 4.14).



Figure 4.14 A zoetrope

At the same time, the reduced focus on pitch in favour of other material attributes, recognised by Roger Smalley as a key harbinger of moment form,²²⁷ leads to impasses in slower performances, with particular respect to the speed at which cluster glissandi can be executed, and the technical management of spread Character 3 clusters—issues, incidentally, that might hinder the literalist ambitions of my projected slow version of the piece. Klavierstück X is thus a Klavierstück in the more traditional sense, a piece that can only be realised by a human performer, and whose aesthetics do not stand in dialectical tension with those of a theoretical model, whether electronic or otherwise.

²²⁷ See Smalley's assertion with respect to the moment form characteristics of *Kontakte* and *Momente* that 'it is no longer the case that every parameter is straight-jacketed into conformity with a pitch-dominated system'. Smalley, "Momente: 1", p. 26. Pitch is also notably the last aspect of the composition to be addressed in Henck's analysis. Henck, *Klavierstück X*, pp. 57–60.

Chapter 5: Conclusions

Performances of serial music are diverse and polyvalent. As soon as one engages with the recording corpora of works such as the Klavierstücke, for which a performance tradition has been allowed to develop, any notion of sterility is banished. Instead, one encounters a variety of response often greater than that heard in popular recordings of the repertoire implicitly held up as the vibrant counterpart to serial music. This is partly a function of the inherent ambiguity and contradictory nature of serial notation, which, in its specificity, both invites and resists literalist interpretation. As Mathew ultimately concludes:

It may be that the most radical characteristic of music like Stockhausen's 1950s Klavierstücke is not the sweeping extension of authorial control that they announce but the paradox that ensues [...] both despite and because the score is so prescriptive, no pair of performances could ever be the same.²²⁸

This is a welcome admission. However, Mathew's over-arching dismissal of the agency and creative input of the performer remains misguided.

A more nuanced and progressive view of the performance practice of serial music can be found in the writing of performers in the early 1960s who, having worked closely with the serialists, found themselves in a position to reflect on the new challenges posed by the

²²⁸ Mathew, 'Darmstadt Pianism', 72.

notation. Cornelius Cardew, for example, while working as Stockhausen's assistant on the realisation of *Carré*, observed how:

[t]he music seemed to exclude all possibility of interpretation in any real sense; the utmost differentiation, refinement and exactitude were demanded of the players. Just because of this contradiction it is stimulating work, and sometimes rewarding to interpret this music, for any interpretation is forced to transcend the rigidity of the compositional procedure, and music results.²²⁹

Stein paints a similar picture, noting how 'the role of the performer becomes that of one removed; once he has mastered his responses as accurately as possible, according to the details of serialization, he must then strive to articulate the sections and discover what contrasts exist';²³⁰ 'the performer's main task', he argues, with specific reference to *Klavierstück I*, 'is essentially that of relating groups and like occurrences so that the structure is ultimately revealed.'²³¹ These statements corroborate Mathew and Duncan's view of literalism in the historic performance practice of serial music, while looking to the frontiers that lie beyond: they describe an ethics of performance that takes literalism as a starting point

²²⁹ Cornelius Cardew, 'Notation: Interpretation, etc.', *Tempo*, New Series, No. 58 (Summer, 1961), 21-33 (p. 22).

²³⁰ Stein, 'The Performer's Point of View', 66.

²³¹ Leonard Stein, 'The performance of Twelve-Tone and Serial Music for the Piano' (unpublished doctoral dissertation, University of California, 1965), p. 140.

rather than an end point; as flautist Elizabeth McNutt succinctly puts it: ‘in a work of total serialism, surrendering to the precise demands in the score is important, but not simple.’²³²

While many of the recordings under discussion in my thesis demonstrate this ethos—most notably those of Henck, Wambach, and Kobler—the diversity of the corpus is also indicative of a friction that emerges when the strictures of the notation are navigated by an interpreter with a distinct expressive and/or iconoclastic sensibility, which is either consciously or unconsciously brought to bear on matters of interpretation; this is the natural result of a specialist repertoire that has been opened up to a broader performing community by virtue of its popularity, and the documentation, enculturation, and institutionalisation of its performance practices. Thus Corver’s classical lyricism, and Damerini’s romantic sensibility highlight aspects of the music that may never have been imagined by the composer at the time of writing. Liebner’s unusual recordings, meanwhile, and my own unorthodox versions of Klavierstücke I and VII are iconoclastic, or what Dorottya Fabian might term ‘interventionist’: they serve to defamiliarise music that has become familiar to many.²³³ The performance tradition of the Klavierstücke thus echoes Cook’s recognition of a ‘degree of consensus and [...] occasional striking deviations from it’ in that of the Webern Variations, with similar signs of pianists ‘playing with reference to one another, encouraged no doubt by the increasing circulation of recordings.’²³⁴

²³² Daphne Leong and Elizabeth McNutt, ‘Script Versus Structure: Virtuosity in Babbitt’s *Lonely Flute*, with Reflections on Process’, in Daphne Leong et al., *Performing Knowledge: Twentieth-Century Music in Analysis and Performance* (Oxford: Oxford University Press, 2019), pp. 263–87 (p. 283).

²³³ Dorottya Fabian, *A Musicology of Performance: Theory and Method Based on Bach’s Solos for Violin* (Cambridge, UK: Open Book Publishers, 2015), p. 39.

²³⁴ Cook, ‘Inventing Tradition’, p. 191.

Performances of serial music are also polysemic: they can be understood in a range of hermeneutic contexts and invite multiple interpretations. These contexts, weighted to differing extents in each of my case studies, include the metaphysical tension between the fixed aesthetics of electronic composition and the dynamic aesthetics of live performance; the structural tension between linear- and non-linear forms; the embodied response of the performer to defamiliarised musical material; the transcendent interpretation of theoretically pure musical systems; and the traces of thematicism that linger in music founded on the fundamental relationships of sounds to one another. As my case studies have shown, these contexts are both accumulative, reflecting the development of serial theory across the 1950s, and variously salient, with the relevance of each context contingent on the style and particularity of each performance, whether recorded or otherwise. Tudor's visceral playing thus places greatest emphasis on the embodied role of the performer, and the physicality of instrumental performance in relation to fixed inscriptions of electronic music, while Henck draws greatest attention to the parametric foundations of the music's serial premises, and Corver foregrounds its underlying connectivity and melodic fortuities.

Beyond these generalisable contexts, the music of each serial composer invites its own specific concerns, with further research into the performance traditions of works (and not just piano works) by Boulez, Nono, and others urgently needed in order to convey the true diversity, legacy, and potential for meaning of the various practices engendered by serial composition at the 1950s Darmstadt New Music Courses.²³⁵ Stockhausen's compositions of the 1950s stand out in this respect for their scientific theoretical framing. Indeed, it is

²³⁵ Such research might include investigation of how performers have interpreted the many expressive performance directions that persist in Boulez's notation—building on Hellaby's valuable assessment of the realisation of similar directions in Messiaen's *Première communion de la Vierge* (1944)—or the implications for performance practice of the extra-musical dimensions of Nono's politically oriented compositions. Hellaby, *Reading Musical Interpretation*, pp. 89–116.

possible to view each of Stockhausen's pieces from this era as an experiment set in motion with a fixed set of variables, for which each performance and recording is a potential data set, contributing over time to a deeper appreciation and understanding of the ontology of musical time. This is reflected in Stockhausen's own anticipation of the sorts of empirical performance analysis undertaken in this thesis:

The best thing to do is to have several good instrumentalists play—each one as often as possible at various times—a sequence of equal and unequal time-proportions, notated with varying degrees of complexity. The results are recorded on tape. One then makes a note of the deviations between the time-proportions as notated and as played, and measures the order of magnitude of each instrumentalist. It is best to pursue such researches, however, with tape-recordings of compositions that already include such field-proportions. For one thing, the player no longer feels that he is a guinea-pig, under artificial conditions; and for another, the musical context, which is of the greatest importance for field-proportions, can be taken into account in determining the size of the fields [...] The more experience a composer has accumulated from such research, the clearer his composition of time-fields will be.²³⁶

Clearly, Stockhausen never had the means or inclination to follow through with these ambitions, and his thinking about performance, while retaining certain core tenets, soon

²³⁶ Stockhausen, '...how time passes...', pp. 30–31. It is worth noting here that Stockhausen gave his blessing to Nedelman's empirical analysis of Tudor and Henck's recordings of *Klavierstück III*. Nedelman, iv.

moved on, as indicated already by the shift in performance practice and aesthetics signalled by Klavierstück X. Nevertheless, my own fulfilment of this task suggests the overriding success of Stockhausen's experimental aims and objectives: namely, to impart 'a new way of feeling time in music' and to introduce a 'new and unprecedented angle on the question of instruments and their playing'.²³⁷

Stockhausen's overt desire to bring the agency and irrationality of the performer in line with his serial design, expressed at length in '...how time passes...', could be used to support the view of authoritarian control cited by Mathew and Duncan, and echoed by many who have worked with the composer.²³⁸ The delimitation of performer agency was undoubtedly a persistent theme in Stockhausen's writing; yet it appeared in many different states and guises, and tended to develop in response to practical outcomes, giving rise to wide variety of musical 'findings'. Within Klavierstücke I–XI, for example, the limited affordances of Klavierstücke V and VII tend towards similar results in literalist performances, with 'irrational nuances' of expression reduced to the microaesthetic plane, while the more open, complex affordances of Klavierstücke I, VI, X, and XI, each demanding their own bespoke practice, leave enormous scope for interpretation, with less direct control of the results on the part of the composer. This reflects the *sui generis* nature of serial compositions, and indeed of much New Music, both in terms of composition and performance practice; it is

²³⁷ Wörner, p. 32.

²³⁸ See for example Cardew's 1974 polemic, Cornelius Cardew, *Stockhausen Serves Imperialism* (London: Latimer New Dimensions Limited, 1974), Iddon's discussion of Stockhausen's control of his intuitive music at the 1968 Darmstadt New Music Courses, Martin Iddon, 'The Haus That Karlheinz Built: Composition, Authority, and Control at the 1968 Darmstadt Ferienkurse', *The Musical Quarterly*, 87.1 (2004), 87–118, and, most notably, Tudor's comments in a letter to Cage dated 30 October 1961 with reference to his experiences performing in Stockhausen's theatre piece *Originale* (1961): 'Karlheinz's theater is not so interesting – I guess he still feels he hears and sees in a more interesting way than others do (so no one is free, even tho [sic] he thinks that in his composition (it is a composition) he has allowed people to do just what they normally do). (note: how can you do what you normally do if you're supposed to have someone else's sense organs?)'. Reproduced in Iddon, *John Cage and David Tudor*, p. 136. These comments are indicative of the one-sided breakdown of Stockhausen and Tudor's creative relationship by the early 1960s.

also partly why the serial moment developed so quickly. From my point of view as a performer and analyst of the pieces, the ends continue to justify the means.

Stockhausen's talent for defamiliarisation, combined with a persistent and empirically regulated sense of idiom, was key to his ongoing success. One of the issues that Adorno may have recognised in listening to Stockhausen and Karel Goeyvaerts perform the latter's Sonata for Two Pianos at the 1951 Darmstadt New Music Courses,²³⁹ was the contradiction between the traditionally expressive and the rationalised, similar to the critique made by Boulez of Schoenberg's archaic forms, unsuited to the novelty of the musical material.²⁴⁰ In Goeyvaerts's Sonata, as well as other early parametrically organised works such as Babbitt's Three Compositions for Piano (1948), phrasing remains broadly traditional, and the writing idiomatic, with the parametric micromanagement of dynamics designed to control the performer's interpretation precisely along familiar lines (see Examples 5.1 and 5.2). Stockhausen's registral, textural and dynamic reformulation of Goeyvaerts's scheme in *Kreuzspiel*, and his radical, frequently contradictory writing in the Klavierstücke and beyond,

²³⁹ Grant (p. 66) cites Heinz-Klaus Metzger's contestation that this piece remained central to Adorno's conception and critique of serial music, particularly that expounded in Theodor W. Adorno, 'The Ageing of the New Music', in *Essays on Music*, ed. by Richard Leppert, trans. by Susan Gillespie (Berkeley: University of California Press, 2002), pp. 181–202.

²⁴⁰ See Pierre Boulez, 'Schoenberg is Dead' in *Stocktakings from an Apprenticeship*, trans. by Stephen Walsh (Oxford: Clarendon Press, 1991), pp. 209–214.

are emblematic of his role in advancing beyond the stagnation of this early moment, and the limitations of a modernist approach to performance, unsuited to the new music.²⁴¹

Example 5.1 Karel Goeyvaerts, Sonata for 2 Pianos, Op. 1, bars 4–6

Example 5.2 Milton Babbitt, Three Compositions for Piano, II, concluding bars

²⁴¹ The 'totally decentred experience of dynamics' in *Kreuzspiel* is cited as an important development by Pace. Pace, 'Notation', p. 183. See also Richard Toop, 'Messiaen/ Goeyvaerts, Fano/ Stockhausen, Boulez', *Perspectives of New Music*, 13 (1974), pp. 141–169 for discussion and analysis of the influence of Goeyvaerts's Sonata on the composition of *Kreuzspiel*.

These developments signal a paradigm shift in notions of musical expression, which can be felt in much subsequent New Music. As my analysis of the affordances of the Klavierstücke have demonstrated, literalist preparation of such scores often involves a great deal of practical decision making, and the resolution of contradictions through artistic compromise and creative use of technique. Such pre-formed interpretations are then executed in performance with varying levels of stability and reproducibility, contingent on the performer's sensibility and performance ethos, as well as the peculiarity of the notation at hand. The music is not afforded expression under these circumstances; rather, expression is emergent in performance. As with Philip Thomas's realisation of Harrison's *être-temps*, it is located in 'different and much more momentary attributes of the performance', than those associated with traditional repertoire.²⁴² Consequently, serial forms are not given expression, but are expressed. Mieko Kanno conveys this idea well in her discussion of Mathias Spahlinger's *Adieu m'amour* (2003), arguing that 'the objects to be expressed change more significantly than the means of expression, [so] that a variety of musical ideas (rather than just expressions) emerges from those outlined in the musical notation.'²⁴³ This is reflected in the varied interpretative and formal readings afforded by performances of Klavierstücke VII and X in particular.

In performances such as Tudor's, which deliberately set out to test the embodied limits of literal interpretation, or those of Pace, which aim to preserve vitality through a responsive and fluid prioritisation of musical features in performance, this process of expression becomes the aesthetic focus, inviting contemplation of the performance act,

²⁴² Clarke et al., 'Interpretation and performance in Bryn Harrison's *être-temps*', 61.

²⁴³ Mieko Kanno, 'Prescriptive Notation: Limits and Challenges', *Contemporary Music Review*, 26 (2007), 231–54 (p. 248).

which is problematised by the performer's necessary navigation of the dynamically, registrally, instrumentally, and temporally defamiliarised musical materials.²⁴⁴ The serial work can thus be understood in one sense as a vehicle for contemplation of the ontology of performance, invoking Carolyn Abbate's notion of the drastic, and Peggy Phelan's assertion that 'performance's only life is in the present'.²⁴⁵

Thinking about serial music in this way—that is, in terms of its historical performance practice—highlights a paradox in practice and reception that Grant fails to address: how can the music retain its unforeseeability in the long term for performers who have become totally familiar with its materials, structures, and technical demands, and for listeners who, at one stage removed, have developed similar levels of familiarity over time? Without the threshold complexity that persists (for now) in later complex music, I would argue that to ensure unforeseeable results in performances by even highly experienced performers such as Pace, performers of serial music must continue to experiment with and probe the bases of their interpretations. In my versions of *Klavierstücke I* and *X*, this involved pursuing untrodden paths, revealed by engagement with the score and the recording tradition, and pursuing certain experimental processes of rationalisation, whose success or failure was safeguarded by the studio setting and investigatory context of the recordings.²⁴⁶ As my comparative analysis of the affordances and recordings of *Klavierstück VII* illustrates, certain serial pieces—

²⁴⁴ Pace, 'Notation', p. 187.

²⁴⁵ Carolyn Abbate, 'Music—Drastic or Gnostic?', *Critical Inquiry* 2, 30 (2004), 505–536. Peggy Phelan, *Unmarked: The Politics of Performance* (London: Routledge/Taylor & Francis Group, 2017). For both Pace and Phelan, such avant-garde acts of performance take on a political dimension, with Pace citing his performance ideology as an Adornian means of 'resistance towards certain ideological assumptions that entail absorption of musical works into the culture industry', and Phelan persuasively arguing that by entering into 'the economy of reproduction', performance 'betrays and lessens the promise of its own ontology.' Pace, 'Notation', p. 192. Phelan, *Unmarked*, p. 146.

²⁴⁶ Future research may consider the influence of live performance conditions on these processes, and the broader viability of such experimental models of performance in public settings.

though far fewer than many might imagine—do appear to have run their experimental course, passing what Frank Cox might call their ‘peak of musically vital results’.²⁴⁷ At worst, this situation, reflecting the standardisation of certain mainstream classical practices, brings to mind Jean Baudrillard’s concern for ‘the high-fidelity threshold beyond which music disappears’, leading ultimately to state in which there is ‘neither judgement nor aesthetic pleasure.’²⁴⁸ This is where a ‘post-authoritarian’ model of performance, such as that proposed by Richard Taruskin to combat the perceived ossification of a certain mode of historically-informed performance practice, may become useful, responding to and building upon existing traditions through critically transgressive engagement with scores, whose existing modes of performance have become somehow saturated and redundant.²⁴⁹

As for listeners, my analyses have shown the value and insight to be gained from engagement with as many recordings and performances as possible, a practice that has hitherto been reserved for traditional repertoire in the field of musicology. This mode of appreciation invokes the more orthodox notion of the work as instantiated in performances, with repeat performances and the emergence of certain traditions contributing to the stability and ‘thickness’ of the work, as epitomised by José Antonio Bowen’s assertion that ‘the study of the performance tradition of a musical work *is* the study of the musical work.’²⁵⁰ This draws parallels with Grant’s comparative citation of modern art series such as those of

²⁴⁷ Cox, p. 70.

²⁴⁸ Jean Baudrillard, *The Illusion of the End*, trans. by Chris Turner (Stanford: Stanford University Press, 1994), p. 5.

²⁴⁹ Richard Taruskin, *Text and Act: Essays on Music and Performance* (New York: Oxford University Press, 1995).

²⁵⁰ José Antonio Bowen,, ‘Finding the Music in Musicology: Performance History and Musical Works’, in *Rethinking Music*, ed. by Nicholas Cook and Mark Everist (Oxford: Oxford University Press, 2001), pp. 424–51, (p. 427). See also Stephen Davies’s assertion that ‘Notations with the function of specifying works are scores. These are to be read as instructions addressed to the work’s potential performers, and it is by following these instructions that players generate instances of the work’. Davies, p. 4.

Cézanne and Delauney, wherein ‘the object does not change [...] only the manner of its presentation’,²⁵¹ invoking once more Kanno’s notion of expression—or the more overtly comparative repetitions of American serial art of the 1960s, wherein ‘each work is seen as a part of a macrostructure of all works in a series, and can only be understood in relation to this whole’.²⁵² The crucial differences for works of music lie in their inherent temporality; the likelihood of their long-term reiteration; and the cultural, geographical, and historical distribution of agency involved in their reproduction. This invokes the concomitance of our conception of musical works and their performance traditions. As Bowen argues:

It is easy for an interpretative or accidental quality to become an essential quality of the work for later generations, especially since the advent of recording technology [...] The boundary between interpretive and essential qualities can and does change, and the new boundary is then enforced by tradition. Tradition is, therefore, the history of remembered innovation, and it defines a set of normative assumptions or essential qualities about the work which can change over time. Each performance, therefore, looks both backward and forward in time. In other words, each performance is simultaneously both example and definition of the musical work.²⁵³

The work thus inheres in the imaginary objects of performance, which become more vivid and multifarious through close engagement with the recording repertory, and whose essential

²⁵¹ Grant, p. 148.

²⁵² *Ibid.*, p. 172.

²⁵³ Bowen, ‘Finding the Music in Musicology’, p. 427.

qualities, such as the gestural performance of crux materials in *Klavierstück I*, may accrue through acts of interpretation, whether wilful or fortuitous, which become embedded in the performance tradition. Unlike the types of traditional works to which Bowen makes reference, the hothousing and relatively recent instantiation of a tradition for the *Klavierstücke*, made possible by Stockhausen's fame and unprecedentedly active, long-term involvement in the supervision and curation of performances and recordings, as well as the inherent quality and appeal of the pieces themselves, represents an accelerated and well-documented microcosm of this phenomenon, made more complex by the intense social settings of Darmstadt and the present-day Stockhausen Courses, and the influential relationships between many of the performers involved. In this sense, there is much to be learned about the nature of tradition and the concomitant emergence of the work through engagement with the performance histories of New Music, which, while often valuably documented from their outset, have remained lacking in critical attention.

I would, however, argue for the further polyvalence of the work concept, as viewed through the lens of serial music. In much philosophical writing on the musical work, there has been resistance to thinking in purely objective terms, and allowing performance to be guided and regulated by theory and textual analysis, in an understandable response to the perceived hegemony of institutional theory and the presence of a normative and exclusionary 'imaginary museum of musical works'.²⁵⁴ Thinking of musical works in these terms nonetheless remains a widespread and—by virtue of the fact that one cannot forbid the ways in which people engage with works of art—valid mode of appreciation, to which the complex

²⁵⁴ Lydia Goehr, *The Imaginary Museum of Musical Works: An Essay in the Philosophy of Music* (Oxford: Oxford University Press, 2007). See also Cook, *Beyond the Score*; Bowen, 'Finding the Music in Musicology'; Davies, *Musical Works and Performances*; and Julian Dodd, *Works of Music: An Essay in Ontology* (Oxford; New York: Oxford University Press, 2007).

compositional structures and defamiliarised performance affordances of serial scores add a new dimension. It is patently possible to engage with individual performances, captured by means of recording, as temporarily definitive versions of the musical work. Indeed, this can be a constructive illusion, affording, in the case of serial music, fine appreciation of the multidimensional tensions that exist between the strictures of serial scores and the sounding realities of performances. As Stephen Davies has aptly observed, 'felicities introduced to the playing by the musician fly past the audience that is present, which can experience them only in the moment, [whereas] the disc's auditor can savour them, recognize them more clearly, and analyse them if she is so disposed, as a result of being able to replay the recording'.²⁵⁵

It is, nevertheless, important to retain a critical distance from recordings, in light of the difficulties that they may provoke 'in distinguishing the work from its interpretation and, hence, in assessing and comprehending the contributions made by the composer and the performer respectively.'²⁵⁶ It is equally important to safeguard oneself from the limitations imposed by pursuing a single mode of appreciation at the expense of all others. As my case studies have demonstrated, to do so relies on a reciprocal, critical, and continuous mediation between text and performance analysis, which takes into account the physical and instrumental contingencies of the music, ultimately affording opportunities for profound contemplation of the musical object in all its multifaceted complexity.

This polyvalent apprehension of the musical work is brought into focus by the defamiliarised affordances and theoretical framing of serial music. Yet this is just a special case of a much broader phenomenon, extending to all notated music, and beyond, to all forms

²⁵⁵ Davies, p. 305.

²⁵⁶ *Ibid.*, p. 328.

of musical performance that are predicated on some form of relationship between performers, composers, and audiences. As with each performer, each listener will bring their own sensibility and interpretive modality to the act of musical performance, which may be further conditioned by any number of circumstantial or contextual factors concomitant to the act of listening. However, perception of performance and, by extension, apprehension of the musical work, remains fundamentally multistable, insofar as it is characterised by a 'spontaneous alternation between two or more perceptual states, [which occur] when sensory information is ambiguous.'²⁵⁷ This invokes the aural equivalent of the Rubin vase (see Figure 5.1)



Figure 5.1 A Rubin vase

Yet unlike the Rubin vase, music is neither neutral nor consistent in its temporal presentation. As illustrated by my stylistic taxonomy and attendant modes of serial listening in Chapter 2,

²⁵⁷ Philipp Sterzer, Andreas Kleinschmidt, and Geraint Rees, 'The Neural Bases of Multistable Perception', *Trends in Cognitive Sciences*, 13.7 (2009), 310-318, (p.310).

while any mode of appreciation may be brought to bear on any mode of performance, certain styles of performance—whether artistic or contingent on the exigencies of the musical material, and extending from attention to fine expressive details and matters of technical decision making to the physical demeanour and gestures of the performer—will naturally encourage certain modes of aesthetic appreciation. In this sense, there is still much to be learned about the nature of perception from engagement with musical performances.

Bibliography

- Abbate, Carolyn, 'Music—Drastic or Gnostic?', *Critical Inquiry* 2, 30 (2004)
- Adorno, Theodor W., *Essays on Music*, ed. by Richard Leppert, trans. by Susan Gillespie (Berkeley: University of California Press, 2002)
- Assis, Gusatvo Oliviera Alfaix, 'Structure and Exception: Evaluating the Concept of *Einschub* in Stockhausen's Compositional Process', in *The Musical Legacy of Karlheinz Stockhausen: Looking Back and Forward*, ed. by M. J. Grant and Imke Misch (Hofheim: Wolke, 2016), pp. 79–89
- Atinello, Paul, Christopher Fox, and Martin Iddon, eds, *Other Darmstadts* (Abingdon: Routledge, 2007)
- Baudrillard, Jean, *The Illusion of the End*, trans. by Chris Turner (Stanford: Stanford University Press, 1994)
- Beal, Amy C., "David Tudor in Darmstadt", *Contemporary Music Review*, 26.1 (2007), 77–88
- Berry, Wallace, *Musical Structure and Performance* (New Haven: Yale University Press, 1989)
- Both, Christoph, 'The Influence of Concepts of Information Theory on the Birth of Electronic Music Composition: Lejaren A. Hiller and Karlheinz Stockhausen, 1953-1960', (unpublished doctoral dissertation, University of Victoria, 1995)
- Blumröder, Christoph von, *Die Grundlegung der Musik Karlheinz Stockhausens* (Stuttgart: Franz Steiner, 1993)
- Bowen, José Antonio, 'Finding the Music in Musicology: Performance History and Musical Works', in *Rethinking Music*, ed. by Nicholas Cook and Mark Everist (Oxford: Oxford University Press, 2001), pp. 424–51
- , 'Tempo, Duration, and Flexibility: Techniques in the Analysis of Performance', *Musicological Research*, 16 (1996), 111–56

- Boulez, Pierre, “‘An der Grenze des Fruchtländes’”, in *Die Reihe I: Elektronische Musik*, ed. by Herbert Eimert and Karlheinz Stockhausen (Vienna: Universal Edition, 1955), pp. 47–56
- , *Stocktakings from an Apprenticeship*, trans. by Stephen Walsh (Oxford: Clarendon Press, 1991)
- Cardew, Cornelius, ‘Notation: Interpretation, etc.’, *Tempo*, 58 (1961), 21–33
- , *Stockhausen Serves Imperialism* (London: Latimer New Dimensions Limited, 1974)
- Clarke, Eric, ‘Empirical Methods in the Study of Performance’, in *Empirical Musicology: Aims, Methods, Prospects*, ed. by Eric Clarke and Nicholas Cook (Oxford: Oxford University Press, 2004), pp. 77–102
- Clarke, Eric F., and Carol L Krumhansl, ‘Perceiving Musical Time’, *Music Perception: An Interdisciplinary Journal*, 7 (1990), 213–52
- Clarke, Eric, Nicholas Cook, Bryn Harrison, and Philip Thomas, ‘Interpretation and performance in Bryn Harrison’s *être-temps*’, *Musicae Scientiae*, 19.1 (2005), 31–74
- Clarkson, Austin, ‘David Tudor’s Apprenticeship: The Years with Irma and Stefan Wolpe’, *Leonardo Music Journal: Composers inside Electronics: Music after David Tudor*, 14 (2004), 5–10
- Clifford, Robert, ‘Multi-Level Symmetries in Webern’s Op. 11, No. 1’, *Perspectives of New Music*, 40. 1 (2002), 198–215.
- Cook, Nicholas, *Beyond the Score: Music as Performance* (Oxford: Oxford University Press, 2013)
- , ‘Inventing Tradition: Webern’s Piano Variations in Early Recordings’, *Music Analysis*, 36 (2017), 136–215
- , *The Development of the Performer’s Role within Karlheinz Stockhausen’s Piano Works* (unpublished master’s thesis, Royal Conservatoire the Hague, 2019)

- Cox, Frank, 'Notes Toward a Performance Practice for Complex Music', in *Polyphony and Complexity, New Music and Aesthetics in the 21st Century*, 1, ed. by Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim: Wolke, 2008), pp. 70–133
- Cox, Gregory, 'On the Relationship Between Entropy and Meaning in Music: An Exploration with Recurrent Neural Networks', *Proceedings of the Annual Meeting of the Cognitive Science Society*, 32 (2010)
- Davies, Stephen, *Musical Works and their Performance: A Philosophical Exploration* (Oxford: Clarendon Press, 2001)
- Dodd, Julian, *Works of Music: An Essay in Ontology* (Oxford; New York: Oxford University Press, 2007)
- Doğantan-Dack, Mine, 'In the Beginning was Gesture: Piano Touch and the Phenomenology of the Performing Body', in *New Perspectives on Music and Gesture*, ed. By Anthony Gritten and Elaine King (Aldershot: Ashgate, 2011), pp. 243–66
- , 'Recording the Performer's Voice', in Mine Doğantan-Dack ed., *Recorded Music: Philosophical and Critical Reflections* (London: Middlesex University Press), pp. 293–313
- Duncan, Stuart Paul, 'To Infinity and Beyond: A Reflection on Notation, 1980s Darmstadt and Interpretational Approaches to the Music of New Complexity', *Journal for New Music and Culture*, 7 (2010)
- Fabian, Dorottya, *A Musicology of Performance: Theory and Method Based on Bach's Solos for Violin* (Cambridge, UK: Open Book Publishers, 2015)
- Fowke, Philip, 'Part I Appendix: The Fingering of Benno Moiseiwitsch in Manuscript Illustrations', in Joseph Banowetz, *The Performing Pianist's Guide to Fingering* (Bloomington: Indiana University Press, 2021)
- Goehr, Lydia, *The Imaginary Museum of Musical Works: An Essay in the Philosophy of Music* (Oxford: Oxford University Press, 2007)
- Grant, M. J., *Serial Music, Serial Aesthetics: Compositional Theory in Post-War Europe* (Cambridge: Cambridge University Press, 2005)

- Gregory, Barbra, *Entropy and Complexity in Music: Some Examples* (unpublished doctoral dissertation, University of North Carolina: 2005)
- Griffiths, Paul, "Serialism" in *Grove Music Online*. *Oxford Music Online*.
 <<https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000025459>> [accessed 17 March 2022]
- Harvey, Jonathan, *The Music of Stockhausen: An Introduction* (London: Faber and Faber, 1975)
- Hellaby, Julian, *Reading Musical Interpretation: Case Studies in Piano Performance* (Farnham: Ashgate, 2009)
- Henck, Herbert, *Klaviercluster: Geschichte, Theorie und Praxis einer Klanggestalt* (Münster: Lit, 2004)
- , *Karlheinz Stockhausens Klavierstück IX: Eine Analytische Betrachtung* (Bonn-Bad Godesberg: Verlag für Systematische Musikwissenschaft, 1978)
- Henck, Herbert, *Karlheinz Stockhausen's Klavierstück X: A Contribution toward Understanding Serial Technique: History, Theory, Analysis, Practice, Documentation* (Cologne: Neuland, 1980)
- Hill, Peter, 'Messiaen recorded: the Quatre Études de rythme', in *Olivier Messiaen: Music, Art and Literature*, ed. by Christopher Dingle and Nigel Simeone (Aldershot: Ashgate, 2007), pp. 79–114
- Iddon, Martin, *John Cage and David Tudor: Correspondence on Interpretation and Performance* (Cambridge: Cambridge University Press, 2013)
- , *New Music at Darmstadt: Nono, Stockhausen, Cage, and Boulez* (Cambridge: Cambridge University Press, 2013)
- , 'The Haus That Karlheinz Built: Composition, Authority, and Control at the 1968 Darmstadt Ferienkurse', *The Musical Quarterly*, 87.1 (2004), 87–118
- Johnson, Evan, 'Karlheinz Stockhausen: Klavierstücke I–XI. Sabine Liebner. Wergo 73412', *Tempo*, 73 (2019), 101–2

- Kagel, Mauricio, 'Tone-Clusters, Attacks, Transitions', trans. by Leo Black, in *Die Reihe 6: Reports; Analyses* (Bryn Mawr, Theodor Pressr: 1959)
- Kanach, Sharon E, ed., *Performing Xenakis* (Hillsdale: Pendragon Press, 2010)
- Kanno, Mieko, 'Prescriptive Notation: Limits and Challenges', *Contemporary Music Review*, 26 (2007), 231–54
- Kob, Malte, Sebastià V. Amengual Garí, and Zora Schärer Kalkandjiev, 'Room Effect on Musicians' Performance', in *The Technology of Binaural Understanding*, ed. by Jens Blauert and Jonas Braasch (Cham: Springer, 2020), pp. 223–49
- Kohl, Jerome, *Karlheinz Stockhausen: Zeitmasse* (New York: Routledge, 2017)
- Kramer, Jonathan D., 'Moment Form in Twentieth Century Music', *The Musical Quarterly*, 64.2 (1978), 177–94
- Krytska, Iryna, *Karlheinz Stockhausens Klavierstück XI (1956): Interpretationsanalysen* (Kassel: Gustav Bosse, 2015)
- Kurtz, Michael, *Stockhausen: A Biography*, trans. by Richard Toop (London: Faber and Faber, 1992)
- Leong, Daphne, *Performing Knowledge: Twentieth-Century Music in Analysis and Performance* (Oxford: Oxford University Press, 2019)
- Lerch, Alexander, Claire Arthur, Ashis Pati, and Siddharth Gururani, 'An Interdisciplinary Review of Music Performance Analysis', *Transactions of the International Society for Music Information Retrieval*, 3 (2020), 221–45
- London, Justin, 'Temporal Complexity in Modern and Post-modern Music: A Critique from Cognitive Aesthetics', in *Unfolding Time*, ed. by Darla Crispin (Leuven: Leuven University Press, 2009), pp. 45–68
- Mathew, Nicholas, 'Darmstadt Pianism, "Historically Informed" Webern, and Modernism's Vanishing Performer', *Keyboard Perspectives*, 3 (2010), 49–73
- Maconie, Robin, *Other Planets: The Music of Karlheinz Stockhausen* (Lanham: Scarecrow Press, 2005)

- , *The Works of Karlheinz Stockhausen* (London; New York: Oxford University Press, 1976)
- Misch, Imke and Markus Bandur, eds, *Karlheinz Stockhausen bei den Internationalen Ferienkursen für Neue Musik in Darmstadt 1951–1996: Dokumente und Briefe 1951–1996* (Kürten: Stockhausen-Verlag, 2001)
- Moelants, Dirk, 'Statistical Analysis of Written and Performed Music. A Study of Compositional Principles and Problems of Coordination and Expression in "Punctual" Serial Music', *Journal of New Music Research*, 29 (1994), 37–60
- Nedelman, Eric Marc, 'Performance Analysis of David Tudor's Interpretations of Karlheinz Stockhausen's Klavierstücke' (unpublished doctoral dissertation, University of California, Santa Barbara, 2005)
- Ong, Arvid, *Die Ähnlichkeit von Tonclustern* (Berlin: Wissenschaftlicher Verlag Berlin, 2019)
- O'Hagan, Peter, *Pierre Boulez and the Piano: A Study in Style and Technique* (London; New York: Routledge, 2017)
- Pace, Ian, 'Lachenmann's Serynade: Issues for Performer and Listener', *Contemporary Music Review*, 24 (2005), 101–12
- , 'Maintaining Disorder: Some Technical and Aesthetic Issues Involved in the Performance of Ligeti's Études for Piano', *Contemporary Music Review*, 31 (2012), 177–201
- , 'Notation, Time and the Performer's Relationship to the Score in Contemporary Music', in *Unfolding Time*, ed. by Darla Crispin (Leuven: Leuven University Press, 2009), pp. 151–92
- Phelan, Peggy, *Unmarked: The Politics of Performance* (London: Routledge/Taylor & Francis Group, 2017)
- Pritchett, James, 'David Tudor as Composer/Performer in Cage's "Variations II"', *Leonardo Music Journal*, 14 (2004)
- Prosseda, Roberto, 'Aldo Clementi: The Works for Solo Piano', *Contemporary Music Review*, 30 (2012), 299–315

- Quanten, Maarten, 'On the Temporal Organisation of Karlheinz Stockhausen's Early Group Compositions', in *The Musical Legacy of Karlheinz Stockhausen: Looking Back and Forward*, ed. by M. J. Grant and Imke Misch (Hofheim: Wolke, 2016)
- Redgate, Christopher, 'A Discussion of Practices Used in Learning Complex Music with Specific Reference to Roger Redgate's *Ausgangspunkte*', *Contemporary Music Review*, 26.2 (2007), 141-49
- Rink, John, 'Analysis and (or?) Performance', in *Musical Performance: A Guide to Understanding*, ed. by John Rink (Cambridge: Cambridge University Press, 2002)
- Ruwet, Nicolas, 'Contradictions Within the Serial Language', in *Die Reihe 6: Speech and Music*, trans. by Margaret Shenfield (Bryn Mawr: Theodor Presser, 1964), pp. 65–76
- Ryan, David, 'Composer in Interview: Helmut Lachenmann', *Tempo*, 53 (1999), 20–25
- Schick, Steven, 'Developing an Interpretive Context: Learning Brian Ferneyhough's Bone Alphabet', *Perspectives of New Music*, 32 (1994), 132–53
- Schuller, Gunther, 'American Performance and New Music', *Perspectives of New Music*, 1 (1963), 1–8
- Smalley, Roger, 'Momente': Material for the Listener and Performer: 1', *The Musical Times*, 115.1571 (1974), 23–8
- , 'Momente': Material for the Listener and Performer: 2', *The Musical Times* 115.1574 (1974), 289-95
- Smith, Ashley William, *Redefining Moments: Interpreting Flexible Moment Form in the Late Solo Works of Franco Donatoni* (unpublished doctoral thesis, University of Western Australia, 2020)
- Song, Sun-Ju, *Music Analysis and the Avant-Garde Compositions of Post-World War II: Four Case Studies* (unpublished doctoral thesis, Queensland Conservatorium, Griffith University, 2008)
- Stein, Leonard, 'The Performer's Point of View', *Perspectives of New Music*, 1.2 (1963), 62-71

- , 'The performance of Twelve-Tone and Serial Music for the Piano' (unpublished doctoral dissertation, University of California, 1965)
- Sterzer, Philipp, Andreas Kleinschmidt, and Geraint Rees, 'The Neural Bases of Multistable Perception', *Trends in Cognitive Sciences*, 13.7 (2009), 310-318
- Stockhausen, Karlheinz, 'Experiential Time', trans. by Leo Black, in *Die Reihe: A Periodical Devoted to Developments in Contemporary Music. II Anton Webern*, (Bryn Mawr: Theodor Presser, 1958), pp. 64–74
- , '...how time passes...', in *Die Reihe 3: Musical Craftsmanship*, trans. by Cornelius Cardew (Bryn Mawr: Theodor Presser, 1959)
- , *Klavierstücke V–X* (London: Universal Edition, 1965)
- , *Texte I: Texte zur elektronischen und instrumentalen Musik; Aufsätze 1952–1963 zur Theorie des Komponierens* (Cologne: M. DuMont Schauberg, 1963)
- , *Texte II: Texte zu eigenen Werken zur Kunst Anderer Aktuelles; Aufsätze 1952–1962 zur musikalischen Praxis* (Cologne: M. DuMont Schauberg, 1964)
- Stockhausen, Karlheinz and Jerome Kohl, 'Clavier Music 1992', *Perspectives of New Music*, 31.2 (1993), 136–49
- Stockhausen, Karlheinz and Robin Maconie, *Stockhausen on Music: Lectures and Interviews* (New York: Marion Boyars, 1989)
- Stravinsky, Igor, *Poetics of Music in the Form of Six Lessons*, trans. by Arthur Knodel and Ingold Dahl (Cambridge: Harvard University Press, 1947)
- Tang, Joyce, *Shifting Ideals of Tone in Grand Pianos (1880–1904) and their Implications for Performance Practice* (unpublished doctoral thesis, University of Southampton, 2021)
- Taruskin, Richard, *Music in the Late Twentieth Century: The Oxford History of Western Music* (New York: Oxford University Press, 2010)
- , *Text and Act: Essays on Music and Performance* (New York: Oxford University Press, 1995)

- Toop, Richard, 'Last Sketches of Eternity: The First Versions of Stockhausen's Klavierstück VI', *Musicology Australia*, 14 (1991), 2–24
- , 'Messiaen/ Goeyvaerts, Fano/ Stockhausen, Boulez', *Perspectives of New Music*, 13 (1974)
- , 'Stockhausen's Klavierstück VIII', *Contact*, 28 (1984), 4-19
- , 'Stockhausen's Other Piano Pieces', *The Musical Times*, 124 (1983), 348–52
- Williams, Sean, 'Interpretation and Performance Practice in Realizing Stockhausen's *Studie II*', *Journal of the Royal Musical Association*, 141 (2016), 445–81
- Windsor, Luke, Rinus Aarts, Peter Desain, Hank Heijink, and Renee Timmers, 'The Timing of Grace Notes in Skilled Musical Performance at Different Tempi: A Preliminary Case Study', *Psychology of Music*, 29. 2 (2001), 149–169
- Wörner, Karl H., *Stockhausen: His Life and Work*, trans. by Bill Hopkins (Berkeley: University of California Press, 1976)

Discography

Feldman, Morton, *Early Piano Pieces*, Sabine Liebner, piano (Wergo, WER 6747 2, 2012)

Messiaen, Olivier, *Mode de valeurs et d'intensités*, Olivier Messiaen, piano (FMR, FMRC120-L0403, 2003)

Stockhausen, Karlheinz, *Klavierstücke I, VII, and X*, Aloys Kontarsky, piano (Sony Classical, S2K 53346, 1993)

———, *Klavierstücke VII*, Benjamin Kobler, piano (Ensemble Musikfabrik, 2015)

———, *Klavierstück X*, Benjamin Kobler, piano (Ensemble Musikfabrik, 2014)

———, *Klavierstücke I and VII*, Elisabeth Klein, piano (Point, (2) P 5028, 1978)

———, *Klavierstücke I and VII*, David Tudor, piano (hat[now]ART, 172, 2018)

———, *Klavierstück X*, David Tudor, piano (EM Records – EM1104CD, 2012)

———, *Klavierstücke I and VII*, Bernhard Wambach, piano (Schwann Musica Mundi, 310 016 H1, 1988)

———, *Klavierstück X*, Bernhard Wambach, piano (Schwann Musica Mundi, 310 009 H1, 1989)

———, *Klavierstücke I, VII, and X*, Ellen Corver, piano (Stockhausen-Verlag, 56 A-C, 2000)

———, *Klavierstücke I, VII, and X*, Herbert Henck, piano (Wergo, WER 60135/36-50, 1996)

———, *Klavierstück I*, Jeremy Denk, piano (Nonesuch, 563316-2, 2019)

———, *Klavierstück I*, Marcelle Mercenier, piano (Stockhausen-Verlag, Text-CD 2, 2007)

———, *Klavierstück VII*, Marianne Schroeder, piano (hat ART, 2030, 1984)

———, *Klavierstück VII*, Massimiliano Damerini, piano (Arts, (3) – 47216-2, 2003)

———, *Klavierstück I*, Pi-Hsien Chen, piano (hat[now]ART, 193, 2014)

———, *Klavierstücke I, VII, and X*, Sabine Liebner, piano (Wergo, WER 7341/2, 2018)

———, *Klavierstück I*, Steffen Schleiermacher, piano (MDG, 613 1004-2, 2000)

———, *Klavierstücke I and VII*, Vanessa Benelli Mossell, piano (Decca, 481 1616, 2015)

———, *Klavierstück VII*, Werner Bärtschi, piano (RecRec Music—RecRec 04, 1984)

Webern, Anton, *Piano Variations*, Jacques-Louis Monod, piano (Dial, 17, 1951)

Appendices

Appendix A: Marcelle Mercenier Klavierstück I timing data

Section	Bar	Onset	Onset timing (seconds)	Cumulative crotchets	Tempo (crotchet bpm)
A	1	1	1.54	0.45	60.61
		2	1.99	1.82	43.71
		3	3.86	2.73	55.26
		4	4.85	3.05	52.37
		5	5.22	3.38	49.95
		6	5.61	3.70	46.05
		7	6.03	4.19	74.93
		8	6.42	4.35	49.19
		9	6.62	4.68	57.46
		10	6.96	5.00	38.88
	2	11	7.46	5.48	63.16
		12	7.92	5.80	49.61
		13	8.30	6.44	41.03
		14	9.24	6.92	35.29
		15	10.06	8.00	30.99
	3	16	12.15	10.00	45.98
	4	17	14.76	10.17	60.61
		18	14.92	10.42	89.29
		19	15.09	10.50	72.46
		20	15.16	10.75	64.10
		21	15.39	11.08	35.84
		22	15.95	11.50	27.96
	5	23	16.85	13.50	44.44
	6	24	19.55	13.61	58.61
		25	19.66	13.73	60.15

		26	19.78	13.84	73.73
		27	19.87	13.96	55.75
		28	19.99	14.07	32.65
		29	20.20	14.19	87.91
		30	20.28	14.30	26.89
		31	20.54	14.41	55.94
		32	20.65	14.52	31.17
		33	20.86	14.63	58.97
		34	20.97	14.74	36.36
		35	21.15	14.85	70.38
		36	21.25	14.95	46.42
		37	21.39	15.06	54.55
		38	21.51	15.17	54.55
		39	21.63	15.28	80.81
		40	21.71	15.39	58.97
		41	21.82	15.50	6.75
	7	42	22.79	15.96	37.37
		43	23.53	16.42	55.27
		44	24.03	16.88	71.01
		45	24.42	17.35	73.85
		46	24.80	17.81	77.57
		47	25.15	18.27	87.91
		48	25.47	18.73	70.46
		49	25.86	19.19	69.40
		50	26.26	19.96	65.47
		51	26.96	20.12	46.62
		52	27.16	20.58	38.78
		53	27.88	21.19	57.25
		54	28.52	21.50	22.14
B	8	55	29.36	22.36	41.61

		56	30.59	22.79	68.57
		57	30.97	23.03	83.02
		58	31.14	23.28	122.45
		59	31.26	23.52	60.47
		60	31.51	23.77	90.70
		61	31.67	24.01	45.78
		62	31.99	24.26	49.98
		63	32.28	25.83	49.40
9	64	34.20	28.50	47.41	
10	65	37.58	28.83	29.24	
	66	38.26	30.50	26.62	
11	67	42.02	36.33	69.16	
12	68	47.08	36.67	42.46	
	69	47.55	37.83	50.51	
	70	48.93	39.17	37.19	
	71	51.08	39.50	22.68	
13	72	51.97	39.64	37.93	
	73	52.19	39.79	40.82	
	74	52.40	39.93	59.25	
	75	52.55	40.07	55.66	
	76	52.70	40.21	76.53	
	77	52.81	40.36	102.04	
	78	52.90	40.67	49.44	
	79	53.27	40.78	26.21	
	80	53.53	40.89	42.64	
	81	53.68	41.00	68.03	
	82	53.78	41.17	49.26	
	83	53.98	41.33	46.08	
	84	54.20	41.50	50.42	
14	85	54.40	41.81	68.10	

		86	54.67	42.13	36.20
		87	55.19	42.19	13.98
		88	55.46	42.38	33.48
		89	55.80	42.61	24.09
C	15	90	56.39	42.83	46.84
		91	56.67	42.92	36.32
		92	56.81	43.00	34.01
	16	93	56.95	43.08	30.61
		94	57.12	43.33	60.65
		95	57.37	43.78	69.69
	17	96	57.75	44.06	55.37
		97	58.05	44.22	62.11
		98	58.21	44.50	23.81
	18	99	58.91	47.07	58.21
		100	61.56	47.50	48.98
	19	101	62.09	47.93	51.02
		102	62.59	48.64	79.86
		103	63.13	48.79	24.33
		104	63.48	49.21	40.97
105		64.11	49.64	91.08	
106		64.39	50.07	51.98	
107		64.88	50.50	46.30	
20	108	65.44	56.50	49.12	
22	109	72.77	56.63	47.97	
	110	72.92	56.75	60.65	
	111	73.05	56.88	65.60	
	112	73.16	57.00	86.87	
	113	73.25	57.13	27.71	
	114	73.52	57.25	39.20	
	115	73.71	57.38	63.03	

		116	73.83	57.50	14.48
	23	117	74.35	57.65	44.85
		118	74.55	57.75	71.43
		119	74.63	58.00	50.62
		120	74.93	58.30	51.77
		121	75.28	58.50	7.66
		24	122	76.84	58.75
	123		77.33	59.00	49.83
	124		77.63	59.38	32.47
	125		78.33	59.50	40.69
	126		78.51	59.75	41.21
	25	127	78.87	60.38	78.78
		128	79.35	61.31	63.61
	26	129	80.23	61.63	36.69
		130	80.75	62.15	56.04
		131	81.30	62.25	21.96
	27	132	81.59	62.56	59.52
		133	81.90	63.03	92.01
		134	82.21	63.19	64.80
		135	82.35	63.50	17.86
D	28	136	83.40	63.80	41.25
		137	83.84	64.10	44.08
		138	84.25	64.40	36.91
		139	84.74	64.70	28.89
	29	140	85.36	65.50	32.29
	30	141	86.84	66.10	51.77
		142	87.54	66.70	34.52
	31	143	88.58	66.90	85.71
		144	88.72	67.10	37.82
		145	89.04	67.30	53.02

		146	89.27	67.50	30.25
	32	147	89.66	67.92	75.99
		148	89.99	68.04	10.61
		149	90.70	68.46	23.19
		150	91.78	68.50	4.91
		151	92.29	72.10	50.84
	33	152	96.53	73.30	75.45
		153	97.49	74.50	47.18
		154	99.02	74.60	30.61
	34	155	99.21	74.70	37.27
		156	99.37	74.80	37.82
		157	99.53	74.90	111.80
		158	99.58	75.00	51.43
		159	99.70	75.10	49.45
	35	160	99.82	75.20	65.93
		161	99.91	75.30	40.82
		162	100.06	75.40	85.71
		163	100.13	75.50	50.42
		164	100.25	75.63	55.42
	36	165	100.38	75.75	13.74
		166	100.93	75.92	82.42
		167	101.05	76.08	65.93
		168	101.20	76.25	52.26
		169	101.40	76.42	57.92
		170	101.57	76.58	27.47
		171	101.93	76.75	12.07
		172	102.76	81.75	71.27
	37	173	106.97	82.32	42.96
		174	107.77	82.61	22.82
		175	108.52	83.32	40.64

	40	176	109.57	83.75	32.04
	41	177	110.38	83.89	22.00
		178	110.77	84.11	37.74
		179	111.11	84.32	34.44
		180	111.48	84.54	35.55
		181	111.84	84.75	12.30
E	42	182	112.89	90.75	55.78
	43	183	119.34	91.42	61.01
		184	120.00	92.08	52.42
		185	120.76	92.75	48.02
	44	186	121.59	93.19	63.14
		187	122.01	93.42	53.91
		188	122.26	93.64	44.30
		189	122.56	94.08	95.24
		190	122.84	94.42	72.64
		191	123.12	94.92	54.25
	45	192	123.67	95.08	66.96
		193	123.82	95.42	40.62
		194	124.31	95.75	58.71
	46	195	124.65	95.88	52.75
		196	124.81	96.08	64.29
		197	124.99	96.22	45.71
		198	125.17	96.42	35.23
		199	125.51	96.48	19.93
		200	125.71	96.75	27.99
	47	201	126.28	97.32	41.04
202		127.12	97.77	40.38	
203		127.78	97.89	22.37	
204		128.12	98.85	124.31	
205		128.58	99.42	40.48	

		206	129.42	99.80	27.67
		207	130.25	99.99	26.33
		208	130.68	100.18	42.59
		209	130.95	100.37	60.47
		210	131.14	100.56	53.82
		211	131.35	100.75	13.38
	48	212	132.21	101.00	38.73
		213	132.59	101.25	41.47
		214	132.96	101.63	58.80
		215	133.34	101.75	33.83
	49	216	133.56	102.00	53.13
		217	133.84	102.42	66.96
		218	134.22	102.50	14.10
		219	134.57	103.00	30.04
	50	220	135.57	103.11	43.05
		221	135.72	103.21	29.62
		222	135.94	103.32	46.70
		223	136.07	103.43	37.23
		224	136.25	103.54	72.50
		225	136.33	103.64	102.04
		226	136.40	103.95	47.87
	51	227	136.78	104.28	35.57
		228	137.34	104.82	65.31
	52	229	137.83	104.95	52.75
		230	137.99	105.05	55.90
		231	138.09	105.15	28.89
		232	138.30	105.25	71.43
		233	138.39	105.55	36.05
		234	138.88	106.13	31.66
F	53	235	139.97	106.25	34.94

		236	140.19	106.75	38.84
	54	237	140.96	109.75	45.38
	55	238	144.93	111.18	47.40
		239	146.74	112.37	101.03
	56	240	147.44	112.61	52.78
		241	147.71	112.96	24.75
		242	148.58	113.56	99.39
		243	148.94	113.68	58.87
		244	149.06	114.04	49.64
		245	149.49	116.25	61.36
	57	246	151.66	116.38	45.27
		247	151.82	116.50	18.58
		248	152.23	116.63	40.18
		249	152.41	117.42	40.31
	58	250	153.59	117.86	50.13
		251	154.12	118.31	44.99
		252	154.72	118.53	47.62
		253	155.00	118.75	20.78
	59	254	155.64	120.75	50.32
	60	255	158.02	121.04	42.47
		256	158.43	121.61	89.60
		257	158.81	122.32	35.25
		258	160.02	123.75	31.56
	61	259	162.74		

Appendix B: Tudor Klavierstück VII ♩ = 40 section timing data

Onset	Onset timing	Cumulative beats	Beats	Timing	Beat length	Tempo
1	1.086984127	0	-	-	-	-
2	5.533605442	3	3	4.446621	1.482207105	40.480
3	5.86600907	3.25	0.25	0.332404	1.329614512	45.126
4	8.23292517	4.5	1.25	2.366916	1.89353288	31.687
5	10.69278912	5.5	1	2.459864	2.459863946	24.392
6	11.67709751	6	0.5	0.984308	1.96861678	30.478
7	14.24399093	7.5	1.5	2.566893	1.711262283	35.062
8	14.55056689	7.75	0.25	0.306576	1.226303852	48.928
9	17.19727891	9	1.25	2.646712	2.117369615	28.337
10	19.32154195	10.5	1.5	2.124263	1.416175359	42.368
11	22.13696145	11.75	1.25	2.81542	2.252335601	26.639
12	30.45442177	18	6.25	8.31746	1.330793651	45.086
13	31.3414966	18.75	0.75	0.887075	1.18276644	50.729
14	35.67165533	22.5	3.75	4.330159	1.154708995	51.961
15	39.00952381	24	1.5	3.337868	2.225245654	26.963
16	40.53696145	25.25	1.25	1.527438	1.221950113	49.102
17	41.59129252	25.75	0.5	1.054331	2.108662132	28.454
18	43.82222222	27.25	1.5	2.23093	1.48728647	40.342
19	44.49886621	27.75	0.5	0.676644	1.353287982	44.336
20	44.98321996	28	0.25	0.484354	1.937414968	30.969
21	50.34013605	32.5	4.5	4.679909	1.039979844	57.693
22	51.14195011	33	0.5	0.801814	1.603628118	37.415
23	55.37414966	35.5	2.5	4.2322	1.692879819	35.443
24	55.69886621	35.75	0.25	0.324717	1.298866212	46.194
25	56.70022676	36.25	0.5	1.001361	2.002721088	29.959
26	59.47210884	37	0.75	2.771882	3.695842783	16.234
27	61.07029479	37.75	0.75	1.598186	2.130914588	28.157

28	65.26773243	41.5	3.75	4.197438	1.119316704	53.604
29	66.73741497	42.5	1	1.469683	1.46968254	40.825
30	73.25170068	47.5	5	6.514286	1.302857143	46.053
31	75.13287982	49	1.5	1.881179	1.254119426	47.842
32	76.98503401	50.25	1.25	1.852154	1.481723356	40.493
33	77.71863946	51	0.75	0.733605	0.978140589	61.341
34	79.26825397	52.25	1.25	1.549615	1.23969161	48.399
35	79.7659864	52.75	0.5	0.497732	0.995464854	60.273
36	82.09886621	54.25	1.5	2.33288	1.555253212	38.579
37	84.06530612	55	0.75	1.96644	2.621919879	22.884
38	87.06789116	56.5	1.5	3.002585	2.001723356	29.974
39	90.00272109	57.75	1.25	2.93483	2.347863946	25.555
40	91.58639456	59	1.25	1.583673	1.266938776	47.358
41	92.42122449	59.75	0.75	0.83483	1.113106576	53.903
42	99.09115646	66	6.25	6.669932	1.067189116	56.222
43	102.1478458	68	2	2.007075	1.003537415	59.789
44	108.2412698	71.25	3.25	6.093424	1.874899703	32.002
45	109.5619048	72.75	1.5	1.320635	0.880423281	68.149
46	112.7774603	74	1.25	3.215556	2.572444444	23.324
47	113.4873243	74.5	0.5	0.709864	1.419727892	42.262
SDEV	-	-	-	-	-	12.161
MEAN	-	-	-	-	-	40.38899

Appendix C: Kobler Klavierstück X timing data and problem data points

Phase	Onset number	Character value	Quaver duration	Timing (mm:ss)	IOI	Beat length	Tempo (qbpn)
0	1	0	2	00:06	1.65	0.82	72.79
	2	0.7.7.1	17	00:07	13.34	0.78	76.48
	3	0.7.7.2	1	00:21	0.53	0.53	113.58
	4	0.7.7.3	2.5	00:21	1.46	0.58	102.95
	5	0.7.7.4	1.5	00:23	0.71	0.47	126.56
	6	0.7.7.5	6.5	00:23	4.97	0.77	78.39
	7	0.7.7.6	10.5	00:28	8.03	0.76	78.44
	8	0.7.7.7	4	00:36	3.21	0.80	74.77
	9	0.7.1	2	00:40	1.75	0.87	68.69
	10	0.7.3.1	1.5	00:41	1.38	0.92	65.01
	11	0.7.3.2	1	00:43	0.64	0.64	93.27
	12	0.7.3.3	1.5	00:43	1.37	0.92	65.47
	13	0.7.2.1	5	00:45	4.14	0.83	72.51
	14	0.7.2.SV	0	00:49	5.76		
	15	0.7.2.2	3	00:55	2.37	0.79	75.93
	16	0.7.2.F	0	00:57	7.95		
	17	0.7.5.1	1	01:05	1.06	1.06	56.79
	18	0.7.5.2	2.5	01:06	2.43	0.97	61.82
	19	0.7.5.3	5.5	01:09	4.81	0.87	68.57
	20	0.7.5.4	1.5	01:13	1.68	1.12	53.65
	21	0.7.5.5	3.5	01:15	2.78	0.79	75.52
	22	0.7.6.1	7	01:18	5.83	0.83	72.06
	23	0.7.6.2	1	01:24	0.68	0.68	87.59
	24	0.7.6.3	4	01:24	3.63	0.91	66.04
	25	0.7.6.4	2	01:28	1.35	0.68	88.72
	26	0.7.6.5	4	01:29	2.72	0.68	88.34
	27	0.7.6.6	9	01:32	6.60	0.73	81.81
	28	0.7.4.1	2.5	01:39	2.39	0.96	62.72
	29	0.7.4.2	8.5	01:41	5.86	0.69	87.07
	30	0.7.4.3	4.5	01:47	3.41	0.76	79.24
	31	0.7.4.4	16.5	01:50	12.32	0.75	80.33
	32	0.7.H	2	02:03	2.06	1.03	58.24
	33	0.1.6	0.25	02:05	0.17	0.68	88.34
	34	0.1.5	0.25	02:05	0.20	0.78	76.56
	35	0.1.2	0.25	02:05	0.15	0.59	102.08
	36	0.1.3	0.25	02:05	0.18	0.71	85.07
	37	0.1.1	0.5	02:05	0.39	0.77	77.86
	38	0.1.7	0.25	02:06	0.19	0.76	79.20
	39	0.1.4	0.25	02:06	0.24	0.94	63.80
	40	0.3.5	0.5	02:06	0.32	0.64	93.75
	41	0.3.3	1.75	02:06	1.45	0.83	72.26
	42	0.3.7	1.25	02:08	0.88	0.71	84.76

	43	0.3.6	0.75	02:09	0.68	0.91	65.94
	44	0.3.2	0.25	02:10	0.43	1.74	34.54
	45	0.3.1	1.5	02:10	1.44	0.96	62.64
	46	0.3.4	2	02:11	1.31	0.65	91.65
		0.3.H					
	47	0.2.2	1	02:13	0.79	0.79	75.93
	48	0.2.7	0.5	02:13	0.36	0.72	82.77
	49	0.2.5	0.25	02:14	0.24	0.98	61.25
	50	0.2.1	1	02:14	0.86	0.86	70.13
		0.2.6					
	51	0.2.3	0.75	02:15	0.72	0.97	62.08
	52	0.2.4	0.5	02:16	0.39	0.78	77.21
	53	0.5.3	5.5	02:16	4.45	0.81	74.15
	54	0.5.6	0.5	02:21	0.75	1.51	39.77
	55	0.5.1	7	02:21	5.82	0.83	72.22
	56	0.5.5	11	02:27	9.27	0.84	71.17
	57	0.5.7	3	02:36	2.51	0.84	71.78
	58	0.5.2	8	02:39	6.64	0.83	72.27
	59	0.5.4	1.5	02:46	1.75	1.17	51.33
		0.5.H					
	60	0.6.1	4	02:47	4.23	1.06	56.80
	61	0.6.2	15	02:51	16.67	1.11	53.98
	62	0.6.6	22	03:08	18.47	0.84	71.46
	63	0.6.7	1	03:27	2.12	2.12	28.36
	64	0.6.3	7	03:29	6.77	0.97	62.05
	65	0.6.5	16	03:36	12.34	0.77	77.80
	66	0.6.4	1	03:48	1.13	1.13	53.11
	67	0.4.7.1	0.75	03:49	0.74	0.98	60.98
	68	0.4.7.2	0.25	03:50	0.75	3.02	19.89
	69	0.4.1	0.5	03:50	0.67	1.33	45.04
	70	0.4.3	1	03:51	0.99	0.99	60.44
	71	0.4.2	1.75	03:52	2.15	1.23	48.80
	72	0.4.5	2.75	03:54	2.84	1.03	58.15
	73	0.4.6	4	03:57	3.42	0.85	70.27
	74	0.4.4	5.75	04:01	6.18	1.08	55.78
1	75	1.7.1	6.5	04:07	5.17	0.80	75.47
	76	1.7.2	0.5	04:12	0.78	1.57	38.28
	77	1.7.3	1.5	04:13	1.29	0.86	69.84
	78	1.7.4	1	04:14	0.94	0.94	64.10
	79	1.7.5	3	04:15	2.97	0.99	60.53
	80	1.7.6	4.5	04:18	3.69	0.82	73.22
	81	1.7.7	29	04:22	22.23	0.77	78.27
		1.7.R1					
	82	1.7.R2	16	04:44	12.10	0.76	79.32
	83	1.7.R3	4	04:56	2.93	0.73	82.03
	84	1.7.R4	6	04:59	4.72	0.79	76.28

	85	1.7.R5	3	05:04	2.12	0.71	84.72
	86	1.7.R6	43	05:06	32.10	0.75	80.38
	87	1.7.R7	10	05:38	7.80	0.78	76.90
	88	1.1	2	05:46	1.68	0.84	71.41
	89	1.3.1	0.5	05:47	0.33	0.65	91.88
	90	1.3.2	1	05:48	0.97	0.97	62.08
	91	1.3.3	2.5	05:49	2.32	0.93	64.52
		1.3.R					
	92	1.2.1	2	05:51	1.68	0.84	71.22
	93	1.2.2	6	05:53	4.78	0.80	75.31
		1.2.R					
	94	1.5.1	2	05:57	1.03	0.52	116.30
	95	1.5.2	3.5	05:58	2.81	0.80	74.78
	96	1.5.3	0.75	06:01	0.36	0.48	125.28
	97	1.5.4	1.5	06:02	1.36	0.91	66.26
	98	1.5.5	2.25	06:03	1.91	0.85	70.55
	99	1.5.R	7	06:05	5.49	0.78	76.56
	100	1.6.1	3.75	06:10	3.76	1.00	59.92
	101	1.6.2	3	06:14	1.38	0.46	130.63
	102	1.6.3	5.25	06:15	4.86	0.93	64.83
	103	1.6.4	0.75	06:20	0.64	0.85	70.31
	104	1.6.5	0.25	06:21	0.29	1.15	52.20
	105	1.6.6	2.5	06:21	2.76	1.10	54.30
	106	1.6.R	18	06:24	13.69	0.76	78.90
	107	1.4.1	3	06:38	2.58	0.86	69.82
	108	1.4.2	5	06:40	3.74	0.75	80.25
	109	1.4.3	2	06:44	1.91	0.95	62.83
	110	1.4.4	8	06:46	6.32	0.79	75.96
	111	1.4.L	0	06:52	3.39		
	112	1.4.R	46	06:56	34.77	0.76	79.37
2	113	2.6.1	0.75	07:30	0.52	0.69	86.86
	114	2.6.2	2.25	07:31	1.94	0.86	69.58
	115	2.6.3	0.25	07:33	0.33	1.30	46.14
	116	2.6.4	2.75	07:33	2.60	0.95	63.45
	117	2.6.5	1.25	07:36	0.68	0.54	110.19
	118	2.6.6	1.75	07:36	1.81	1.03	58.07
	119	2.6.R	7	07:38	5.38	0.77	78.01
	120	2.5.1	1	07:44	0.78	0.78	76.70
	121	2.5.2	0.25	07:44	0.40	1.58	37.86
	122	2.5.3	2.75	07:45	2.14	0.78	76.98
	123	2.5.4	0.5	07:47	0.26	0.53	113.58
	124	2.5.5	3.5	07:47	2.79	0.80	75.17
		2.5.R					
	125	2.2.1	1.25	07:50	0.95	0.76	78.54
	126	2.2.2	3	07:51	2.19	0.73	82.03
		2.2.R					

	127	2.3.1	0.25	07:53	0.42	1.67	36.01
	128	2.3.2	2	07:54	1.20	0.60	100.11
	129	2.3.3	0.5	07:55	0.47	0.93	64.20
	130	2.1	18.25	07:55	15.28	0.84	71.67
	131	2.1.R1	65.75	08:11	49.57	0.75	79.58
	132	2.1.R2	44	09:00	33.11	0.75	79.74
	133	2.7.1	4.5	09:33	3.84	0.85	70.31
	134	2.7.2	3	09:37	2.46	0.82	73.22
	135	2.7.3	1	09:39	0.77	0.77	77.71
	136	2.7.4	1.5	09:40	1.23	0.82	73.22
	137	2.7.5	0.5	09:41	0.48	0.95	62.83
	138	2.7.6	6.5	09:42	5.11	0.79	76.32
	139	2.7.7	2	09:47	1.64	0.82	73.37
	140	2.7.R1	21	09:49	19.61	0.93	64.26
	141	2.7.R2	16	10:08	11.53	0.72	83.26
	142	2.4.1	3.75	10:20	2.77	0.74	81.13
	143	2.4.2	2.25	10:23	2.30	1.02	58.80
	144	2.4.3	1.5	10:25	1.35	0.90	66.61
	145	2.4.4	6	10:26	4.44	0.74	81.09
	146	2.4.R	18.5	10:31	13.65	0.74	81.30
3	147	3.5.1	0.25	10:44	0.24	0.98	61.52
	148	3.5.2	0.5	10:45	0.41	0.82	72.92
	149	3.5.3	0.75	10:45	0.73	0.98	61.52
	150	3.5.4	1.25	10:46	1.27	1.02	59.06
	151	3.5.5	1.25	10:47	1.23	0.98	61.01
		3.5.R					
	152	3.3.1	4	10:48	4.18	1.04	57.48
	153	3.3.2	9	10:52	9.38	1.04	57.56
	154	3.3.3.V	6	11:02	6.68	1.11	53.86
	155	3.3.SV	0	11:08	2.67		
	156	3.3.R1	13	11:11	9.60	0.74	81.25
	157	3.3.R2	6	11:21	4.53	0.75	79.53
	158	3.3.R3	20	11:25	17.85	0.89	67.23
	159	3.3.R4	48	11:43	35.30	0.74	81.58
	160	3.3.R5	2	12:18	1.54	0.77	78.01
	161	3.3.R6	16	12:20	11.87	0.74	80.87
	162	3.7.1	2.5	12:32	1.96	0.78	76.56
	163	3.7.2	1.5	12:34	0.94	0.62	96.15
	164	3.7.3	3.5	12:35	2.82	0.81	74.40
	165	3.7.4	3	12:38	2.96	0.99	60.80
	166	3.7.5	1	12:41	0.54	0.54	110.25
	167	3.7.6	0.5	12:41	0.55	1.10	54.40
	168	3.7.7	2	12:42	1.49	0.75	80.28
	169	3.7.R	18	12:43	13.18	0.73	81.91
	170	3.6.1	0.75	12:56	0.64	0.85	70.47
	171	3.6.2	1.75	12:57	1.67	0.95	62.91

	172	3.6.3	0.25	12:59	0.36	1.42	42.19
	173	3.6.4	1.5	12:59	1.25	0.83	72.11
	174	3.6.5	0.5	13:00	0.50	1.00	59.92
	175	3.6.6	3.25	13:01	2.25	0.69	86.69
		3.6.R					
	176	3.2.1	0.75	13:03	0.57	0.76	78.50
	177	3.2.2	1.25	13:04	1.41	1.13	53.28
	178	3.1	18.25	13:05	16.39	0.90	66.80
	179	3.1.R1	17.75	13:21	12.97	0.73	82.13
	180	3.1.R2	24	13:34	18.00	0.75	80.02
	181	3.4.1	1.5	13:52	1.12	0.74	80.54
	182	3.4.2	1	13:53	0.79	0.79	75.86
	183	3.4.3	2.5	13:54	2.16	0.86	69.37
	184	3.4.4	4	13:56	3.09	0.77	77.64
	185	3.4.R	7	13:59	5.24	0.75	80.17
4	186	4.2.1	6	14:05	4.71	0.78	76.44
	187	4.2.2	12	14:09	9.07	0.76	79.38
	188	4.2.R1	45	14:18	41.88	0.93	64.47
	189	4.2.R2	22	15:00	16.46	0.75	80.21
	190	4.2.R3	33	15:17	25.70	0.78	77.04
	191	4.7.1	0.75	15:43	0.68	0.91	65.97
	192	4.7.2	2.25	15:43	2.08	0.93	64.82
	193	4.7.3	1.5	15:45	0.88	0.59	102.51
	194	4.7.4	0.5	15:46	0.70	1.41	42.62
	195	4.7.5	1.75	15:47	1.44	0.83	72.72
	196	4.7.6	1	15:48	0.83	0.83	72.53
	197	4.7.7	1.25	15:49	0.90	0.72	83.35
	198	4.7.R	7	15:50	5.38	0.77	78.11
	199	4.5.1	0.25	15:55	0.24	0.96	62.64
	200	4.5.2	1.25	15:56	0.92	0.74	81.39
	201	4.5.3	0.5	15:57	0.42	0.84	71.28
	202	4.5.4	0.75	15:57	0.67	0.89	67.41
	203	4.5.5	0.25	15:58	0.31	1.25	48.07
	204	4.1	13.75	15:58	11.39	0.83	72.42
	205	4.1.R	18.25	16:09	13.41	0.73	81.66
	206	4.6.1	0.25	16:23	0.21	0.84	71.28
	207	4.6.2	0.25	16:23	0.19	0.75	79.51
	208	4.6.3	1	16:23	1.25	1.25	48.07
	209	4.6.4	0.5	16:24	0.22	0.45	133.37
	210	4.6.5	0.75	16:25	0.89	1.18	50.83
	211	4.6.6	0.75	16:26	0.55	0.74	81.60
	212	4.6.R	0.5	16:26	0.69	1.38	43.52
	213	4.3.1	6	16:27	5.00	0.83	72.01
	214	4.3.2	9	16:32	6.74	0.75	80.11
	215	4.3.3	4	16:39	3.56	0.89	67.50
	216	4.3.R1	9	16:42	6.77	0.75	79.76

	217	4.3.R2	20	16:49	14.91	0.75	80.47
	218	4.3.R3	5	17:04	4.02	0.80	74.63
	219	4.3.R4	15	17:08	11.23	0.75	80.12
	220	4.4.1	1.75	17:19	1.34	0.77	78.22
	221	4.4.2	0.5	17:20	0.41	0.81	73.83
	222	4.4.3	1	17:21	0.83	0.83	72.53
	223	4.4.4	2.75	17:22	2.08	0.76	79.23
	224	4.4.R	2	17:24	1.74	0.87	68.91
5	225	5.3.1	8	17:25	6.07	0.76	79.13
	226	5.3.2	4	17:31	3.05	0.76	78.56
	227	5.3.3	2	17:35	1.82	0.91	65.89
	228	5.3.R	10	17:36	13.50	1.35	44.43
	229	5.6.1	0.25	17:50	0.17	0.67	89.88
	230	5.6.2	0.25	17:50	0.22	0.87	68.91
	231	5.6.3	0.5	17:50	0.39	0.78	76.56
	232	5.6.4	0.5	17:51	0.34	0.68	87.97
	233	5.6.5	1	17:51	0.86	0.86	69.49
	234	5.6.6	0.5	17:52	0.51	1.02	58.56
	235	5.1	14	17:52	11.90	0.85	70.57
		5.1.R					
	236	5.5.1	1.5	18:04	1.22	0.82	73.48
	237	5.5.2	3	18:05	2.61	0.87	69.06
	238	5.5.3	2	18:08	1.70	0.85	70.79
	239	5.5.4	7	18:10	5.47	0.78	76.81
	240	5.5.5	4.5	18:15	3.68	0.82	73.36
	241	5.5.R1	6	18:19	4.94	0.82	72.87
	242	5.5.R2	13	18:24	9.83	0.76	79.32
	243	5.5.R3	8	18:34	5.98	0.75	80.20
	244	5.5.R4	5	18:40	0.46	0.09	646.00
	245	5.5.R5	32	18:40	27.33	0.85	70.25
	246	5.5.R6	2	19:07	1.47	0.74	81.39
	247	5.5.R7	17	19:09	12.97	0.76	78.62
	248	5.5.R8	11	19:22	8.05	0.73	81.97
	249	5.5.R9	16	19:30	11.83	0.74	81.15
	250	5.7.1	0.75	19:42	0.51	0.67	89.10
	251	5.7.2	1.5	19:42	1.48	0.99	60.80
	252	5.7.3	0.25	19:44	0.16	0.63	95.70
	253	5.7.4	1.25	19:44	0.64	0.51	117.45
	254	5.7.5	0.5	19:45	0.37	0.73	82.03
	255	5.7.6	2	19:45	0.84	0.42	143.55
256	5.7.7	0.5	19:46	0.36	0.72	83.35	
257	5.7.R	1.25	19:46	1.40	1.12	53.39	
258	5.2.1	12	19:48	8.93	0.74	80.59	
259	5.2.2	6	19:56	4.93	0.82	73.05	
260	5.2.R1	14	20:01	10.92	0.78	76.93	
	5.2.R2						

	261	5.2.R3	24	20:12	18.36	0.76	78.45
	262	5.2.R4	8	20:31	5.96	0.74	80.59
	263	5.2.R5	0.25	20:37	0.17	0.70	86.13
	264	5.4.1	0.5	20:37	0.42	0.84	71.78
	265	5.4.2	1	20:37	1.02	1.02	58.89
	266	5.4.3	1.75	20:38	0.85	0.49	123.05
	267	5.4.4	1	20:39	1.06	1.06	56.48
		5.4.R					
6	268	6.1	5.75	20:40	4.36	0.76	79.08
	269	6.1.R1	0.25	20:45	0.51	2.02	29.70
	270	6.1.F	0	20:45	1.97		
	271	6.1.R2	2.25	20:47	1.91	0.85	70.79
	272	6.2.1	10	20:49	5.44	0.54	110.25
	273	6.2.F1	0	20:54	3.82		
	274	6.2.2	4.75	20:58	3.21	0.68	88.70
	275	6.2.F2	0	21:01	5.52		
	276	6.2.R	2.25	21:07	1.82	0.81	74.18
	277	6.6.1	0.5	21:09	0.77	1.53	39.15
	278	6.6.2	2.5	21:10	1.74	0.70	86.13
	279	6.6.3	1.5	21:11	1.31	0.88	68.45
	280	6.6.4	4.5	21:13	3.67	0.81	73.65
	281	6.6.5	5.5	21:16	4.44	0.81	74.31
	282	6.6.6	3.5	21:21	3.07	0.88	68.32
	283	6.6.R1	2	21:24	1.47	0.74	81.55
	284	6.6.R2	2	21:25	1.32	0.66	90.67
	285	6.6.R3	4	21:27	2.98	0.74	80.59
	286	6.6.R4	43	21:30	32.57	0.76	79.22
	287	6.6.R5	4	22:02	3.10	0.77	77.42
	288	6.6.R6	17	22:05	12.66	0.74	80.56
	289	6.6.R7	25	22:18	20.15	0.81	74.44
	290	6.6.L	0	22:38	4.01		
	291	6.6.R8	8	22:42	5.82	0.73	82.52
	292	6.7.1	0.25	22:48	0.28	1.11	53.83
	293	6.7.2	0.75	22:48	0.41	0.55	109.18
	294	6.7.3	0.25	22:49	0.38	1.53	39.15
	295	6.7.4	0.5	22:49	0.37	0.74	80.75
	296	6.7.5	0.25	22:49	0.42	1.67	35.89
	297	6.7.6	1.25	22:50	0.89	0.72	83.90
	298	6.7.7	0.75	22:51	0.43	0.57	104.76
	299	6.3.1	3	22:51	2.55	0.85	70.47
	300	6.3.2	2	22:54	1.36	0.68	88.34
	301	6.3.3	4.5	22:55	3.66	0.81	73.83
	302	6.3.R	6.5	22:59	4.91	0.76	79.41
	303	6.5.1	8.25	23:03	6.79	0.82	72.88
	304	6.5.2	1.5	23:10	1.23	0.82	73.13
	305	6.5.3	3	23:12	2.08	0.69	86.61

	306	6.5.4	0.75	23:14	0.60	0.80	74.54
	307	6.5.5	5.25	23:14	3.68	0.70	85.59
	308	6.5.SV	0	23:18	3.65		
	309	6.5.R1	4.25	23:22	3.54	0.83	72.01
	310	6.5.R2	1	23:25	1.09	1.09	54.98
	311	6.5.R3	7	23:26	5.19	0.74	80.93
	312	6.5.R4	3	23:31	2.33	0.78	77.13
	313	6.5.R5	3	23:34	2.50	0.83	72.11
	314	6.5.R6	9	23:36	6.72	0.75	80.33
	315	6.5.R7	1	23:43	0.87	0.87	68.91
	316	6.5.R8	3	23:44	2.26	0.75	79.81
	317	6.5.R9	2	23:46	1.76	0.88	68.28
	318	6.5.R10	12	23:48	8.37	0.70	86.01
	319	6.4.1.V	0.25	23:56	0.30	1.22	49.22
	320	6.4.2.V	0.5	23:56	0.54	1.08	55.72
	321	6.4.3.V	1	23:57	0.80	0.80	74.76
	322	6.4.4.V	0.25	23:58	0.88	3.54	16.97
7	323	7.7.1.V	0.25	23:59	0.26	1.06	56.79
	324	7.7.2.V	0.25	23:59	0.31	1.26	47.63
	325	7.7.3.V	0.25	23:59	0.27	1.10	54.69
	326	7.7.4.V	0.25	24:00	0.39	1.54	38.86
	327	7.7.5.V	0.25	24:00	0.38	1.50	39.91
	328	7.7.6.V	0.25	24:00	0.48	1.91	31.42
	329	7.7.7.V	0.5	24:01	0.86	1.73	34.74
	330	7.1.V	3.5	24:02	7.57	2.16	27.73
	331	7.1.R.V	0.5	24:09	0.85	1.70	35.34
	332	7.3.1	2.5	24:10	1.95	0.78	77.08
	333	7.3.2	1.25	24:12	1.10	0.88	68.36
	334	7.3.3	1.75	24:13	1.57	0.90	66.99
	335	7.3.R	2.5	24:15	1.88	0.75	79.75
	336	7.2.1	6	24:17	4.51	0.75	79.89
	337	7.2.2	3	24:21	2.18	0.73	82.52
	338	7.2.R	7	24:23	5.28	0.75	79.59
	339	7.5.1	5.25	24:29	3.98	0.76	79.07
	340	7.5.2	2.5	24:32	1.88	0.75	79.75
	341	7.5.3	1.5	24:34	1.10	0.73	82.03
	342	7.5.4	0.75	24:35	0.64	0.85	70.31
	343	7.5.5	3.75	24:36	3.03	0.81	74.25
	344	7.5.R	18.25	24:39	14.07	0.77	77.84
	345	7.6.1	5.5	24:53	4.31	0.78	76.56
	346	7.6.2	4.5	24:58	3.80	0.84	71.04
	347	7.6.3	1.5	25:01	1.52	1.01	59.40
	348	7.6.4	2.5	25:03	1.76	0.71	85.07
	349	7.6.5	0.5	25:05	0.39	0.78	76.56
	350	7.6.6	3.5	25:05	2.56	0.73	82.03
	351	7.6.R1	30	25:08	22.50	0.75	79.98

	352	7.6.R2	16	25:30	11.81	0.74	81.31
	353	7.4.1	2	25:42	1.52	0.76	79.20
	354	7.4.2	5	25:43	3.71	0.74	80.88
	355	7.4.3	3	25:47	2.46	0.82	73.30
	356	7.4.4	22	25:50	16.51	0.75	79.95
	357	7.4.R	96	26:06			

List of Audio Appendices

Audio Appendix 2.1: Klavierstück I Version A Take 1

Audio Appendix 2.2: Klavierstück I Version A Take 2

Audio Appendix 2.3: Klavierstück I Version A Take 3

Audio Appendix 2.4: Klavierstück I Version B Take 1

Audio Appendix 2.5: Klavierstück I Version B Take 1

Audio Appendix 2.6: Klavierstück I Version B Take 2

Audio Appendix 2.7: Klavierstück I Version B Take 3

Audio Appendix 2.8: Klavierstück I Version C Take 1

Audio Appendix 2.9: Klavierstück I Version C Take 2

Audio Appendix 2.10: Klavierstück I Version C Take 3

Audio Appendix 4.1: Klavierstück X Version A Take 1

Audio Appendix 4.2: Klavierstück X Version A Take 3