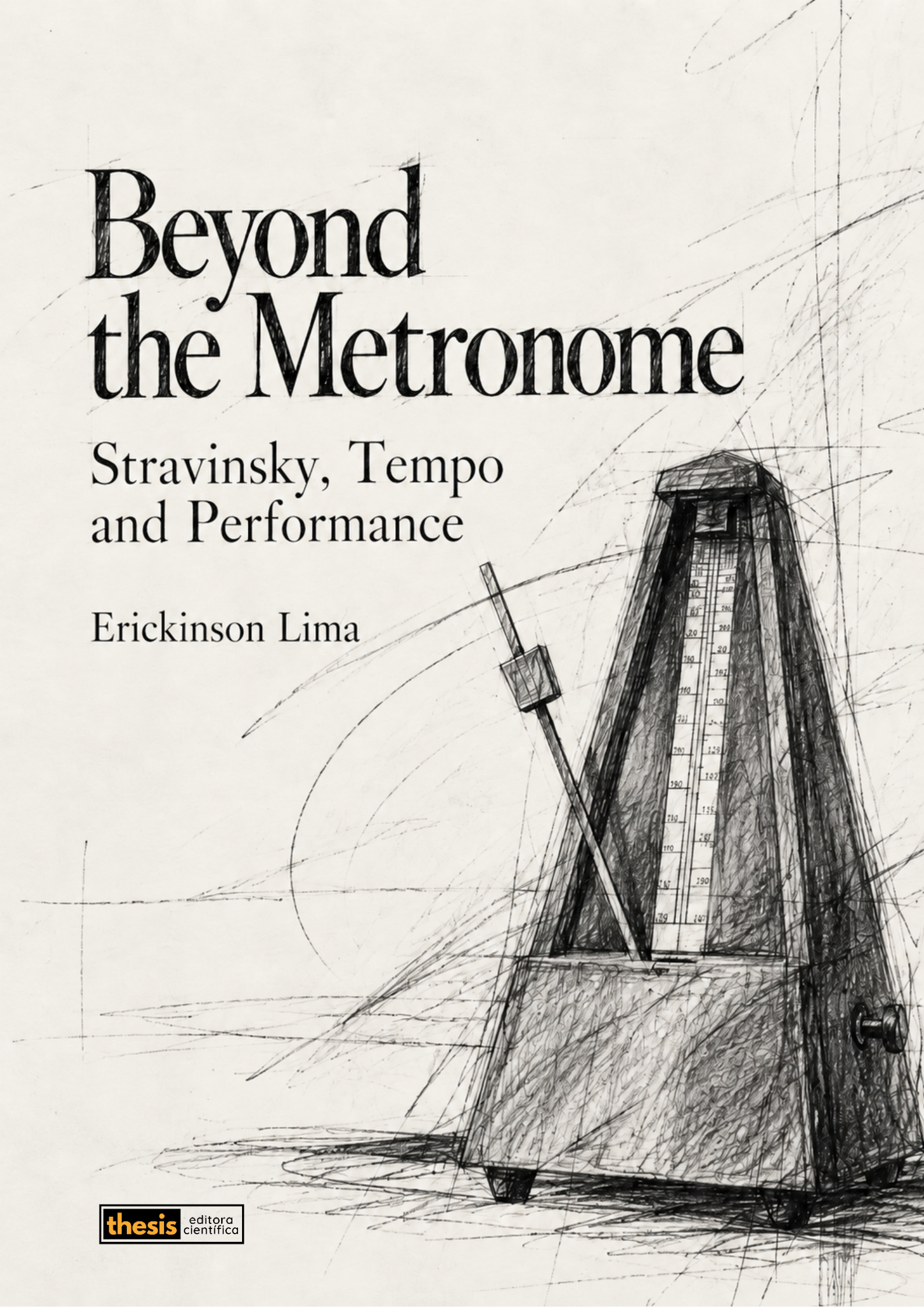
Beyond the Metronome

Stravinsky, Tempo and Performance

Erickinson Lima



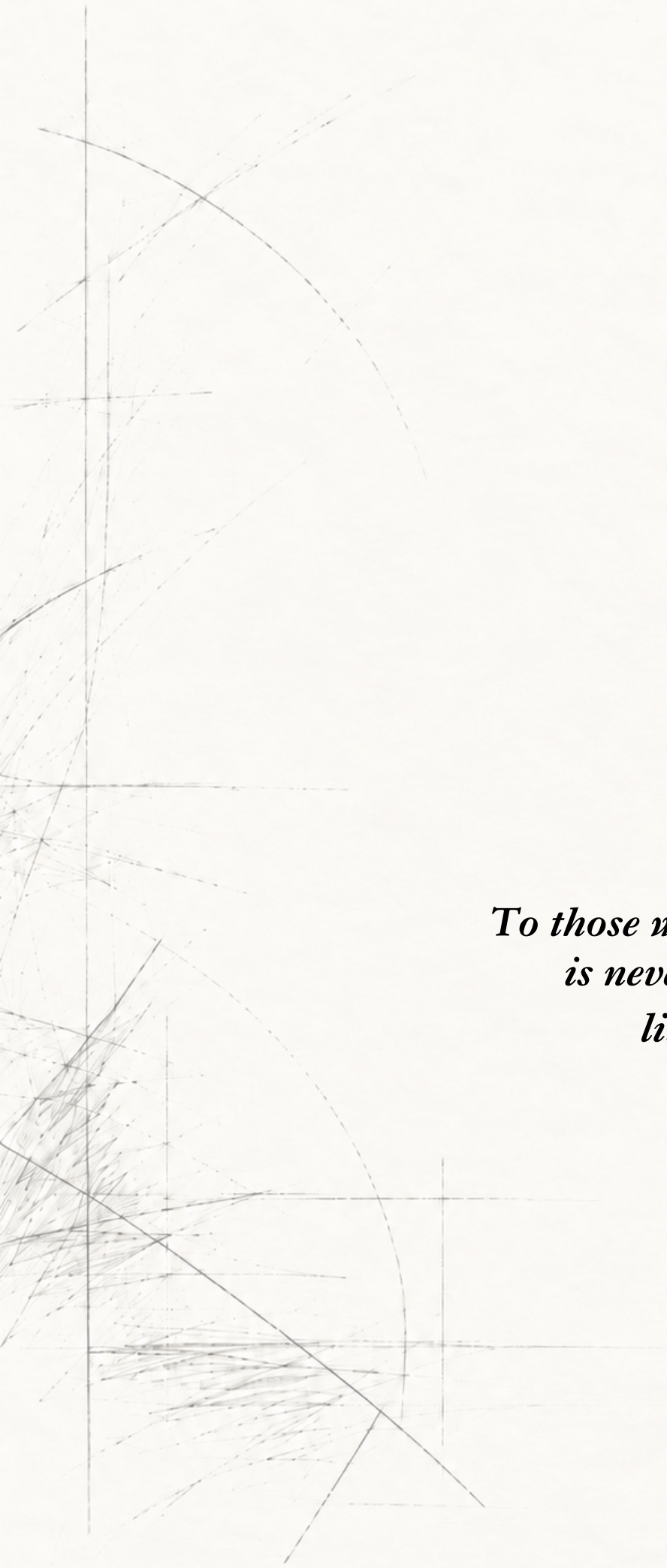
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Stravinsky, Tempo and Performance

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To those who taught me that time
is never merely measured, but
lived, shaped, and heard.

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Foreword

There are books that begin with an answer, and others that remain alive because a question refuses to disappear. This book clearly belongs to the second group. I know well the spark that first set this question in motion. Years ago, when Erickinson and I turned our attention to *L'Histoire du Soldat*, we were interested in understanding the tension between the objectivity advocated by Stravinsky and what the composer himself did when conducting his own work. That study opened a fissure. The book now before the reader passes through that opening and transforms what began as a question of interpretation into a much broader investigation of time, performance, and transformation.

My relationship with this work is not solely academic. As a conductor and professor of conducting, I have also had the experience of performing it. *L'Histoire du Soldat* confronts the interpreter with a very particular kind of precision. The writing is incisive, the metrical relationships demand clarity, and the contrasts seem to call for firm decisions. Yet the moment the work is made to sound, it becomes evident that the exactness of the page does not eliminate the experience of time. Between indication and gesture, between the imagined pulse and the one that passes through the ensemble, there is a territory that no number can occupy on its own. It is precisely within that territory that this book chooses to remain.

What I find especially compelling about this research is that it does not use Stravinsky's recordings to decide which of them is the most "correct". Nor does it turn the score into a tribunal before which each performance must account for itself. The comparison proposed here is more productive. It asks what persists, what shifts, and what is reorganised when the composer himself returns to the same music at different moments in his life. The recordings of 1932, 1954, and 1961 thus cease to be merely historical testimonies and become different states of a living relationship between a musician and his own work.

This change of perspective is supported by a particularly consistent method. Listening is brought into dialogue with computational tools capable of making measurable aspects that would be difficult to compare through auditory memory alone. Events are detected, intervals calculated, metrical relationships calibrated, and temporal profiles reconstructed. Yet the number is never allowed to speak on its own. Every result must return to the music and acquire meaning in relation to the form, position, and trajectory of each performance. For those who work with interpretation, this balance is especially valuable. Technology does not replace the ear. It extends its capacity to ask questions.

The structure of the book follows this expansion. It begins with the need to distinguish tempo from temporality, moves through the ways in which Stravinsky understood precision,

notation, and authority, and then reaches the practical problem of transforming historical recordings into comparable data. Only then are the performances examined in detail, movement by movement, before longitudinal comparison reveals continuities, differences, and changes of direction across the three recordings. This construction means that the reader is not simply handed a ready-made conclusion. Rather, the reader is gradually led through the conditions that make such a conclusion possible.

There is also something here that lies very close to the conductor's craft. We conduct knowing that time must be sufficiently clear to be shared and sufficiently alive to remain music. A gesture may indicate a pulse, but it can never be reduced to that pulse. The same metronome marking may produce profoundly different results depending on how what comes before, what follows, what breathes, and what changes are organised across the course of the performance. In this sense, the questions raised by this book extend beyond Stravinsky. They concern the very condition of performance and the way in which a work continues to exist each time it happens again.

I therefore invite the reader to move through these pages without seeking confirmation that the metronome was right or wrong, or that Stravinsky was faithful or unfaithful to himself. What is offered here is something more interesting: the possibility of observing musical time as it ceases to be merely an indication and becomes action, choice, and history. For performers, researchers, and all those who ask what truly happens between score and sound, this book proposes a path in which measurement does not impoverish experience but opens new ways of listening to it.

André Muniz
Conductor and Professor of Conducting

Contents

Foreword 7

Introduction 11

1 Musical Temporality: Between Prescription and Performance 16

1.1 Tempo is not Temporality 21

1.2 Prescribed Time: Temporality in the Score 25

1.3 Realised Time: Performance as Temporal Production 31

1.4 From Global Value to Temporal Transformation 37

2 Stravinsky and the Authority of Time 45

2.1 Precision, Notation and the Authority of the Composer 53

2.2 Stravinsky in Performance: Recording and Transformation 62

2.3 *L'Histoire du Soldat*: A Temporal Laboratory 67

2.4 One Work, Three Moments 73

3 Methodological Procedure: Measuring Realised Time 80

3.1 Temporal Event Detection and Algorithm Selection 83

3.2 Metrical Calibration and Calculation of Realised Tempo 88

3.3 Statistical Treatment and Construction of Temporal Profiles 92

3.4 Computational Implementation, Traceability, and Reproducibility 96

4 Temporal Profiles of L'Histoire du Soldat 103

4.1 *Marche du Soldat* 105

4.2 *Le Violon du Soldat* 111

4.3 *Pastorale* 118

4.4 *Marche royale* 125

4.5 *Petit concert* 132

4.6 *Trois Danses* 139

4.6.1 *Tango* 140

4.6.2 *Valse* 147

4.6.3 *Ragtime* 154

4.7 *Danse du Diable* 161

4.8 *Grand Choral* 168

4.9 *Marche triomphale du Diable* 175

5 Stravinsky's Tempo: Persistence and Transformation 184

5.1 Persistence and Difference 186

5.2 Trajectories of Transformation 190

5.3 Between Prescription and Realisation 193

5.4 Beyond the Metronome 195

Appendix A: Computational Pipeline for the Analysis of Realised Tempo ***199***

A.1 Scope 199

A.2 Inputs, environment, and execution 199

A.3 Complete source code 200

A.3.1 Dependencies, constants, and filename parsing 200

A.3.2 Input validation and duplicate protection 201

A.3.3 Metrical calibration and score metadata 204

A.3.4 Duration-weighted statistics and temporal segmentation 205

A.3.5 Score-reference handling and processing of individual performances 207

A.3.6 Cross-recording comparisons 212

A.3.7 Method notes and pipeline execution 213

A.4 Generated outputs and reproducibility boundary 218

References ***221***

Discography ***225***

A Note on the Author ***227***

Introduction

This book began before it existed as a book. It began with a conductor's unease in the face of an apparently simple question: to what extent does what is written coincide with what happens when music is realised in performance? On the podium, that distance is never abstract. It appears in gesture, in breathing, in the response of the ensemble, and in the way a tempo is established, sustained, relaxed, or reorganised. The score provides references. Performance compels those references to happen in time.

In 2013, this concern first took the form of research in the article I co-authored, *A subjetividade versus objetividade interpretativa à luz da obra L'Histoire du Soldat de Igor Stravinsky* (Lima & Oliveira, 2013). At that stage, we compared the indications contained in the score with three recordings of the work made under Stravinsky's own direction, in 1932, 1954, and 1961. The problem was framed primarily in terms of the tension between interpretative objectivity and subjectivity. The differences identified between prescription and realisation made it possible to question the idea that an objective performance could constitute an unequivocal performative truth.

The research came to an end, but the question did not. Over time, it became clear to me that those differences were more interesting than the opposition we had initially sought to demonstrate. Establishing that Stravinsky did not always realise literally what he had prescribed was only the beginning. It remained necessary to understand how those differences were organised, whether they were occasional or recurrent, whether relationships persisted across the recordings, and whether others were transformed. Above all, it was necessary to abandon the idea that a performance could be adequately explained by a single tempo value.

This book emerged from that change of perspective. The corpus remained the same, but the question became more complex. The recordings of 1932, 1954, and 1961 ceased to function merely as evidence of a possible tension between discourse and practice. Instead, they came to be understood as three moments in a historically extended relationship between Stravinsky and the same work. The twenty-nine years separating the first recording from the last make it possible to observe something particularly rare: a composer returning to his own music, conducting it again, and leaving sonic documents sufficiently comparable for persistence and transformation to be investigated.

There is also, inevitably, something of my own trajectory in this research. This book brings together three ways of approaching music that, for a long time, seemed to belong to separate activities. The first is that of the conductor and performer, for whom time is experienced physically, projected through gesture, and constructed collectively. The second is that of the researcher, who

must turn impressions into verifiable questions and find language precise enough to discuss what listening perceives. The third is my relationship with technology, not as a substitute for musical experience, but as a means of observing aspects of that experience that memory and listening alone cannot preserve with the same degree of precision.

It was precisely at the intersection of these three perspectives that the analytical procedure took shape. Listening remained indispensable, but it was no longer sufficient. It became necessary to return to a specific point, measure intervals, reconstruct trajectories, and compare events separated by seconds within a recording and by decades across recordings. Technology made those differences observable. At the same time, the more precise the data became, the clearer it was that the problem could not be resolved through numbers alone. The challenge was therefore to build a path between listening and measurement without reducing one to the other.

The pipeline developed for this research emerged from that need. The recordings were prepared and segmented to establish comparable units. Temporal event detection was carried out in Sonic Visualiser, with BeatRoot selected after tests of its suitability for the corpus. The events were then exported, validated, and calibrated according to the metrically relevant unit in each passage. From that point onwards, it became possible to calculate the realised tempi, their distributions, and their trajectories over the course of each performance. Weighted measures, quartiles, temporal deciles, and normalised profiles made it possible to work across different scales without losing the position of events within the performance.

This computational process was not conceived as an external layer imposed upon the music. It was necessary because each stage responded to a concrete musical problem. Detection identifies events. Calibration asks what those events represent metrically. Statistical treatment summarises without erasing distribution. The profiles restore position and direction to the values. Longitudinal comparison finally makes it possible to ask whether the way tempo is organised persists or changes from one recording to another. The pipeline thus became less a machine for producing numbers than a structure of passage between sound, measurement, and interpretation.

This passage also required constant caution. A graph is not a performance, just as a tempo curve is not temporality in its entirety. The data represent measurable properties of a musical event and acquire meaning only when they are returned to that from which they were extracted. For this reason, the path followed in this book begins with performance, passes through computational analysis, and returns to the music. Technology matters precisely because it makes it possible to listen again with different questions.

The central question that emerged from this process can be formulated relatively simply: how are the temporal relationships prescribed in the score realised and transformed in Stravinsky's

performances, and what do these transformations reveal about musical temporality? The question shifts the focus away from "what is the correct tempo?" towards something broader. The aim is to understand what happens to a tempo reference when it becomes a trajectory, how that trajectory is organised within a performance, and what occurs when the same performer returns to the work years later.

The first chapter establishes the conceptual ground for this investigation. It begins with the distinction between tempo and temporality and develops the concepts of prescribed time, realised time, and temporal profile. The aim is not to construct a general theory of musical time, but to define the distinctions necessary for comparison between score and performance to become analytically productive. It is also in this chapter that stability, variation, and transformation come to be understood as related behaviours operating at different scales.

The second chapter brings these questions into relation with Stravinsky. His concern with precision, notation, interpretation, and authority is considered not only through his writings, but also through the ways in which he sought to control and transmit the realisation of his music. Recording occupies a special place here. While it offered the composer a means of preserving a sonic realisation, it also makes decisions taken at different moments comparable. In this context, *L'Histoire du Soldat* emerges as a particularly fertile laboratory because of the clarity of its metrical construction, the diversity of its materials, and the existence of the three recordings that constitute the corpus.

The third chapter presents the methodological route through which these recordings were converted into analysable data. More than describing tools, it makes explicit the decisions required for events detected in audio to acquire musical meaning. The central concern is process traceability. Every transformation of the data must be re-constructible, from the initial temporal event to the profile used in the analysis.

The fourth chapter returns fully to the performances themselves. Each segment is examined in terms of its internal organisation, preserving the particularities of 1932, 1954, and 1961 before any attempt at historical synthesis. The guiding question is not which recording lies closest to the score, but how each realisation organises the movement temporally. This choice makes it possible to observe regions of stability, changes of direction, redistributions, and behaviours that would disappear if each recording were reduced to an average.

The fifth chapter changes the scale of observation. The performances are no longer considered only in terms of their internal logic but are compared across time. Attention shifts towards what persists, what is transformed, and the different directions assumed by those changes. The analysis then returns to the problem of prescription, the authority of the score, and the status

of recordings made by the composer himself. The path ends where the title of this book begins: beyond the metronome.

This "beyond", however, does not represent a rejection of measurement. The metronome remains one of the tools that make time comparable. What this study seeks to show is that the metronomic value does not exhaust what happens musically with it. Between a printed marking and a performance there is a trajectory. Between two performances there is a history. It is within that space that this book is situated.

Perhaps for that reason, the investigation ultimately returned to the experience from which it began. For the conductor, time is never merely counted. It must be anticipated, communicated, shared, and continually adjusted as the music unfolds. For the researcher, that same process requires sufficient distance to become observable. For those who work with technology, it can be converted into data without ceasing to require interpretation. The pages that follow arise from the meeting of these three positions.

At its core, the question that has remained since the first study has also become simpler. It is no longer a matter of determining whether Stravinsky was faithful to his own metronome. It is a matter of understanding what Stravinsky did with time when he had to turn his own music into an event once again.



1 Musical Temporality: Between Prescription and Performance



Music unfolds in time. Every sound has a beginning, a duration, and an end. It may be followed by another sound or overlap with it, while silence itself also participates in this temporal organisation. Unlike an image, which can be apprehended simultaneously, a musical work reveals itself progressively as its events unfold in succession. To hear it is, necessarily, to move through it in time.

This condition may seem self-evident, yet its implications are significant. Musical time does not simply coincide with the time measured by a clock. Two performances may have almost identical overall durations and still present markedly different temporal organisations. One may sustain a greater degree of tempo stability, while another may emphasise contrasts, prolong transitions, or locally reshape the relationships between musical events. Duration tells us how long a performance lasts, but it does not explain how that time is musically organised.

Kramer (1988) takes precisely this relationship as a point of departure. For him, music does not merely exist in time. It generates its own forms of temporality. This perspective shifts attention away from time conceived as a neutral container and towards the ways in which continuity, direction, proportion, duration, tempo, and discontinuity are articulated through musical processes. Kramer offers a particularly useful formulation in distinguishing lived temporality from its mere graphic inscription:

> Music is temporal: abstract sonorous shapes moving through yet simultaneously creating time. Time is both the essential component of musical meanings and the vehicle by which music makes its deepest contact with the human spirit. Most theories of music have been concerned not with time but with pitch, in part because pitch is discretely defined, precisely notated, and hence quantifiable. The musical score, which provides data for pitch studies, does not unfold in time, whereas heard music exists only in experienced duration. (Kramer, 1988, p. 2)

This shift is important because musical analysis tends to deal more readily with what can be delimited and represented in the score. Pitch, notated durations, bars, and metric relationships provide relatively stable points of observation. Other aspects of temporal experience, such as continuity, movement, proportion, tempo, and *pacing*, are less easily reduced to what is fixed on the page (Kramer, 1988).

It is useful to distinguish between several dimensions. Duration refers to the temporal extent of an event. Pulse provides a recurring reference, whether explicit or inferred. Rhythm organises durations, attacks, accents, and the intervals between events. Metre establishes relationships between pulses and groupings. Tempo, in turn, determines the speed of a given temporal unit. These dimensions are related, but they are not equivalent.

An indication such as ♩ = 112 provides a clear example. It establishes a precise relationship between a given note value and chronological time. If maintained consistently, it allows durations to be calculated. Yet this indication does not determine the temporal behaviour of a performance. It does not show whether that relationship will be maintained uniformly, whether local fluctuations will occur, or how different regions of the work will be articulated in time.

It is at this point that the distinction between tempo and temporality becomes fundamental. Tempo is a measurable dimension of temporal organisation, while temporality is broader. In this study, the term refers to the configuration assumed by temporal relationships as the music unfolds, including their continuity, stability, transformation, and formal articulation. The concern is not only to determine the tempo at which a passage is performed, but also to observe how that tempo changes as the music unfolds.

The distinction is important because temporality cannot be reduced to a sequence of numbers. Hasty (1997) draws attention to the risk of turning musical time into something static in order to make it analysable. Scores, graphs, and timelines allow relationships to be represented and quantities to be compared, but musical experience unfolds while events are still taking shape. For Hasty, understanding this condition requires a shift of attention from product to process, from what is already constituted to what is in the process of becoming.

In this sense, music as heard is always incomplete while it is unfolding. What has just occurred remains related to what is being heard, while what has not yet occurred participates in the experience as expectation. Hasty (1997) understands this condition through the idea of *becoming*. Musical organisation is not only a structure that can later be observed, but something that emerges in the very course of experience. This same tension between process and representation also lies at the heart of Hasty's distinction between analysis and experience:

> To take measurements or to analyze and compare patterns we must arrest the flow of music and seek quantitative representations of musical events. But music as experienced is never so arrested. To the extent we find it comprehensible, music is organized; but this is an organization that is communicated in process and cannot be captured or held fast. (Hasty, 1997, p. 3)

Musical time is not simply an extent that can be divided and measured. It involves relationships that are formed between past, present, and anticipated events. To listen to music is to follow this process and continually reorganise what has already been heard in the light of what comes afterwards.

This does not mean rejecting measurement. On the contrary, it means recognising precisely what measurement captures. Measuring durations, pulses, or variations in tempo makes specific aspects of temporal realisation observable. The problem arises only when these values are treated

as equivalent to temporality itself. As Hasty (1997) observes, reducing duration to homogeneous quantities may facilitate analysis, but it can also obscure the very processual character of what is being measured.

This distinction becomes even more significant when we move from the notated work to the performed work. The score establishes relationships of duration, metre, articulation, and, in many cases, explicit tempo indications. It offers a prescribed temporal organisation. On the page, however, these relationships do not yet possess the specific durations they will acquire in a particular performance.

It is in performance that this prescription becomes an event. Each pulse acquires a concrete duration, minute differences become perceptible, and accelerations, decelerations, moments of stability, and transitions become part of that specific realisation. A performance does not simply occupy an interval of time. It configures that interval in a specific way.

This argument does not treat score and performance as opposing entities. Cook (2013) shows why it is inadequate to regard the act of making music as the mere reproduction of a meaning already fully contained within the musical text. The experience of music as sounded, whether live or on record, is itself a primary mode of musical existence, rather than simply a secondary materialisation of something already wholly contained in notation.

To think of music in performative terms, then, is to recognise that meaning is also created in the act of making music. The score remains fundamental, but it is no longer understood as an object that contains in advance everything "that is subsequently to be reproduced". Cook (2013) suggests that it is better understood as something closer to a *script*: a structure that guides actions and relationships without fully determining what happens in its enactment.

This perspective is especially relevant to the study of time. A metronome marking possesses a particular kind of objectivity because it establishes a verifiable numerical reference. Performance also produces measurable data. Yet there is not necessarily an absolute correspondence between the two. It is precisely in the space between what is prescribed and what is realised that temporal choices become analytically significant.

Recordings make this relationship particularly observable. They preserve realisations that would otherwise disappear with the act of performance itself, allowing differences in duration, tempo, and flexibility to be compared. Cook (2013) demonstrates the potential of this approach by bringing together listening, recording, and quantitative performance analysis without reducing musical interpretation to the data produced by measurement. In this way, Cook shifts the discussion towards music as performed and towards the status of the score:

> The experience of live or recorded performance is a primary form of music's existence, not just the reflection of a notated text. And performers make an indispensable contribution to the culture of creative practice that is music. My claim is that in order to think of music as performance we need to think differently about what sort of an object music is. (Cook, 2013, p. 1)

The central concern of this study lies in the gap between what the score prescribes and what is realised in performance. How are the temporal relationships prescribed in the score transformed through performance, and what do these transformations reveal about musical temporality? This question moves beyond a simple opposition between text and interpretation and instead focuses on the relationship between the two. The aim is to identify which aspects of temporal organisation remain stable, which are altered, and how such differences can be observed and compared across different performances. Temporality is therefore understood not as a property of either the score or performance alone, but as something that emerges through the relationship between prescription and realisation.

The hypothesis that guides this book locates temporality precisely within this relationship. The score establishes temporal conditions, while performance gives them a particular realisation. The analytical aim is not to decide which of the two contains the "true" time of the work, but to understand how prescription becomes realisation and what that transformation can reveal.

This is also why the metronome, although central to this study, is not its ultimate point of reference. It provides a means of measurement, but it does not exhaust the complexity of temporal organisation. Temporality begins to emerge when we consider what happens beyond that measure.

1.1 Tempo is not Temporality

For the conductor as interpreter, the distinction expressed in the title of this section becomes particularly concrete when score study requires choices of tempo. To establish a "speed"[1] is not simply to decide how fast or how slowly a passage should be performed. Such a choice affects articulation, the perception of rhythmic relationships, the shaping of phrases, the weight of musical events, and the proportion between sections. Even when a precise metronome marking is given, an interpretative question remains: to what extent does that value allow the internal relationships of the work to become perceptible in performance? Tempo therefore ceases to be merely an instruction to be followed and becomes part of a broader network of decisions involving form, character, and continuity.

[1] The term speed is used in this study in a strict sense to refer to the rate at which a musical unit is realised in time, whether expressed or estimated through metronome values. In this sense, speed is a property of tempo and should not be confused with musical time or temporality, which are broader concepts used throughout this study.

The issue becomes even more apparent when the conductor must relate different tempi across the same work. Each local decision alters the perception of what has come before and conditions what follows. A *ritardando*, a return to the previous tempo, or a sudden change of speed does not carry meaning in isolation. Its function arises from the position it occupies within the musical trajectory. The interpretative task lies less in finding an ideal tempo for each passage than in constructing temporally coherent relationships between them. It is at this point that the choice of tempo approaches the broader question of temporality. The conductor does not merely determine "speeds" but participates in shaping how the work is organised and experienced in time.

Tempo and temporality belong to the same conceptual field, but they do not refer to the same thing. Tempo establishes a relationship of speed between a musical unit and a unit of chronological time. A marking such as ♩ = 108 indicates how many quarter notes correspond to one minute. It is a precise, measurable, and comparable relationship. Even so, it does not describe how time is organised as the music unfolds.

The distinction is crucial. Tempo answers, above all, the question "at what speed?" Temporality raises a broader question: "how is that speed shaped over time?" It encompasses stability, change, contrast, continuity, interruption, recurrence, and the relationships established between different regions of the work.

For this reason, tempo should not be treated as synonymous with musical time. It is one of its observable dimensions. A metronome value may remain virtually constant while other temporal relationships undergo substantial change. Likewise, a relatively small change in speed may become highly significant when it coincides with a formal transition, a change of character, or a point of articulation.

Igor Stravinsky's own reflections help to clarify this distinction. In *Poetics of Music in the Form of Six Lessons* (Stravinsky, 1996), the composer does not treat time as a mere framework for the succession of sounds. Musical organisation depends on impulses and points of repose, approaches and withdrawals, tensions and moments of stability. It is from the articulation of these elements that what he describes as the "breathing" of music emerges.

The discussion becomes more explicit when Stravinsky (1996) draws on the ideas of Pierre Souvtchinski. In distinguishing different ways in which music may relate to *chronos*, he suggests that a work may follow the flow of time, resist it, or reorganise it[2]. The argument does not amount to a systematic theory of temporality and originates in Souvtchinski's formulation. Even so, its inclusion

[2] The distinction between ontological and psychological time is presented by Stravinsky through the ideas of Pierre Souvtchinski. Although incorporated into the argument of *Poetics of Music*, this distinction is best understood as part of Stravinsky's engagement with Souvtchinski's thought rather than as an original theory of temporality developed by Stravinsky himself.

in *Poetics of Music* is significant. For Stravinsky (1996), the problem of musical time extends beyond both physical duration and the mere speed of performance.

Barreiro (2000) helps to sharpen this distinction by treating continuity, ordering, transformation, directionality, speed, and duration as different aspects of musical time. He further distinguishes between relationships that structure music temporally, such as metre[3] and rhythm, and processes that alter the way music unfolds in time, including tempo, *rubato*, *accelerando*, and *ritardando*. The implication is important: tempo contributes to temporal behaviour but does not define it in its entirety.

A simple example helps to illustrate this distinction. Imagine a passage marked ♩ = 120. In the first performance, the performer maintains this value with almost no variation. In the second, the performer begins close to 120 BPM, slows down through a transition, gradually regains the initial speed, and later settles into a stable tempo once again. The two performances may share the same reference tempo and even have a very similar overall average. Their temporality, however, is not the same, because the relationships between stability, slowing, recovery, and formal articulation differ.

The example shows why an average value is not enough to describe a performance. Two interpretations may have similar averages and yet follow very different temporal trajectories. The reverse is also possible. Performances with different average speeds may preserve similar internal relationships between sections or display comparable patterns of acceleration and deceleration.

As we shall see, quantitative analysis therefore requires a distinction between value and behaviour. A number indicates a speed at a particular point or over a given interval. A sequence of values makes it possible to observe a trajectory. It is when that trajectory is related to form, transitions, and differences between performances that measurement begins to acquire analytical significance.

From this perspective, reducing a performance to a single metronome value means turning a process into an average and, in doing so, obscuring some of the relationships that may be musically most significant. Measurement remains indispensable, but its value lies not only in the numerical result. It also lies in the way values are distributed, remain stable, diverge, or change over the course of a performance.

[3] Barreiro uses the term metre to refer to the organisation of pulses according to patterns of accentuation and temporal hierarchy. In this study, metrical organisation is used in a corresponding sense to describe the organisation or structure of these relationships, while preserving the distinction between this structural dimension and processes of temporal variation associated with tempo.

This distinction finds a particularly provocative counterpoint in Adorno[4] (1974). In *Philosophy of New Music*, his critique of Stravinsky is directed not simply at speed or metric regularity, but at the way rhythm, repetition, and succession relate to the construction of musical time. In contrasting an "expressive-dynamic" mode of listening with a "rhythmic-spatial" one, Adorno (1974) understands the former as capable of integrating the passage of time into the musical process, while the latter tends to subdivide time into equal quantities and, in doing so, to spatialise it[5].

The formulation is deliberately critical and should be read as such. For Adorno (1974), the problem lies not in rhythmic organisation or temporal precision in themselves, but in the way they are integrated into the musical construction. It is in this context that he accuses Stravinsky of separating rhythmic articulation from the rest of the musical content and of replacing certain forms of development with repetition, *shock*[6], and juxtaposition. The value of this argument for the present study does not depend on accepting Adorno's aesthetic judgement. Rather, it lies in the distinction it brings into view: organising units in time is not necessarily the same as organising the temporal experience of music.

This critique, however, should not be taken as Adorno's final word on Stravinsky. Akamine (2006) draws attention precisely to the risk of treating the chapter in *Philosophy of New Music* as the philosopher's definitive position. Adorno's engagement with Stravinsky extended over several decades, and the later essay *Stravinsky: A Dialectical Portrait* (1962) shifts the emphasis of his assessment, even though it does not remove the fundamental tensions in his reading. This qualification is important because it allows Adorno's critique to be used as a theoretical problem rather than as a diagnosis to be adopted uncritically.

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[4] Adorno's critique of Stravinsky spans several decades and is not confined to the chapter "Stravinsky and Restoration" in *Philosophy of New Music*. Among his later writings, "Stravinsky: A Dialectical Portrait" (1962) is particularly significant. In this essay, aspects of his earlier assessment are reconsidered, although central elements of his conception of temporality remain.

[5] The terms "expressive-dynamic" and "rhythmic-spatial" belong to Adorno's critical vocabulary. He does not present them as natural or universal categories, but as historically constituted modes of listening and musical organisation. The expressive-dynamic mode, associated with singing, conceives time as an active part of the musical process. Differences, tensions, and transformations are integrated into the course of the music and give direction to the succession of events. The rhythmic-spatial mode, which Adorno associates with drumming, organises time through regular subdivisions and tends to convert it into equivalent, spatialised units. For Adorno, great music does not belong exclusively to either pole but emerges through the tension and articulation between them. His critique of Stravinsky stems precisely from what he perceives as the predominance of the rhythmic-spatial principle, in which precision, repetition, and segmentation tend to replace temporal relationships based on development and transformation (Adorno, 1974). In the present study, these categories are used to clarify Adorno's argument and his conception of temporality, rather than as an analytical model for the study of Stravinsky's performances.

[6] In Adorno (1974), *shock* does not refer merely to a sudden effect or a forceful accent. The term denotes musical events that interrupt or fragment the continuity of the flow, producing abrupt contrasts and a discontinuous experience of time. In his reading of Stravinsky, Adorno associates such procedures with repetition, segmentation, and the spatialisation of time, although he also recognises *shock* as a broader phenomenon of modern music, present in Schoenberg's expressionism as well (Adorno, 1974).

Seen from this perspective, the disagreement between Stravinsky and Adorno becomes particularly productive. Stravinsky conceives temporal organisation in terms of impulses, points of repose, and relationships of attraction, similarity, and contrast. Adorno, by contrast, requires time to be constituted through succession, transformation, and development. Their conceptions do not coincide, but both point to something fundamental: musical time cannot be explained solely by the speed at which events occur.

It is precisely here that an exclusively metronomic reading becomes insufficient. Knowing whether a passage is performed at ♩ = 108, 112, or 116 is relevant, but the analytical question does not end there. It is also necessary to consider where the differences occur, how they are distributed, how long they last, and how they relate to the organisation of the work.

Tempo will therefore be treated as a measurable manifestation of temporality rather than as its equivalent[7]. Metronome values provide points of reference. Their variations reveal patterns of behaviour. The relationships between these patterns, observed across the form and compared between different performances, make it possible to investigate how temporal organisation takes shape in performance. Tempo is a measure of speed. Temporality is the organisation of relationships in time. The former can be expressed as a value. The latter becomes intelligible only when we observe what those values do as the music unfolds.

1.2 Prescribed Time: Temporality in the Score

If the previous section required a distinction between tempo and temporality, the problem now shifts. Before any sound takes place, how does time exist in the score? The question is less straightforward than it may seem. Music can only unfold successively, yet the score presents that succession simultaneously. What is to happen before and after is laid out at once before the eye. Musical notation therefore performs a paradoxical operation: it transforms relationships that belong to temporal flow into relationships organised spatially on the page.

A rhythmic value does not endure in the score. A bar does not elapse. A fermata suspends nothing while it remains printed on the page. Even an indication such as ♩ = 120 produces no pulse by itself. All these elements represent conditions under which temporal relationships may occur, but they do not yet constitute their occurrence. Notation makes an organisation of time visible precisely by removing it, provisionally, from the flow in which it may come to exist as music.

[7] This methodological choice does not assume that temporality can be fully quantified. Tempo data are treated as indicators of particular temporal behaviours, whose interpretation depends on their distribution, their internal relationships, and the way they interact with musical form.

Adorno (1998) formulates this paradox with clarity in *Quasi una Fantasia*. Music is dynamic because its elements condition one another in succession, yet notation fixes that succession within a graphic and spatial system. What is meant to unfold in time appears immobilised in the text. For Adorno, this contradiction is not a defect of notation, but a condition of its very possibility. It is precisely because relationships can be fixed that a complex succession can be organised, preserved, and transmitted.

This formulation allows us to take an important step further. The score should not be understood as a container in which musical time is already deposited in its final form. Rather, it contains a configuration of temporal relationships that may potentially be realised. It includes notated duration, proportional relationships, metrical hierarchy, the ordering of events, changes of tempo, and different degrees of temporal determination. Yet none of these relationships possesses the concrete duration it will acquire in performance. Written time is structured but remains suspended.

It is in this sense that I propose using the concept of prescribed time. The term refers to the set of temporal conditions established by the score prior to any realisation. These conditions include proportional relationships between durations, metrical organisation, verbal tempo indications, metronome markings, tempo changes, and instructions that shape the handling of time. "Prescribed", in this context, does not mean that every moment of a performance has already been determined in advance. Rather, it means that the score defines a field of relationships within which temporality must acquire concrete existence.

The distinction is important because it avoids two opposing reductions. The first would be to regard the score as incapable of determining anything significant about time, as though temporality belonged exclusively to the performer. The second would be to assume that temporal organisation is already fully realised in the text, leaving performance merely to convert it mechanically into sound. Prescribed time lies between these two positions. It is sufficiently determined to guide, constrain, and structure realisation, but not sufficiently complete to coincide with it.

Hasty (1997) addresses precisely this problem when he observes how easy it is to conceive of the score as a fixed set of instructions awaiting faithful decoding. The difficulty arises when this image obscures the fact that every actual musical event involves contingency, indeterminacy, and passage. For Hasty (1997), a fixed representation may make certain relationships apprehensible, but it should not be confused with the temporal process it represents. The point is not to diminish the importance of notation, but to recognise the transformation that occurs when something temporal comes to be represented spatially.

This limitation of notation already appears in particularly concrete form in Riemann (1884). In discussing phrasing, metre, and performance, he begins from the recognition that conventional notation does not provide sufficient means to make musical articulation unambiguous. His advocacy of specific signs for the delimitation of motives and phrases arises precisely from the awareness that what appears graphically organised on the page does not necessarily coincide with the way those relationships need to be understood and realised in performance. The issue extends beyond phrasing in the strict sense. Notation can record durations, metrical divisions, and relative positions, but these elements alone do not guarantee the temporal organisation that will emerge in performance.

This transformation becomes especially apparent in metre. Bar lines, time signatures, and the disposition of note values make it possible to represent hierarchical and proportional relationships with remarkable precision. At the same time, the very technology of notation can encourage the idea of a homogeneous temporal grid, as though the units represented were pre-existing entities simply waiting to be filled by musical events. Hasty (1997) draws attention precisely to the risk of turning what is experienced as process into an abstract system of positions and quantities.

There is a subtle but crucial distinction here. The score may prescribe that two crotchets have, in principle, the same proportional duration without determining everything those durations will mean when placed within concrete musical relationships. Their notated equality is a structural condition. The experience of that equality, however, depends on what happens before, during, and after it. Notation establishes relationships. Performance makes them temporally present.

Riemann (1884) pushes this distinction further by arguing that the equality of prescribed temporal units does not necessarily imply absolute equality in their realisation. In his conception of agogics, small accelerations, decelerations, and prolongations contribute to the articulation of motives and phrases, so that graphically equivalent units may acquire slightly different durations without losing their metrical relationship. It is in this context that he rejects strictly regular performance according to the metronome as a sufficient model of musical realisation. The significance of this position for the present study lies not in turning Riemannian agogics into an interpretative norm, but in recognising the principle it makes explicit: notated duration and realised duration belong to different levels of temporal organisation.

Cook (2013) offers another way of understanding this status by suggesting that the score should be thought of less as a closed literary text and more as a *script*. From this perspective, notation does not contain a performance in latent form, waiting merely to be revealed. It organises possibilities for action, coordinates relationships, and establishes the conditions under which something can happen. To think of the score as a *script* does not diminish its authority. It changes

the nature of that authority. Rather than being a complete sonic object in graphic form, the score becomes a structure that calls for realisation.

The distinction becomes even more important because notation is not transparent. Cook (2013) observes that representation itself shapes what it represents, and that the passage from notation to sound is never a direct and unmediated correspondence. Even the apparently most objective elements of notation leave many aspects of performance undetermined. The score may be highly precise while still depending on tacit knowledge, interpretative conventions, and decisions that only become necessary when the music is brought into sound.

Among the various temporal signs found in a score, few appear to possess such a strong power of determination. *Allegro*, *Lento*, and *Moderato* remain semantically open. ♩ = 112 seems to belong to a different order. The number presents itself as a measure. Its appearance is objective, verifiable, and reproducible. Unlike a verbal indication, it seems to offer a precise answer to a question that, for centuries, had remained dependent on convention, style, and judgement.

The apparent self-sufficiency of a metronome value becomes less convincing, however, once the unit to which the number refers is considered. Riemann (1884) had already observed that metrical notation does not always make it possible to determine unequivocally which level should function as the unit of counting, and that the choice of unit alters the perception of tempo itself. For him, it makes a difference whether a passage is perceived in crotchets, minims, or smaller subdivisions, even though these relationships may be converted mathematically from one into another. The metronome value, therefore, does not operate in isolation. Its meaning depends on the musical unit it quantifies and on the position of that unit within the metrical organisation. In this sense, the precision of the number is relational rather than absolute.

We can observe this relationship quite simply. A marking such as ♩ = 120 does not simply mean '120'. It establishes a proportion between a specific musical unit and chronological time: 120 crotchets per minute. If the same passage is marked ♪ = 240, the chronological relationship expressed by the two values is mathematically equivalent, since two quavers correspond proportionally to one crotchet. Each crotchet at 120 lasts 0.5 seconds, while each quaver at 240 lasts 0.25 seconds. Taken in pairs, those quavers reproduce exactly the duration of one crotchet at 120.

The number, therefore, has no independent temporal meaning. 240 is not "faster" than 120. We first need to know which musical unit is being measured. Prescribed speed results from the relationship between the numerical value and the note value that serves as its reference.

Yet this precision produces an effect that extends beyond measurement. The metronome marking acquires not only quantitative value, but also symbolic force. Because it is written down,

numerically specified, and often directly associated with the composer, it may come to function as a privileged sign of authorial intention. The number then ceases merely to answer the question "what is the tempo reference?" and begins, almost silently, to answer another: how did the composer want it to be?

Cook (2013) shows how this shift becomes particularly concrete in discussions of Beethoven's metronome markings. Debate among performers quickly moves beyond questions of speed and becomes a dispute about authority, fidelity, and intention. The marking is invoked as evidence of the composer's wishes, even when its musical appropriateness remains contested. In this sense, the metronome did not merely introduce a technology of measurement into musical culture. It also introduced a new form of documentary authority over time.

The authority of the number creates the appearance of eliminating interpretation precisely where interpretation remains necessary. ♩ = 112 is incomparably more determinate than *Allegro*, but its exactness does not resolve all the temporal relationships within which it must operate. It is still necessary to understand where that reference begins to take effect, how it relates to articulation, phrasing, metrical change, transitions, contrasting materials, and larger-scale form. The more precise a local prescription appears to be, the more important it becomes to understand its function within the whole.

For this reason, the metronome marking does not eliminate the interpretative problem. It shifts it. The question is no longer simply one of choosing a speed, but of determining the status of that speed within a network of relationships. A numerical indication may function as a centre of stability, an approximate reference, a condition of proportionality between sections, or a limit against certain interpretative tendencies. The sign remains the same. Its musical function depends on the configuration in which it is embedded.

For Stravinsky (1996), faithful performance requires attention not only to the notes, but also to tempo, nuance, phrasing, and the other indications that contribute to the configuration of the work. Performance thus appears as a responsibility towards a set of prescriptions that should not be arbitrarily replaced by the performer's subjectivity.

It is tempting to conclude from this that a more detailed score would progressively reduce the scope for interpretation. Yet the situation is more complex. The greater the degree of specification, the greater the number of relationships that must be reconciled. Fidelity therefore ceases to be simply a matter of obeying isolated signs and comes to involve the question of how to make them coexist musically. A tempo indication may be realised exactly and still produce internal relationships different from those shaped by another performer working with the same value. Documentary precision does not dissolve mediation. It makes it more visible.

Adorno (1998) offers a particularly fertile formulation of this problem by conceiving time as something that remains, so to speak, frozen in the musical text and can only be actualised in performance. When notation becomes sound, it enters empirical time, acquires chronological duration, and begins to exist as an event. What was simultaneously available on the page must then submit to the irreversibility of succession. This passage from graphic simultaneity to sonic succession is not simply a change of medium. It is a change in ontological condition.

For the conductor as interpreter, the score exists precisely at this threshold. Faced with it, the conductor can examine simultaneously relationships that will never be simultaneous in listening. It is possible to return to a bar, compare distant sections, observe proportions, anticipate consequences, and construct an overall image of the work. In performance, however, this synchronic view disappears. Each decision begins to produce irreversible effects. The tempo chosen at a particular moment alters the temporal conditions of what follows and retrospectively reshapes the perceived proportion of what has already passed.

This is why studying prescribed time does not mean searching the score for a hidden ideal performance. It means reconstructing the system of relationships that notation projects onto a performance that does not yet exist. The score does not provide the event itself. It provides the conditions, proportions, hierarchies, references, and limits from which that event must be constructed.

The distinction therefore takes on particular importance in this study because Stravinsky occupies the roles of both composer and performer of his own music. His metronome markings are not merely indications in a text to be realised by others. They coexist with recordings in which the composer himself turns those prescriptions into concrete temporal events. This creates an exceptional analytical situation. For the first time, we need not ask only what the score prescribes. We can also observe what happens when the person who prescribed the time must also give it concrete form in performance.

The concept of prescribed time does not constitute an absolute standard against which performance is to be judged, but rather the first term in a relationship. The written marking establishes a temporal expectation. Performance may confirm, shift, flexibilise, or reorganise that expectation. What matters is not to measure the distance between a presumed pure intention and its imperfect execution, but to understand what that distance means musically.

The score does not contain the time of the work. It contains a projection of its temporal organisation. This projection has normative force without yet possessing sonic existence, and it is precisely for this reason that performance becomes analytically necessary. Between what the sign

fixes and what sound realises lies the space in which temporality ceases to be merely prescribed and begins to happen.

1.3 Realised Time: Performance as Temporal Production

If prescribed time projects relationships that have not yet occurred, performance brings about a decisive change of status. What was available as possibility now comes to exist as actual duration. A pulse acquires temporal extent, a rest occupies a concrete span of time, and a transition begins at one moment and ends at another. Relationships that could be examined simultaneously on the page now become successive and irreversible. Performance does not simply add sound to what was written. It brings a temporal organisation into existence as an event.

It is in this sense that I propose the concept of realised time. The term refers to the temporal configuration produced in a specific performance. It does not correspond simply to the tempo adopted or to the total duration of the performance. Rather, it includes the way durations, pulses, inflections, transitions, pauses, and changes of tempo relate to one another over the course of a particular realisation. If prescribed time establishes temporal conditions, realised time reveals how those conditions behave once they are subjected to the continuity of performance.

The word *realised* is important. It does not mean that performance reveals a temporality that already existed, complete and silent, within the score. Rather, it means that certain relationships acquire empirical existence only in the act of performance. Rink (2024) insists precisely on the event-like nature of performance. Performances are not stable objects of the same kind as the texts that may serve as their points of reference. They happen. They are temporal, contingent, and ephemeral acts. It is this condition that makes each realisation both connected to what precedes it and irreducible to it.

To speak of temporal production requires some precision. The performer does not create the time of the work *ex nihilo*, as though notation left everything open. To produce time in performance means to convert relational possibilities into a particular configuration. Prescription constrains. Style provides orientation. Structure creates expectations. The body imposes conditions. Instruments and performers respond in ways. Other performers intervene. Within this network of constraints, a single temporal sequence must, ultimately, come into being.

From this perspective, performance can no longer be adequately understood as reproduction. Reproduction would suggest that temporal relationships already possessed a concrete form prior to the act of performance and that the performer's task was simply to restore them. Yet a prescribed duration does not have the same status as a performed duration. The former establishes a

relationship. The latter occupies time. What occurs between them is not merely a transfer of information, but a passage from possibility to determination.

The passage from possibility to determination does not take place all at once. Realised time is constituted across different scales. It can be observed in the duration of a note, the extent of a pulse, the relationship between beats within a bar, the shaping of a phrase, the handling of a transition, the proportion between sections, or the overall duration of a movement. These scales do not operate independently. A small local expansion may alter the direction of a phrase without significantly changing its overall duration. If repeated systematically, however, it may transform the proportion of an entire section. The local contributes to the global, while at the same time deriving its function from it.

Within this framework, *timing* assumes particular importance. Clarke (2002) observes that it belongs simultaneously to musical organisation and to how performers produce expression. Performers exercise temporal control over a performance at levels ranging from the individual note to extended passages and the work as a whole. More importantly, the research discussed by Clarke shows that the temporal profiles of experienced performers can display remarkable stability across performances without diminishing their ability to modify them consciously.

Such stability also prevents temporal variation from being confused with indeterminacy. The fact that a performance does not mechanically reproduce the nominal durations of the score does not mean that its temporal behaviour is arbitrary. On the contrary, fluctuations may form highly organised patterns. Clarke (2002) shows that even when performers are asked to play with less expression, variations in tempo and dynamics are reduced but do not disappear entirely. Certain patterns remain, suggesting that temporal organisation is deeply connected to the way performers understand and articulate musical structure.

Such considerations substantially change the analytical status of what is often described as "deviation". A note that lasts slightly longer than its proportional value, a slowing at the end of a phrase, or a return to the previous tempo need not initially be understood as departures from a norm. They may instead constitute the very means by which musical relationships become perceptible. The difference between prescribed value and realised duration thus shifts from a question of fidelity to one of function.

At the same time, small physical differences can produce significant perceptual effects. In discussing the perception of performance, Clarke (2002) shows that listeners may be sensitive to temporal changes of only a few tens of milliseconds, although that sensitivity depends strongly on musical context. A slight expansion at a phrase boundary may sound natural and pass almost unnoticed, whereas the same alteration elsewhere may become highly salient. The temporal

meaning of a duration therefore lies not only in its quantity. It depends on where it occurs and on the relationship it establishes with the process already under way.

A fundamental property of realised time begins to emerge here: it is relational. A second does not always carry the same musical weight. A physically identical duration may be perceived in radically different ways depending on its position, its function, and what surrounds it. The stopwatch measures spans of time. Performance creates relationships between those spans.

Rink (2002) takes this idea further by placing temporality at the centre of performer's analysis. For him, the form that matters in performance should not be conceived merely as a static architecture, but as *shape*[8], as a configuration that takes form over time. In his more recent work (Rink, 2024), this position becomes more radical still. Structural relationships are not simply immanent properties that performance reveals, but potentialities that may be inferred, articulated, and projected in different ways. Because music is intrinsically dependent on time, structure comes to be understood less as an object than as a process.

This formulation is crucial to the concept of realised time. Performance does not occur *after* temporal structure, as though it merely clothed that structure in expression. Part of what we call structure becomes musically operative only when it begins to establish relationships over the course of performance. A climax must be prepared if it is to function as a climax. An arrival depends on the trajectory that precedes it. A return can only be perceived as a return because something has occurred between two temporal appearances. Performance does not modify these relationships from the outside. It produces the temporal conditions under which they can be perceived as relationships.

In examining the manipulation of time in performance, Rink (2024) shows how temporal choices contribute to the construction of an interpretative conception. For the performer, creating coherence means maintaining an awareness of the broader direction while acting within the immediate present. Performance continually articulates these different scales. What happens now acquires its function in relation to what has just occurred and, at the same time, prepares the conditions for what has yet to happen. Realised time is therefore both prospective and retrospective. Each moment reshapes the memory of what has passed and alters the expectation of what may follow.

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[8] Rink (2002) deliberately uses *shape* in contrast to *structure* when discussing performer's analysis. The term does not correspond simply to "form" or "structure", but refers to the configuration music acquires as it is projected through time in performance. It is a more processual and temporal notion, involving the ways in which local and global relationships are articulated, directed, and made perceptible as the performance unfolds. Rink considers *shape* to be more temporally conceived than *structure* and places temporality at the centre of performer's analysis. In this study, the English term is retained in order to preserve this distinction and avoid its immediate identification with "musical form" (Rink, 2002).

Such a temporal dimension makes decisions in performance fundamentally different from decisions made while studying the score. During preparation, the performer can stop, go back, compare, experiment, and replace one solution with another. In performance, however, each decision uses up the possibility that preceded it. Once realised, a duration becomes part of the conditions for the duration that follows. Realised time accumulates consequences.

A performance therefore cannot be understood as a series of independent temporal choices. If a performer prolongs a transition, what follows does not begin within the same temporal context that would have existed without that prolongation. If a passage is gradually accelerated, its point of arrival will be heard through the temporal energy generated along the way. Even when a subsequent tempo coincides numerically with a value heard earlier, the experience of that value may have changed because its immediate history has changed.

The irreversibility of realised time brings it close to the very logic of action. Hill (2002) observes that the passage from score to sound requires far more than accuracy in reproducing written information. Even in technically simple material, slight differences in dynamics, articulation, and shaping can profoundly alter the perceived configuration of a phrase. Performance gives form and meaning to the material precisely by turning it into perceptible relationships that do not exist in the same way within the text.

Equally important is a bodily dimension that cannot be separated from this process of production. Realised time is not a disembodied calculation. It is shaped through breathing, gesture, motor coordination, physical endurance, attack, sustain, and the physical properties of instruments. Clarke (2002) goes so far as to characterise playing as a concrete form of musical thought. Body and understanding are not successive stages in which a decision is first made and then executed. Action itself participates in shaping what the music becomes.

Embodiment allows this question to move beyond an understanding of the body as a mere means of execution. Martins (2021) proposes thinking of the performing body as a site in which temporality is both inscribed and produced. Gesture, movement, voice, and rhythm do not simply occur in time, but constitute ways in which time is experienced and made perceptible. Although her reflection emerges from a different cultural and epistemological context, it nevertheless makes it possible to recognise a principle that is relevant to musical performance: temporality does not simply pass through a neutral body. It is also constituted through it.

In conducting, this issue acquires an additional layer of complexity. The conductor does not produce the time that is heard alone. The gesture projects a temporal organisation that must be perceived, anticipated, and transformed into action by the musicians. Goodman (2002) shows that ensemble coordination depends on continuous processes of anticipation and response. Even when

a common tempo is established, each performer makes local adjustments in response to what is heard and to what they anticipate the others will do.

The technical gesture of conducting is better understood not as the projection of an external clock, but as the creation of a shared field of temporal expectation. The conductor indicates points of reference, directions, impulses, and degrees of continuity. The orchestra or choir transforms these signals into sound according to the concrete conditions of each instrument and the interaction that develops among its members. Goodman (2002) also emphasises that the conductor communicates far more than pulse alone. Bodily movement, posture, and visual expression convey information about character and musical direction.

Even under highly controlled conducting, therefore, realised time is not simply "the conductor's time". It is co-produced. Instruments differ in their attack and response times. Instrumentalists and singers do not begin sounds with absolute physical simultaneity. Spatial distance affects the propagation of sound. Entries after rests require anticipation. Changes of tempo demand collective readjustment. Goodman (2002) observes that perfect physical simultaneity within an ensemble is unattainable and that what we perceive as synchronisation results, in part, from the coordination of small temporal differences.

This point is particularly relevant to a study centred on orchestral conducting. What a recording captures is not the simple materialisation of an individual temporal intention. Even when the composer is on the podium, what we hear results from the interaction between gesture, instrumental response, collective coordination, acoustics, and the concrete circumstances of production. The conductor's authority may be decisive without being absolute.

The concept of realised time must therefore preserve both determination and contingency. Determination, because a particular performance has durations that can be measured and compared. Contingency, because that configuration arises from a situation that could have unfolded differently. A performance ends with a determinate overall duration, but there is no reason to conclude that this constitutes the duration of the work itself. It is the duration of that realisation.

Recording introduces a decisive methodological condition here. A temporal event that was originally ephemeral becomes repeatedly accessible. We can return to the same moment, measure intervals, compare passages, reconstruct profiles, and set performances made decades apart against one another. Yet the possibility of repeated listening does not turn a recording into the definitive

temporality of the work[9]. It fixes a particular realisation, making persistent something that, at the moment of its production, occurred only once.

Johnson (2002) draws attention precisely to the ambiguity of this status. A recording may provide valuable evidence of how a performer played, but it should not be confused with 'the work' or treated as an authoritative version of how the work ought to sound. The issue becomes still more complex when the conditions of studio recording are taken into account, since multiple takes, editing, and production decisions may all contribute to the sonic configuration that is ultimately preserved. A recording is therefore not a neutral window onto performance. It is simultaneously a document of a particular realisation and an object produced under specific conditions of recording.

Rink (2024) further argues that a recording constitutes a trace of performance rather than a complete equivalent of the event from which it originated. In the present study, it will therefore be treated as a document of a realised temporal configuration, not as a fully transparent representation of an original event.

The distinction outlined above also defines the limits of what quantitative analysis can do. When we extract durations, tempo values, or temporal curves from a recording, we are not converting the entirety of performance temporality into numbers. Rather, we are constructing representations of properties of realised time. A tempo curve can reveal stability, expansion, compression, transitions, and broader tendencies. It is not the performance itself, just as it is not temporality in its entirety.

Such caution is necessary because data can create a misleading impression of immediate evidence. Rink (2024) draws attention to approaches to performance analysis in which the production of data appears to become an end, without necessarily leading to musically meaningful conclusions. The value of temporal data lies not only in their precision, but in the relationship, we are able to establish between them and the musical process from which they were derived. Measuring when something happened is only the first step. We must also understand why that temporal configuration matters.

The concept can therefore be defined more precisely: realised time is the concrete, relational, and situated configuration assumed by the temporal conditions of a work in a specific performance. It can be measured in part, but it cannot be reduced to measurement. It may reveal regularities, but it is not synonymous with regularity. It may diverge from what is prescribed, but it is not defined

[9] This caution is particularly important in recordings made or supervised by the composer. Drawing on the different recordings of Elgar's *Violin Concerto* conducted by the composer himself, Johnson (2002) observes that even this kind of document should not automatically be regarded as the definitive realisation of the work. The composer's involvement does not eliminate historicity, contingency, or the possibility of interpretative change across different realisations.

by that divergence. Its existence begins when potential relationships start to produce consequences within the irreversible course of a performance.

In Stravinsky's case, this formulation substantially changes the analytical question. Comparing his recordings with his metronome markings does not mean checking whether the composer "obeyed" his own instructions[10]. Rather, it means investigating the relationships he established between prescribed reference and realised configuration. A faster or slower value becomes analytically significant only when we know where it occurs, how it is reached, how long it is sustained, and what function it assumes within the temporal trajectory of the performance.

Comparison between different recordings leads to a further consequence. When the same performer returns to a work at different points in time, the identity of the score does not produce temporal identity. Some relationships may remain remarkably stable, others may shift, and others may be substantially reorganised. Realised time has a history. It does not merely unfold within the time of a performance. It may also change over the course of a performer's interpretative life.

What, then, happens when the performer is also the composer? In Stravinsky's recordings, we are not comparing a fixed authorial intention with performances that either approach or depart from it. Rather, we are comparing different ways in which the same musical authority realised the work in time. If the recording differs from the metronome marking, that difference will not be treated in advance as inconsistency. Nor will differences between the recordings themselves automatically be taken as signs of instability. In both cases, the question is different: what kind of temporal organisation becomes audible in each performance, and what do its continuities and transformations reveal?

Prescribed time offers relationships before the event. Realised time gives those relationships consequences. Through this relationship, performance ceases to be understood merely as the place where the time of the work is executed and becomes the place in which a temporality is produced.

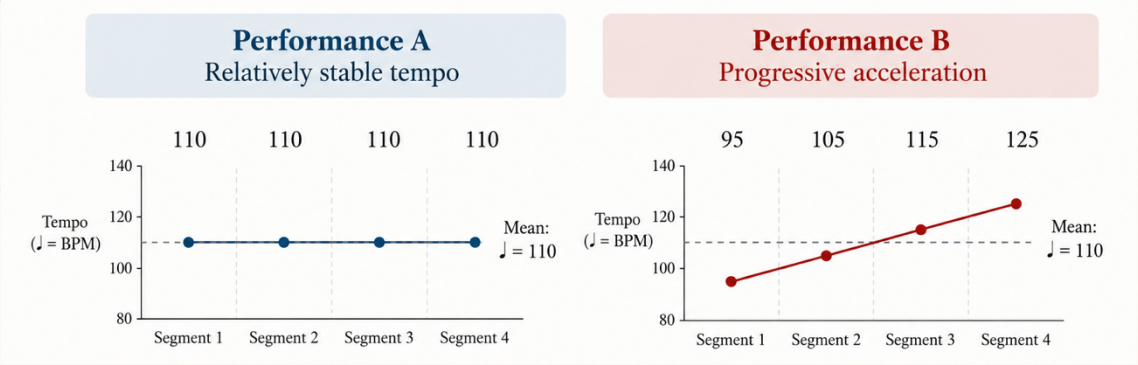
1.4 From Global Value to Temporal Transformation

If, as we have seen, realised time cannot be reduced to the simple execution of a prescribed value, its analysis likewise cannot be reduced to a single number that summarises the performance.

[10] This methodological choice is necessary in Stravinsky's case. Cook (2013) observes that his recordings of *The Rite of Spring* differ considerably from his own tempo indications, including speeds both above and below the prescribed markings, unnotated tempo changes, and pauses added in performance. Kramer (1988) likewise notes that, as a performer, Stravinsky often approximated rather than reproduced his metronome markings literally, while at times preserving proportional relationships between tempi with greater consistency. Such evidence calls for caution in treating the difference between marking and realisation normatively. In the present study, that difference will be treated as analytical evidence to be interpreted in relation to its position, extent, and function within the temporal trajectory of the performance, rather than as an automatic index of fidelity or infidelity.

Total duration, average tempo, and proximity to a metronome marking are all relevant measures, but they share one important characteristic. Each condenses into a single value what, in performance, unfolded as a trajectory.

Consider a simple case. Two performances may have the same average tempo, ♩ = 110, and yet behave in entirely different ways:



Example 01. Comparison of two performances with the same average tempo (♩ = 110) but different temporal organisations: relative stability in Performance A and progressive acceleration in Performance B.
Source: author's own elaboration.

Equality of averages does not imply temporal equivalence. In the first performance, the overall value results from relative stability. In the second, it is produced by an upward trajectory that passes through markedly different values. The calculation correctly returns the average of both performances but removes precisely what distinguishes them: the way each performance arrived at that value. The average preserves quantity while losing the trajectory.

This observation introduces a crucial distinction between global value and temporal organisation. The former places a performance within a particular range of speed. The latter reveals how that speed is distributed, transformed, and given function over the course of the work. A performance is not constituted temporally only by the point at which it is situated, but by the relationships it establishes between its different moments.

For this reason, a local value likewise has no analytical meaning in isolation. ♩ = 100 may represent an acceleration after ♩ = 90, a deceleration after ♩ = 110, or a region of stability when embedded within a sequence organised around that same value. The number itself has not changed. What has changed is its relationship to what precedes it and, consequently, to what it begins to project as continuity. The same quantitative value can fulfil different temporal functions.

This condition can be explored further through the phenomenology of temporal experience. In reconstructing Husserl's theory of internal time-consciousness, Rodemeyer (2006) shows that a sequence of events is not experienced as a succession of self-contained presents. What has just

occurred remains implicated in the constitution of the present moment, while anticipation of what may follow also contributes to its meaning. The present, in this sense, is not an isolated point but a temporal thickness in which the immediate past, current experience, and projection towards the future remain interrelated.

Applied to the problem at hand, this perspective helps to explain why a temporal value cannot be interpreted solely in terms of its magnitude. Each moment in a performance acquires its function through what it retains from the trajectory already traversed and through what it makes possible as a continuation. The temporal profile therefore represents not a simple succession of measurements, but a chain of relationships in which each state reshapes the meaning of what came before and conditions the interpretation of what follows.

This relational condition brings the analysis close to a fundamental property of musical experience itself. An event does not reach the listener as an isolated present. It is heard in the light of what has just happened and, in turn, reshapes expectations of what may follow. London (2004), in understanding metrical attention as a process of synchronisation and anticipation, shows that temporal perception is organised through patterns that emerge as the music unfolds rather than through the apprehension of independent moments. The temporal meaning of a moment depends on its position within a continuity.

To preserve this continuity analytically, we propose the concept of a temporal profile. In this study, the term refers to a representation of the trajectory taken by tempo over the course of a performance. Its purpose is not to replace the sounding experience with a curve, but to preserve relationships that disappear when the entire performance is reduced to an average value: regions of greater or lesser stability, tendencies towards acceleration or deceleration, expansions, compressions, disruptions, returns, and changes of direction.

A distinction must nevertheless be drawn between the trajectory itself and its representation. The temporal trajectory belongs to the performance. The temporal profile is an analytical reconstruction of that trajectory. This distinction prevents the graph or numerical series from being confused with the temporality it is intended to represent. As noted earlier in relation to realised time, measurement does not exhaust the event. It selects one dimension of what occurred and makes it available for comparison.

Rink (2024) offers a closely related way of framing the issue by conceiving performance as the articulation of temporally defined gestures across different scales and by emphasising the continuous relationship between overall architecture and local event. The analytical interest lies not simply in identifying values, but in understanding how those values contribute to what enables the

music to 'hold together' as it unfolds. Performance analysis loses precisely this dimension when data are produced independently of their musical function.

At this point, we can distinguish three behaviours that are fundamental to the present study: stability, variation, and temporal transformation. They are not mutually exclusive states, nor are they intended to constitute a universal taxonomy of performance. Rather, they are operational categories designed to make different modes of organisation and change analytically observable.

Temporal stability refers to the relatively consistent maintenance of a temporal organisation. This does not imply an absence of fluctuation. A performance may continually accelerate and decelerate and still display a high degree of stability if those inflections recur consistently at points or establish recurrent proportional relationships. The stability that matters here is not the mechanical regularity of the metronome, but the persistence of a relational logic.

Such a distinction prevents stability and expressivity from being treated as opposites. London (2004) observes that human performances rarely display mechanically perfect patterns of *timing* and may nevertheless reveal stable configurations, shaped precisely by expressive nuances characteristic of styles, genres, and even individual performers. A temporality may be stable precisely in the way it varies.

Temporal variation, in turn, refers to the differences that arise within a single realisation. Its significance does not lie simply in the amplitude of fluctuation. A small change may carry considerable weight if it occurs at a structurally decisive point, whereas a numerically larger change may have little consequence if it belongs to a region already characterised by broad flexibility. Asking how much the tempo varied is therefore not enough. We must also ask where it varies, in relation to what, in which direction, and with what consequences for the trajectory of the performance.

Clarke (2002) helps to clarify this distinction by showing that performers' expressive profiles may display considerable consistency across performances even when their local values are not identical. Expression does not depend on the literal repetition of durations, but on the organisation of differences. What becomes decisive is no longer the mere presence of variation, but its configuration.

Stability and variation therefore belong to the same analytical plane. Stability allows us to recognise relationships that persist, while variation reveals how those relationships are flexed in performance. One does not negate the other. Without some degree of stability, variation would have no background against which it could be recognised. Without variation, stability would risk becoming indistinguishable from mere uniformity. It is through the tension between the two that a temporal profile takes shape.

The third category requires a change of scale. Temporal transformation does not describe what happens within a single performance, but what becomes visible when two or more realisations are placed in relation to one another. It refers to a systematic reconfiguration of temporal relationships across performances. This may involve changes in overall speed, but it is not reducible to them. Transformation may occur in the location of expansions, the degree of stability within regions, the intensity of an acceleration, the proportion between sections, or even the overall direction taken by the temporal trajectory.

This distinction is central. Variation and transformation operate at different analytical scales.

- Variation is *intraperformative*: it describes changes that occur within a single realisation, such as a deceleration, an acceleration, or a region of greater stability.
- Transformation is *interperformative*: it becomes visible when different realisations are compared. Thus, if a deceleration present in one recording disappears, shifts position, becomes more pronounced, or forms part of a different trajectory in another, we are no longer dealing merely with a new local variation, but with a transformation in the temporal organisation of the performance.

In simple terms, variation describes how time changes within a performance, whereas transformation describes how that way of organising time changes across different performances.

For this reason, transformation should not be confused with mere difference. No two performances are ever identical. Small discrepancies are inevitable and, as we have already seen, belong to the contingent nature of performance itself. For a difference to acquire significance as transformation, it must reveal some degree of organisation. The point is not simply to establish that the numbers have changed, but to determine whether the way those numbers relate to one another has changed.

Transformation should not be understood solely as a structural difference between profiles. It also has an interpretative and historical dimension. Kramer (2011) conceives performance not as the simple reproduction of previously stabilised content, but as an activity through which the work is understood and made meaningful in concrete circumstances. From this perspective, interpretation does not consist in recovering intact something that is already fully given, but in bringing the work into action from a particular historical position.

If the same work can assume different configurations in different acts of interpretation, then a temporal transformation between performances represents more than a change in speed or proportion. It may constitute a change in the way the performer organises and makes intelligible the trajectory of the work through time. Longitudinal comparison therefore acquires a dimension that extends beyond description. By observing what remains and what changes across realisations

separated by years or decades, it becomes possible to investigate not only differences between performances, but also different ways in which the performer relates to the same work over the course of their own history.

An important consequence follows from this distinction. A performance may be faster overall while preserving much of the temporal organisation of another. If its expansions, contractions, and relationships between regions remain proportionally similar, an absolute change in speed may coexist with a strong continuity of profile. Conversely, two recordings with almost identical average tempi may organise time internally in such different ways that their global similarity conceals a profound transformation.

The question therefore shifts from equality of values to the invariance of relationships. What remains when the numbers change? What changes when the numbers remain close? It is through this double question that stability, variation, and transformation cease to be merely descriptive and begin to function as interpretative tools.

Such a shift also prevents change from being automatically equated with evolution. A transformation between two performances does not imply maturation, progress, or movement towards an ideal version. It simply indicates that the work has been temporally reorganised. Any historical or interpretative meaning attributed to that reorganisation must emerge from comparison and context rather than from a narrative imposed in advance.

In Stravinsky's case, such caution is essential. Recordings made at different points in his career should not be arranged in advance as stages in an interpretative evolution. We must first reconstruct their profiles and observe what actually happens between them. A relationship that remains stable over decades may be just as significant as a change. A localised alteration may reveal more than a global difference in tempo. And an apparent convergence with Stravinsky's own metronome markings may coexist with an internal reorganisation that makes the performance temporally distinct.

The analysis therefore operates across three related scales:

1. Global value provides a summary.
2. Temporal profile reconstructs the internal trajectory of the realisation.
3. Comparison between profiles makes it possible to identify stability, variation, and transformation.

Each scale answers a different question, and none can replace the others. This progression also clarifies the role of measurement in the present study. We do not measure in order to replace listening with numbers, but to make comparable relationships that listening apprehends as process and that memory can scarcely preserve with sufficient precision across recordings separated by

decades. Rink (2024) warns precisely against forms of performance analysis in which the production of data becomes an end in itself. Measurement acquires analytical value only when it returns to the music and makes it possible to formulate a question that could not previously have been posed with the same degree of precision.

At this point, the preceding sections converge. Prescribed time provides references and relationships before the event. Realised time gives those relationships concrete existence. The temporal profile allows us to observe how that existence is organised over the course of a performance. Comparison between profiles then reveals what remains, what varies, and what is transformed when the same work returns to time.

For the present study, it is precisely this final step that makes it possible to move from the question at what tempo did Stravinsky conduct? to a broader one: how did Stravinsky organise the same work temporally at different points in his interpretative life? To go beyond the metronome does not mean abandoning the number. It means restoring what the isolated number loses: position, direction, relationship, and history.



2 Stravinsky and the Authority of Time



The conceptual distinctions developed in the previous chapter now allow us to bring the question of temporality into closer relation with Stravinsky's musical thought. Tempo, prescription, and performance are no longer considered merely as general categories, but are examined through the ways in which the composer relates rhythm, metre, tempo, notation, and form. The aim, in this sense, is to understand the place that time occupies within his musical conception and to identify principles of temporal organisation that emerge through the recurrence of these relationships across his writings.

Such an approach requires a degree of caution. Stravinsky's writings do not constitute a systematic theory formulated all at once, nor should they be treated as the unchanging expression of a single authorial intention. His books belong to different moments in his career and respond to different discursive circumstances. Stravinsky himself acknowledges that tastes, opinions, and reactions change over the course of a lifetime, and he seeks to distinguish his later positions from those he held at other stages of his development (Stravinsky, 1962). Rather than searching for an immutable doctrine of time, the concern here is to identify continuities, shifts, and tensions in the ways Stravinsky thought about time musically.

One such continuity appears clearly in *Poetics of Music* (1996). The idea of chrononomy, introduced in the previous chapter, is of interest here not primarily because of the definition it offers, but because of the need it reveals. Stravinsky finds it necessary to name a specifically temporal order because, for him, a succession of sounds does not become music simply by occurring chronologically. Events must acquire position, proportion, and function in relation to one another. Time is not an indifferent framework onto which composition is projected. It forms part of the problem of musical organisation itself.

The distinction between metre and rhythm confirms this orientation. Stravinsky's (1996) concern is not simply to oppose regularity and freedom. What is at stake is the distinction between what can be measured and what is constructed through measurement. Metre provides conditions for quantification and ordering, while rhythm shapes relationships between those conditions. This point is crucial to understanding Stravinsky. His insistence on precision does not necessarily lead to identity between events or to the mechanical repetition of equal units. As discussed throughout the previous chapter, measuring time and producing temporal organisation are interdependent operations, but they are not equivalent.

The presence of Pierre Souvtchinski's ideas in *Poetics of Music* makes this conception still more revealing. The distinction between ontological and psychological time has already been discussed and need not be reconstructed here. What matters now is how Stravinsky makes use of it. The opposition quickly moves beyond abstract speculation and begins to support a reflection on

compositional procedures. Similarity and contrast, continuity and opposition, stability and change become ways in which music establishes relationships with the passage of time (Stravinsky, 1996).

This shift in emphasis is significant. Stravinsky does not appear primarily concerned with establishing which mode of time possesses greater philosophical legitimacy. What interests him above all is what composition can do with time. A work may follow a particular flow, resist it, interrupt it, reiterate it, or reorganise it. Chronological succession remains, but the experience of that succession comes to depend on relationships produced through music. Musical time thus emerges not from some autonomous temporal substance, but from composition's capacity to differentiate and articulate the unfolding of music in performance.

From this perspective, the notions of impulse, attraction, and repose acquire greater significance. In conceiving music as a succession of impulses oriented towards points of attraction and repose, Stravinsky assigns each musical event a function that depends on its position within a trajectory. An event does not acquire temporal meaning simply because it has a particular duration. It may prepare, suspend, draw closer, move away, or stabilise. Succession becomes directional because events begin to establish tensions between what has just occurred and what they appear to lead towards. It is from this articulation that what Stravinsky calls the "breathing of music" emerges (Stravinsky, 1996).

The metaphor is important because it introduces differentiation and mobility into a conception often associated primarily with regularity. Breathing implies alternation. It presupposes expansion and contraction, continuity and interruption, impulse and repose. The image suggests that Stravinskian order is not necessarily static. Its coherence may depend precisely on the way temporal differences are produced without dissolving the relationships between them.

A similar logic reappears in another form when Stravinsky discusses symmetry and parallelism. In *Conversations with Igor Stravinsky* (1959), he rejects perfect equivalence as a formal principle and expresses a preference for relationships in which elements correspond without becoming identical. His examples emphasise balance without equality and forms of parallelism in which proportions, movements, and points of repose remain open to variation. In his formulation, perfect symmetry approaches immobility, whereas relationships between differences preserve formal vitality (Stravinsky & Craft, 1959).

The argument developed here helps to clarify a broader feature of Stravinsky's conception of order. To organise does not mean to make things equivalent. It means establishing conditions under which difference can remain recognisable without becoming arbitrary. Repetition does not necessarily imply identity, just as stability does not imply immobility. Coherence may arise from the persistence of relationships through variation.

A related aspect of Stravinsky's thought can be found in his recurring concern with construction. When discussing musical form, he describes it as the outcome of a kind of logical dialogue between materials. Elsewhere, he draws an analogy between musical and mathematical thought, while rejecting the idea that composition can be reduced to formulas, equations, or numerical procedures (Stravinsky & Craft, 1959). What seems to matter in the mathematical analogy is not calculation itself, but the possibility of establishing proportions, correspondences, and internally consistent relationships.

Such a distinction is fundamental. It prevents construction from being confused with mechanisation. Musical organisation may be rigorously determined without deriving its meaning from the automatic application of a rule. A number can make a relationship precise, but it cannot by itself produce that relationship's musical function. A distinction between quantity and organisation therefore remains, one that Stravinsky's own thinking appears to preserve.

This may help to explain Stravinsky's resistance when Robert Craft proposes an explicitly philosophical account of music as an image of human experience of time. Faced with the ideas of recurrence and becoming, Stravinsky avoids turning such a formulation into a general truth about music and insists on the distance between this kind of reflection and his own compositional activity. In that context, he describes himself as someone whose mind is essentially oriented towards making (Stravinsky & Craft, 1959).

His response to Robert Craft places an important limit on our own reading. Stravinsky should not be retrospectively turned into a systematic philosopher of time. His conception of temporality emerges from elsewhere. Stravinsky thinks about time primarily through the concrete problems of composition. How to relate materials, define units, create correspondences, construct differences, establish proportions, control recurrence, and organise succession are questions that precede any explicit metaphysical formulation.

Stravinsky's accounts of his compositional process confirm this, as he describes the improvisation of rhythmic units as part of the very search for compositional material. Rhythm and interval emerge in relation to one another from the earliest stages of elaboration, before the idea reaches a definitive form (Stravinsky & Craft, 1959). Rhythm does not appear as a dimension subsequently applied to a pre-existing pitch structure. Temporal relationships participate in the formation of the material itself.

If the material itself emerges through temporal relationships, there is no first stage in which a neutral musical entity exists and is only later placed in time. Intervals, durations, accents, and units enter from the outset into a field of relationships. To conceive music is already to conceive positions, proportions, and possible modes of succession.

One of Stravinsky's most significant formulations appears precisely when he relates tempo and pulse unit. According to the composer, a particular kind of music, a particular tempo, and a particular reference note value arise together in his imagination. There is no first stage in which abstract material exists and is only later assigned an appropriate rhythmic unit and speed. Unit, tempo, and interval are integrated into the original conception (Stravinsky & Craft, 1959).

This account gives tempo a very specific status. Tempo is not merely an external instruction applied after the music already exists. For Stravinsky, tempo stands in a constitutive relationship to the kind of material being conceived. This does not mean that there is only one possible temporal realisation. It means that changing the tempo is not necessarily a neutral operation, because it may alter the way particular internal relationships become manifest.

Stravinsky's attention to the visual form of notation reinforces this idea. He acknowledges that a passage could be rewritten using proportionally larger or smaller note values while preserving a certain acoustic equivalence. Even so, he regards such translation as problematic because, for him, the visual appearance of the note values forms part of the conception itself. There is a relationship between notated unit, perception, and compositional imagination that prevents notation from being treated as an entirely interchangeable code (Stravinsky & Craft, 1959).

Here too, however, a hasty conclusion should be avoided. The fact that Stravinsky assigns constitutive importance to notation does not mean that his musical conception is exclusively abstract or graphic. In *An Autobiography*, he defends working at the piano precisely because he prefers composing in direct contact with the physical medium of sound rather than working only with an abstract mental representation (Stravinsky, 1962). Musical elaboration involves a concrete relationship between gesture, sound, notation, and imagination. Temporal organisation emerges within this circuit rather than from a purely numerical domain.

A historical dimension must also be preserved. In *Memories and Commentaries*, recalling a ballet performance he heard in childhood, Stravinsky remarks that, if he could return to that evening, he would be particularly interested in recovering the *tempi* of that performance because of his broader interest in the question of tempo in earlier periods (Stravinsky & Craft, 1960). The comment is brief, but it carries an important implication: tempo may belong to the conception of a work and, at the same time, possess a history of realisation. The relationship between the two is not necessarily fixed.

This tension provides a crucial point of entry into Adorno's critique of Stravinsky's conception of time. In *Philosophy of New Music*, Adorno (1974) challenges not only metric precision or the centrality of rhythm. His objection is directed towards the kind of temporality that certain Stravinskian procedures would produce. Drawing on the opposition between *temps durée* and *temps*

espace, Adorno interprets fragmentation, repetition, and the relative autonomy of musical complexes as processes that tend to turn succession into disposition. Time would no longer be constituted primarily through the transformation of what occurs but would instead approach a configuration in which events confront one another as temporally juxtaposed blocks.

The argument becomes more explicit when Adorno distinguishes between two historically constituted modes of organisation and listening, the expressive-dynamic and the rhythmic-spatial. Whereas the former would incorporate the passage of time into musical development, the latter would rely on the articulation of time through relatively equivalent subdivisions and would tend, in Adorno's interpretation, to spatialise it. Stravinsky becomes a central instance of this second tendency. At the same time, Adorno acknowledges that his music cannot simply be reduced to a literal mechanisation of time. The critique is directed less at measurement itself than at the relationship between measurement and musical process (Adorno, 1974).

At stake is a question that goes to the heart of the problem. Is organising events in time necessarily the same as producing a temporal process? Stravinsky seems to answer in the affirmative whenever recurrence, contrast, impulse, repose, and proportion establish sufficiently defined relationships between events. Adorno demands something more. For him, succession must leave qualitative consequences in what follows, so that the present cannot simply reappear as a relatively intact unit after passing through the process.

The difference between them is not merely stylistic. It involves two conceptions of what it means to change in time. For Stravinsky, temporal organisation may arise from relationships between permanence and contrast, repetition and differentiation, balance and asymmetry. For Adorno, temporality reaches its most significant form when succession internally transforms what participates in it. The conflict does not simply oppose rhythm and expression, or regularity and freedom. It raises a deeper question: must temporal difference take the form of development to constitute musical historicity?

Adorno's critique becomes analytically productive without needing to be adopted as a normative model. It compels us to distinguish between two questions that might initially seem equivalent: how does Stravinsky organise time? And what conception of temporal process makes that organisation possible? The first can be addressed by examining relationships, proportions, recurrences, and contrasts. The second requires us to ask whether those relationships are transformed through succession or whether they remain relatively available as units that can return, be displaced, and recombined.

Adorno's own critical trajectory, however, also calls for caution, since his reading of Stravinsky did not remain entirely fixed. In the later essay *Stravinsky: A Dialectical Portrait*, included

in *Quasi una Fantasia*, the composer no longer appears solely as a figure of restoration. Adorno acknowledges that certain of Stravinsky's aspirations may place him closer to concerns later taken up by more recent music than his earlier opposition to Schoenberg might suggest. This reconsideration does not remove his previous reservations, but it makes the picture more contradictory. Procedures associated with historically regressive materials and forms may coexist with a pursuit of objectivity and distance that anticipates problems subsequently taken up by the avant-garde itself (Adorno, 1998).

Such a reconsideration prevents the opposition between Stravinsky and Adorno from becoming too simple an alternative. The task is not to choose between the composer's self-understanding and the philosopher's critique. Each illuminates a different dimension of the same problem. Stravinsky shows how relationships of measurement, difference, proportion, and recurrence can constitute a distinctive musical order. Adorno asks whether that order is capable of fully incorporating the transformation produced by the passage of time.

Reading Stravinsky alongside Adorno shifts the question from how musical time is ordered to whether that order remains unchanged when it is realised in performance and across history. If we accepted only the composer's own discourse, we would risk treating order and precision as sufficient evidence of temporal coherence. If we adopted Adorno's critique in full, we would run the opposite risk of judging Stravinsky according to a conception of development that his own music helps to call into question. The issue is not to decide whether his music possesses temporality, but to understand what kind of temporality becomes possible when permanence, repetition, proportion, contrast, and change no longer depend necessarily on a continuous model of development.

This perspective allows us to formulate more precisely what appears to remain constant across Stravinsky's different statements. He does not offer a complete metaphysics of time. Rather, he offers a poetics of temporal organisation. Within it, time becomes musical when events enter sufficiently determinate relationships for position, recurrence, contrast, proportion, and direction to become perceptible. Measurement contributes to this construction but does not exhaust it. Repetition may produce identity without excluding difference. Stability may coexist with transformation. And order may arise less from a continuously developing flow than from the articulation of elements whose relationships are redefined as they recur.

Seen in this way, Stravinsky's conception of time extends beyond the image of an aesthetic founded simply on regularity. The core of his temporal thought seems to lie less in the uniformity of individual units than in the determination of the relationships between them. What must remain

controlled is not necessarily each isolated duration, but the configuration through which different durations, pulses, contrasts, and recurrences form a recognisable organisation.

This point leads directly to the next problem. If certain temporal relationships belong so deeply to musical conception, it becomes necessary to understand how Stravinsky seeks to preserve them when composition moves from the domain of creation into notation and performance. At this point, the question of temporality meets the question of authority: what status does the composer assign to notation, precision, and the instructions intended to govern the realisation of the work?

2.1 Precision, Notation and the Authority of the Composer

In an earlier study of *L'Histoire du Soldat*, Lima and Oliveira (2013) compared the prescriptions of the score with Stravinsky's recordings from 1932, 1954, and 1961, taking as their central problem the tension between objectivity and interpretative subjectivity. Their conclusion — that the objective performance advocated by the composer could not be sustained as an unquestionable truth — opened a question that the present study now seeks to formulate more precisely. The divergence between prescription and realisation remains relevant, but it is no longer of primary interest as evidence of a contradiction between what Stravinsky said and what he did. The problem becomes more productive when it moves beyond that opposition and towards an investigation of the conditions through which the composer sought to construct, legitimise, and transmit authority over the realisation of his music. Score, metronome marking, rhythmic notation, the composer's presence, conducting, and recording thus cease to function merely as terms within a dispute between objectivity and subjectivity. Instead, they come to be understood as different means through which Stravinsky sought to determine the field within which his music should become sound.

Such a shift also allows us to recognise that compositional authority in Stravinsky is not simply a natural consequence of his being the author of the work. It was also historically constructed. His writings of the 1920s and 1930s emerged within an aesthetic context in which order, discipline, objectivity, and construction acquired strong polemical force in relation to the expressive legacy of Romanticism. Walsh (1993) associates the discourse surrounding the *Octet* with the climate of the *rappel à l'ordre* and shows how formal rigour, clarity of materials, and the exclusion of expressive nuances not inscribed within the structure form part of a deliberately constructive aesthetic. Walsh also relates this outlook to a conception of the artist as craftsman, for whom the quality of the work depends on correctness and rigour of making rather than on the spontaneous externalisation of an inner self (Walsh, 1993).

Stravinsky's insistence on precision must be read within this context. It does not arise merely as a psychological trait of an unusually controlling composer. Nor can it be reduced to a technical preference for exact attacks or stable tempi. Precision forms part of a broader conception according to which responsibility for expressive organisation should, as far as possible, be shifted from the performer to the construction of the work itself. The more precisely relationships, articulations, contrasts, dynamics, and tempi were integrated into the composition, the less need there would be for the performer to complete the music through a subjectivity imposed from outside it.

Stravinsky's distinction between execution and interpretation reveals the full extent of this position. To interpret does not simply mean to play in a personal manner (Stravinsky, 1996). The term acquires a critical force because it presupposes a form of intervention capable of coming between the work and its transmission. The ideal performer, by contrast, submits their actions to the demands inscribed within the musical configuration itself. Cook (2003) observes that Stravinsky turns this opposition into a philosophy of performance. Execution corresponds to the rigorous realisation of the work, whereas interpretation comes to represent the risk of distortion introduced by freedoms inherited from the Romantic tradition.

The vocabulary Stravinsky employs is significant. Fidelity, obligation, submission, law, and even betrayal recur throughout his statements on performance. These are not neutral terms. They establish an asymmetry between composer and performer. The former determines the conditions of the work, while the latter assumes responsibility for realising them. Performance remains indispensable, but its legitimacy is conceived as proportional to the performer's ability not to appropriate as their own what properly belongs to the composition.

This position becomes particularly clear in the essay on the *Octet*. Walsh (1993) observes that Stravinsky seeks to concentrate expression within formally controllable elements themselves, including counterpoint, instrumentation, contrasts of texture, and tempo, so that the performer need not add an expressive layer external to what has already been composed. Cook (2003) takes this logic to its limit by describing the music as, in a sense, pre-interpreted. Part of what would traditionally have belonged to the performer's expressive agency has been incorporated into the musical architecture itself.

Seen in this light, Stravinsky's notation acquires a more specific function. The aim does not appear to be simply to write down more information. Rather, it is to redistribute musical agency. Every aspect transferred from performative decision-making into the domain of notation reduces what the performer may legitimately claim as a decision of their own. An explicitly notated articulation, a carefully written metrical change, or a numerically determined tempo relationship is therefore more than information. It may function as a means of delimiting the interpretative field.

Notational precision acquires a political dimension within musical practice itself, with "political" understood here in the strict sense of the distribution of authority. Who is entitled to decide what? This question remains implicit in Stravinsky's discourse on performance. The more elements are treated as constitutive of the work and determined in advance by the composer, the smaller the legitimate territory left to the performer appears to become.

Yet this does not mean that Stravinsky imagined a score capable of recording literally everything. His distinction between performer and interpreter is more complex than a simple opposition between blind obedience and freedom. The performer remains subject to the work, but the task also involves tradition, culture, technical mastery, and understanding (Stravinsky, 1996). What Stravinsky seeks to restrict is not necessarily all human mediation, but the possibility that such mediation might claim an authority capable of replacing the organisation conceived by the composer.

In this sense, the authority of the score is less absolute than directional. It seeks to guide realisation within limits. Notation defines relationships, excludes certain possibilities, privileges others, and establishes levels of responsibility. Its rigour does not eliminate the performer. Rather, it seeks to govern in advance the terms within which the performer's agency is to operate.

The history of *Le Sacre du printemps* itself shows, however, that this movement does not operate in only one direction. Van den Toorn (1987) documents a long history of alterations, revisions to bar structures, instrumental changes, and reformulations made after Stravinsky's direct experience of rehearsals and performances. Practical engagement with the work under Pierre Monteux and, later, under Stravinsky himself contributed to the transformation of its published versions. Before the score acquired the status of a definitively stabilised textual authority, *Le Sacre* was itself shaped by successive decisions arising from the relationship between composition and performance.

Such evidence substantially changes the way textual authority can be understood. Notation may guide performance, but performance can also feed back into notation. A text that later acquires normative force may itself be the product of earlier experiences in which what would eventually be prescribed was still being discovered, tested, or redefined. The authority of the score, then, does not necessarily correspond to an original intention preserved intact from the moment of composition. In some cases, it is the sedimented result of a process.

Drawing on Robert Fink's study of *Le Sacre*, Cook (2003) draws attention precisely to this problem. The metronomic rigidity that would later become so strongly associated with Stravinsky does not characterise the work's early history uniformly. Early performances and recordings reveal changes of tempo and inflections that were gradually reduced over time. The performance style

that came to be recognised as specifically "Stravinskian" was, to some extent, historically constructed. Cook himself warns against replacing one myth with another. Recognising this transformation does not justify the conclusion that Stravinsky never advocated or practised rigorous performance. It simply shows that his relationship with precision was more fluid than an isolated reading of his manifestos might suggest.

If the ideal of precision has a history, then Stravinsky's authority cannot be investigated solely through a theoretical statement treated as a fixed principle. We must also observe how that authority shifts over time, which media come to embody it, and how his own realisations modify what had previously seemed established.

That changing location of authority becomes especially visible in Stravinsky's engagement with technologies of reproduction. The player piano offered him something that the score, however detailed, could not provide in the same way: the possibility of fixing temporal relationships without depending, at every performance, on the choices of another performer. Cook (2003) shows that Stravinsky did not regard piano rolls simply as records of his own playing. He treated them as constructed versions capable of "reconstituting" the music under conditions determined by the composer himself. The mechanical nature of the medium was therefore not merely a technological limitation. To some extent, it corresponded to his desire to stabilise relationships that human performance might alter.

With the gramophone, this possibility takes on a different dimension. Recording no longer fixes only relationships abstracted from performance. It preserves a sounding realisation conducted by the composer himself. Stravinsky consequently begins to assign his recordings a status that extends beyond that of historical documents. At different moments, he presents them as guides for performers, as particularly exact means of transmitting his intentions, and later as indispensable supplements to the score. Cook (2003) summarises this position by arguing that Stravinsky sought, through recording, to establish an authorised performance tradition, turning the phonographic record into a kind of extension of compositional activity itself.

This shift is decisive. Authority no longer resides exclusively in the text. The score is no longer the only document capable of indicating how the work should be realised. Recording introduces a second form of prescription, no longer graphic but sonic. If notation establishes relationships that are to be realised, the recording offers a concrete example of how those relationships may take shape.

Yet recording also introduces a problem that the score could partially conceal. A written sign remains materially stable until it is revised. A recorded performance, by contrast, makes choices audible and therefore comparable with other choices made by the same performer. When the

composer records the same work again and realises differently what had previously been preserved, sonic authority no longer points towards a single object.

Here one of the most significant consequences of Stravinsky's status as composer-performer comes into view. If each recording is intended to document an authorised realisation, what happens when those authorised realisations do not coincide? The simplest response would be to determine which of them corresponds most closely to the composer's true intention. But such a solution would preserve precisely the notion of a fixed intention that the recordings themselves call into question.

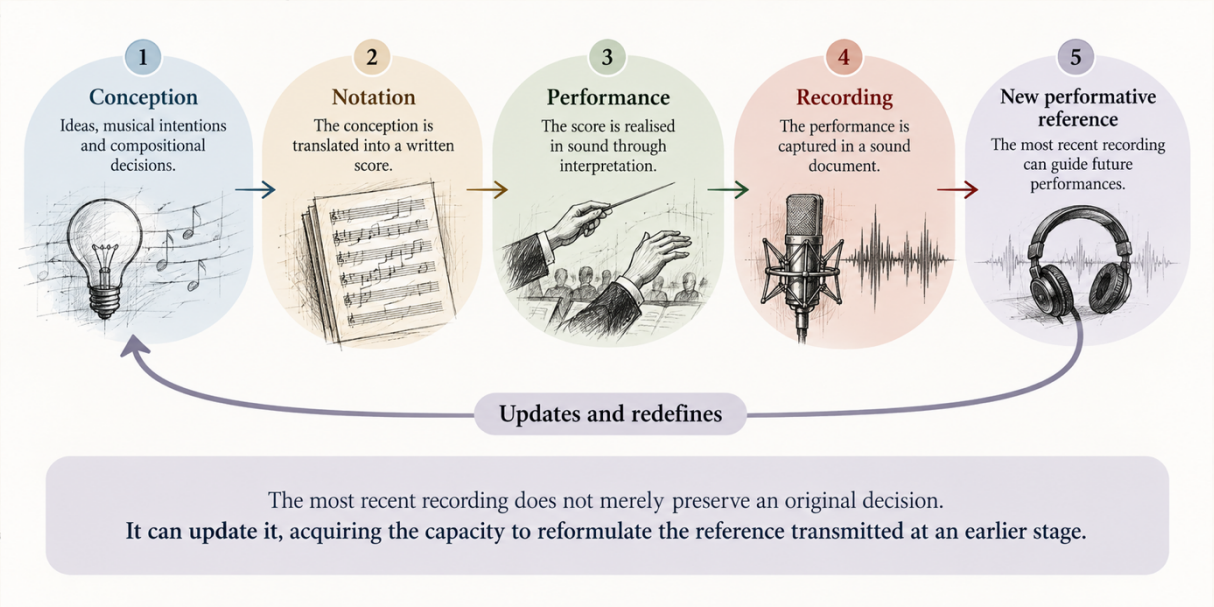
Cook (2003) formulates this impasse particularly sharply when he observes that the idea of a fully recoverable compositional intention becomes unstable in the face of the variability of Stravinsky's own performances. If the composer realises a passage in one way and, years later, in another, the later recording cannot simply be used to correct the earlier one without assuming that intention itself may also change. What appears as inconsistency only when one begins from the premise of a fixed intention may, from another perspective, be understood as the historicity of authorial realisation itself.

This point marks a fundamental difference between the present study and the formulation adopted in our earlier work (Lima & Oliveira, 2013). The differences identified in the recordings of *L'Histoire du Soldat* continue to challenge a literal reading of Stravinskian objectivity. Their significance, however, no longer lies primarily in demonstrating that Stravinsky contradicts Stravinsky. The more productive question is to understand what these differences do to the very idea of authority. If the person who prescribes also changes the way in which those prescriptions are realised, authority does not disappear. It becomes historical.

The documentation assembled by Joseph (2001) gives this hypothesis concrete form. The archival evidence reveals a Stravinsky deeply concerned with how his works would be performed and determined to use scores, mechanical rolls, and recordings as means of limiting what he regarded as interpretative distortions. Joseph also recalls Boulez's association between this concern and Stravinsky's search for a form of codification capable of making the composer's message as precise as possible.

Even more revealing is an episode from 1966. On learning that Herbert von Karajan intended to film *Le Sacre du printemps*, Stravinsky did not simply refer him back to the metronome markings in the score. Instead, he recommended that the conductor follow, as closely as possible, the tempi of his latest recording for Columbia. Joseph (2001) also shows that Stravinsky repeatedly referred other conductors to his own recordings when offering guidance.

The word "latest" is conceptually decisive. If the most recent recording is to guide a future performance, then authority is not merely preserving an original decision. It may also be updating it. A later sonic document acquires the capacity to reformulate the reference previously transmitted. In place of a simple line running from intention, through the score, and into performance, a more complex circuit begins to emerge:



Example 02. Circuit of performative authority: from conception to recording and the establishment of a new reference for future performances.
Source: Author's own elaboration, based on Cook (2003) and Joseph (2001).

Within this circuit, one realisation may become the source for another. Performance no longer occupies only the final stage of the process but begins to participate in the production of the norms that will guide future performances.

This helps to explain why Stravinsky was not satisfied with the score even when he believed that he had notated his intentions with great precision. The episode recounted by Joseph (2001) is almost emblematic. When Alfred Wallenstein replied that the score of *Orpheus* already seemed sufficiently clear for him to understand what the composer wanted, Stravinsky reacted negatively and continued to insist on the usefulness of his recording as a reference. If the score were entirely self-sufficient, such insistence would be difficult to explain. The composer's own conduct acknowledges, however implicitly, that there is performative information that notation alone cannot fully stabilise.

Nor does the recording resolve the problem. Its authority depends precisely on what distinguishes it from the score: it fixes a singular occurrence. That singularity makes it possible to hear articulations, proportions, inflections, and tempo relationships that the text does not

determine completely. Yet it also means that each new recording may reveal a different configuration. A medium conceived to reduce uncertainty ultimately produces an archive of transformation.

A productive paradox emerges here. Stravinsky turns to technology to restrict interpretative variability, yet by repeatedly recording his works over several decades he creates the very historical conditions that make his own variability observable. The more he seeks to document how his music should sound, the more evidence he leaves of the different ways in which he himself performed it.

This paradox does not reduce recording to a failure of Stravinsky's project of control. On the contrary, it reveals how remarkably effective that project became. Cook (2003) shows how the image of 'Stravinsky conducting Stravinsky' acquired both institutional and commercial force, eventually shaping the critical reception of his recordings. Even when technical limitations in his conducting were acknowledged, his status as composer gave those recordings a distinctive interpretative authority. That authority depended not only on the sonic result, but also on who produced it.

Such authority, however, requires careful interpretation. It would be insufficient to explain Stravinsky's position solely as the result of commercial strategy or self-promotion. Joseph (2001) demonstrates convincingly how actively the composer participated in constructing his own public image and how closely he sought to control the narratives that circulated around him. Yet it would be equally reductive to treat his concern with performance as merely a market-driven operation. The effectiveness of his authority arose precisely from the convergence of several dimensions: aesthetic conviction, authorial status, technology, the circulation of recordings, and the public construction of the composer's persona.

From this perspective, authority is less an individual property than a network of legitimations. Stravinsky possesses the authority of authorship, but that authority becomes operational because it is embedded in the score, reiterated in his writings, enacted through his activity as a conductor, fixed in recordings, and reinforced by publishing, recording, and critical institutions. The composer does not merely state how his music should sound. He constructs means through which that claim can continue to operate beyond his physical presence.

Stravinsky's relationship with George Balanchine (1904–1983) offers a particularly illuminating example of the movement between principle and practice[11]. Joseph (2002) shows the

[11] George Balanchine (1904–1983), a Russian-American choreographer of Georgian origin and one of the central figures of twentieth-century ballet, developed an artistic collaboration with Stravinsky that began in the 1920s and continued, in different forms, over several decades. Balanchine later became co-founder and artistic director of the New York City Ballet and choreographed numerous works by Stravinsky. Their partnership is particularly relevant to the present study because it was grounded in close attention to musical structure, pulse, tempo, and temporal proportions, without reducing dance to a visual duplication of the music. Joseph (2002) characterises their relationship

importance Stravinsky attached to the accuracy of rhythmic and tempo relationships and recalls Soulima Stravinsky's[12] (1910–1994) observation that his father was extremely demanding about pulse. Balanchine, in turn, regularly used a metronome during rehearsals to check the tempi established by the composer. Temporal precision here ceases to be merely a matter of discourse and becomes a concrete procedure within collaborative practice.

Yet the same collaboration also prevents authority from being equated with simple submission. Joseph (2002) insists that the relationship between Stravinsky and Balanchine was more elastic and contrapuntal than a strictly hierarchical reading might suggest. Both artists conceived the relationship between music and dance in terms of correspondences, tensions, and interactions rather than literal duplication between movement and sound. This reveals an important distinction: observing temporal conditions does not mean mechanically reproducing every dimension of the work. Limits may organise collaboration without eliminating what each participant contributes within them.

Stravinsky's position also becomes more nuanced in his later statements. Cook (2003) draws attention to the section on performance in *Conversations* (Stravinsky & Craft, 1959), where the earlier general condemnation of interpretation gives way to a distinction between traditions. Stravinsky acknowledges that certain kinds of music, particularly repertoire associated with Romanticism, require flexibility of tempo and a mode of performance that he himself describes as interpretative, while continuing to demand greater rigour for what he regards as belonging to a "classical" tradition, including his own music. The shift is significant because it shows that the problem is no longer interpretation, but its appropriateness to the kind of music being performed.

This shift prevents Stravinsky's performance aesthetic from being reduced to an unchanging commandment of regularity. The later Stravinsky does not abandon the idea of precision, but he defines its field of validity more narrowly. *Rubato*, flexibility, and variation cease to be universal errors and become resources whose legitimacy depends on repertoire, style, and function. The very notion of rigorous performance thus acquires a historicity that the earlier manifestos tended to conceal.

At this point, Adorno's counterpoint becomes relevant once again, though for a different reason from the one discussed in the previous section. Adorno (1998) argues that to interpret music is to make it sound, and that interpretation is not an accidental attribute but an integral part of its

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as more elastic and contrapuntal than a simple hierarchy between composer and choreographer, making it possible to understand how temporal discipline and creative autonomy could coexist within the same performative process.

[12] Sviatoslav-Soulima Stravinsky (1910–1994), Igor Stravinsky's son, was a pianist, composer, and teacher. He frequently collaborated with his father as a performer, including in concerts and recordings, and was particularly closely involved in the performance of works for piano, such as the *Concerto for Two Solo Pianos*. He later pursued a long teaching career at the University of Illinois (Joseph, 2001).

existence as music. This formulation directly challenges Stravinsky's ideal of separating supposedly transparent execution from interventionist interpretation. If the passage into performance already constitutes a form of interpretation, the issue cannot be to eliminate mediation. It can only be to regulate the terms under which that mediation takes place.

Stravinsky's project of precision need not therefore be understood as a naïve attempt to make performance literally automatic. More productively, it can be read as an effort to reduce indeterminacy and redistribute the legitimate margins of decision-making. The authority of notation does not eliminate performance. It seeks to circumscribe it. The authority of recording does not eliminate the possibility of other realisations. It seeks to provide them with a privileged point of reference.

We thus arrive at a more complex conception of compositional authority. In Stravinsky, it does not reside entirely in intention, the score, the metronome, or the recording. It circulates among these elements. Intention seeks to take form in notation. Notation requires performance. The composer's performance may become a recording. The recording may then return to the circuit as guidance for future performances. Each medium seeks to reduce the distance from the one that precedes it, yet none can eliminate that distance entirely.

The normative force Stravinsky assigns to precision does not disappear when his performances diverge from the score or from one another. What changes is how that force must be understood. Authority does not mean immutability. A composer may exercise strong control over his music while also transforming the very decisions through which that control is expressed.

The contribution of our earlier study remains fully recognisable (Lima & Oliveira, 2013), but the question is now more demanding. Rather than using the difference between notation and recording to demonstrate the limits of interpretative objectivity, the present study seeks to understand how those limits themselves participate in the history of Stravinskian authority. Variation ceases to be merely that which contradicts the norm. It may become one of the means through which the norm is revised, displaced, or realised anew.

As composer-performer, Stravinsky did not merely formulate an ideal of performance, write detailed scores, and seek to stabilise his intentions through technologies of reproduction. He repeatedly entered the space in which those prescriptions had to become events. The next question, therefore, is how compositional authority operates when Stravinsky must exercise it in the real time of performance.

2.2 Stravinsky in Performance: Recording and Transformation

What happens when the composer's own performance does not fully coincide with what he prescribed? How should we interpret differences that do not appear only once, but recur in different ways across recordings separated by years or decades? And, above all, how can we distinguish genuinely performative transformation from changes produced by recording conditions, musicians, editions, spaces, technologies, or historical circumstances? These questions move the discussion onto particularly sensitive ground. The issue is no longer simply the authority that seeks to determine performance, but what becomes observable when that authority has to operate within the concrete time of performance itself.

Such a shift requires us to move beyond an overly simple opposition between discourse and practice. The fact that Stravinsky did not always realise literally what he prescribed is important, but it is not sufficient. To reduce the problem to the formula 'he said one thing and did another' would turn a historically complex tension into an accusation of inconsistency. A more productive question is what kind of relationship exists between what Stravinsky conceives as the conditions of a correct realisation and the decisions he makes when he must bring that realisation into being[13].

Performance changes the nature of the problem because no prescription remains merely potential once it is realised. A tempo must acquire concrete duration, an articulation must occur, a transition must be shaped, and a proportion must become perceptible in succession. Even when the performer is the composer himself, this process requires decisions that do not exist in the same form within the score. Stravinsky occupies a singular position: he is simultaneously responsible for the prescribed conditions and subject to the contingencies of their realisation.

The recordings of *Le Sacre du printemps* analysed by Cook (2003) make this tension particularly clear. In the 1960 recording, for example, Stravinsky introduces *Luftpausen*[14], tempo inflections, and alterations not indicated in the score. In the introduction to Part II, Cook identifies a change of tempo that departs from the prescribed return to *Tempo I*, while at the same time developing the very principle of tempo differentiation already inscribed in the work. The performance reorganises a logic already present in the notated construction, articulating it through four tempo regions instead of the three established in the score (Cook, 2003).

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[13] Lima and Oliveira (2013) analysed three recordings of *L'Histoire du Soldat* conducted by Stravinsky, comparing them with the indications in the score and discussing the relationship between objectivity and interpretative subjectivity. The present study revisits this corpus through a longitudinal framework of performative temporality.

[14] The German term *Luftpause* (plural *Luftpausen*, literally 'breathing pause') refers to a brief suspension or temporal expansion, not always indicated in the score, which may contribute to the articulation of phrases or points of transition. In his analysis of Stravinsky's 1960 recording of *Le Sacre du printemps*, Cook (2003) identifies unnotated *Luftpausen* and relates them to practices of temporal flexibility associated with the Romantic performance tradition.

This example shows that divergence and rupture are not equivalent. A performance may depart from a particular value while still preserving, or even emphasising, a broader structural relationship. Fidelity can therefore no longer be assessed solely by the degree of numerical correspondence. It becomes necessary to ask at what level of musical organisation a particular relationship is being preserved.

J. D. Kramer (1988) reaches a complementary conclusion in observing that Stravinsky, as a performer, often only approximated his own metronome markings, although his recordings tended to preserve certain tempo modulations and durational proportions with greater consistency. The distinction is crucial. Precision in a relationship need not coincide with the literal reproduction of its absolute values. Flexibility may occur at the local level while stability is maintained across a broader proportional framework.

This possibility substantially changes how differences between score and performance should be understood. An isolated metronome value may diverge from the prescription without necessarily disrupting the broader temporal organisation. The reverse is also possible: a performance may closely approximate several prescribed values while establishing different relationships between them. The analytical task, therefore, is to determine which relationships remain operative when values change, and which are transformed even when the values themselves appear close.

It is here that Stravinsky's position as composer-performer ceases to simplify the problem and begins instead to make it more complex. The presence of the author makes it possible to observe the distance between conception and performance within the activity of the same historical subject. What, in the case of another performer, might quickly be interpreted as freedom, error, or departure requires a more difficult question when it is produced by the composer himself: what status should be assigned to a difference produced by the very person who established the reference from which it departs?

The answer cannot be to turn the composer's performance automatically into a new norm. Doing so would merely transfer authority from one document to another. A recording does not necessarily correct the score, just as a later recording does not necessarily invalidate an earlier one. Each realisation adds new evidence about what Stravinsky considered possible, necessary, or musically effective at a particular moment.

There is another reason to resist a rigid opposition between discourse and practice: Stravinsky's discourse itself also changes. Cook (2003) shows that, in the later writings, the confidence previously invested in metronome markings begins to be qualified. Stravinsky acknowledges that values written decades earlier belonged to the conditions of another moment,

accepts that circumstances affect the perception of tempo, and even expresses doubts as to whether his more recent recordings could follow the earlier indications literally. He later also questions the value of fixing a particular performance as a permanent reference, precisely because each performance arises from a specific set of circumstances.

This change is fundamental. The relationship between discourse and practice should not be understood as a confrontation between two stable poles, with a fixed theory on one side and variable performances on the other. Thinking about performance itself also has a trajectory. Stravinsky not only realises his works differently over time. He also changes the terms through which he understands the very possibility of fixing a realisation.

Recording therefore assumes an ambiguous status. It makes possible the comparison of what would otherwise become irretrievable once the event had passed, but it does not provide transparent access to an original performance. That caution was already established in the previous chapter. In Stravinsky's case, however, it acquires an additional historical dimension because the composer himself was acutely aware of the distance between recorded performance and the live event.

Cook (2003) recalls that Stravinsky described the gramophone as producing an "image of an image" and that he was critical both exhausting conditions of the early recording sessions and, later, of the manipulations made possible by editing, artificial balance, reverberation, and other studio procedures. Cook concludes that a historical recording cannot be treated as a kind of neutral observation of the past. It is a document whose interpretation requires close attention to the conditions of its production.

Placing two recordings side by side does not mean comparing only two states of an interpretation. Between them, the ensemble, the musicians, the acoustic space, the recording technology, the editing process, rehearsal conditions, the edition of the score used, and even the way the recording session itself was conducted may all have changed. Chronological distance belongs not only to the performer. It also belongs to the document.

For this reason, a measurable difference cannot immediately be attributed to a change in interpretative conception. Before it can acquire that status, it is necessary to assess whether it occurs in a musically organised way, whether it reappears at structurally comparable points, and whether it forms part of a broader reconfiguration of the temporal trajectory. An isolated alteration may result from contingency. Transformation requires relationships.

This caution becomes even more necessary in view of the complex authorship of Stravinsky's later recordings. Joseph (2001) documents cases in which recordings publicly associated with the image of "Stravinsky conducting Stravinsky" had in fact been conducted by Robert Craft. In 1967,

Stravinsky himself acknowledged this situation in correspondence with Columbia and identified recordings in which Craft had effectively taken over the conducting, even stating that, at that stage of his life, Craft could represent his intentions more faithfully than he himself could (Joseph, 2001).

The point has important methodological implications. The expression "Stravinsky recording" may refer to different realities: a performance conducted by the composer, a realisation supervised by him, or a phonographic product associated with his authorial authority. These categories should not be conflated. Before attributing a temporal configuration to Stravinsky's performative gesture, it is necessary to establish who produced it and under what conditions.

This does not diminish the value of the recordings. It makes their scholarly use more precise. A recording supervised by Stravinsky may be highly relevant to understanding his preferences and decisions, but it should not automatically be analysed as evidence of his conducting technique. Likewise, a performance conducted by him should not be treated as the isolated expression of authorial will, since it also results from interaction with musicians, material conditions, and production practices.

Recording should therefore be understood as a point of convergence. Conception, execution, historical circumstance, and technology meet within it. That convergence is precisely what makes it so valuable. The recording does not give us Stravinsky's "purê" time. It gives us a temporal configuration produced under identifiable conditions and preserved with sufficient stability to be compared with other configurations.

It is from this possibility that the properly longitudinal dimension of the present study emerges. To compare performances separated in time is not simply to increase the number of examples. It is to introduce history into the analysis of realisation itself. A work may remain recognisable while the relationships through which it becomes temporally concrete do not remain the same.

In this study, longitudinal temporal transformation refers specifically to a systematic and musically interpretable reconfiguration of temporal relationships observed across chronologically distinct realisations of the same work. The term will not be used for every numerical difference. A transformation may appear in the redistribution of tempi between sections, in changes to the intensity or placement of accelerations and decelerations, in shifts in the stability of regions, or in the reorganisation of proportions between formally corresponding moments.

The longitudinal dimension adds something that a comparison between the score and a single performance cannot reveal. A particular realisation may show how a given prescription was made concrete at one moment. A sequence of realisations allows us to ask whether the very mode of

realising it remains stable. Difference therefore no longer exists only between text and performance, but also between different historical states of performance.

This movement should not be confused with evolution. Cook (2003) cautions against constructing an overarching coherent narrative from Stravinsky's successive recordings. The differences between them often resist a linear trajectory in which each later recording might be understood as a more mature, precise, or truthful stage. Chronology establishes sequence, not progress.

A later recording does not possess greater analytical authority simply because it came later. A relationship preserved over decades may reveal deep stability. A late change may represent revision, circumstantial adaptation, or a more extensive transformation. Only the articulation of temporal evidence, formal position, and historical context makes it possible to distinguish among these possibilities.

Continuity itself may also be historically significant. If relational patterns recur in performances separated by many years, that persistence may indicate that certain aspects of temporal organisation resisted changing circumstances. If other elements shift systematically, the difference acquires a different status. Interpretative history is not only a history of change. It is also a history of what manages to endure.

It is in this sense that Stravinsky's recordings constitute such a fertile corpus. They allow us to observe the same composer returning to his own works at different moments in his career and leaving comparable records of those realisations. The distinctiveness of this situation lies in the possibility of hearing how authorial identity itself interacts with historical difference.

In the case of *L'Histoire du Soldat*, the recordings from 1932, 1954, and 1961 establish an arc of almost three decades. Their shared authorial proximity should not lead us to expect coincidence. What matters is precisely to determine whether certain relationships remain recognisable, whether others shift, and whether those changes amount merely to local fluctuations or to a broader reorganisation of realised temporality.

Comparing these performances requires two inseparable operations. The first is to reconstruct as rigorously as possible what each recording realises. The second is to interpret the differences without prematurely reducing them to error, freedom, or evolution. Only then is it possible to ask whether we are dealing with simple variation between performances or with longitudinal temporal transformation.

Stravinsky's position as composer-performer acquires a different significance here from that associated with authority. He is no longer observed merely as the person who might determine how the work should sound, but as a historically situated interpreter of his own music. Authorship

does not remove him from time. On the contrary, it makes even more visible the fact that authorial realisation itself has a past, undergoes change, and is shaped by circumstance.

Recordings do not resolve the distance between prescription and performance. They do something more revealing: they give that distance a history. By allowing realisations separated in time to be heard again, measured, and brought into relation with one another, they turn difference into an object of analysis.

The problem is no longer to determine in which recording Stravinsky finally achieved what he truly intended. The question becomes more demanding: which temporal relationships did he preserve, which did he modify, and how did these continuities and transformations reorganise the same work across the course of his performance trajectory?

At this point, the recording becomes both a trace of the past and a means of observing the temporality of performance historically. In Stravinsky's case, it allows us to follow something particularly rare: one of the twentieth century's most explicit claims to temporal precision itself becoming an object of transformation over time.

2.3 *L'Histoire du Soldat*: A Temporal Laboratory

Why does *L'Histoire du Soldat* provide such a revealing case for the study of temporality? What is it in the work's own construction that allows the relationship between measure, metrical organisation, tempo, recurrence, interruption, and performative action to be observed with such clarity? The answer lies in the way the work itself was conceived, reinforced by the presence of metronome markings and the availability of different recordings. In *L'Histoire du Soldat*, almost nothing is temporally neutral. Music, speech, and movement must coexist, alternate, and, at certain moments, be coordinated. Marches, dances, chorales, and episodes of contrasting character follow one another without being absorbed into a homogeneous stylistic continuity. Metre continually reorganises the perception of groupings, while pauses, returns, and recurrences participate in the dramatic progression itself. Time serves both as the medium in which these events occur and as one of the forces that articulates them.

The work was composed in 1918, during Stravinsky's period in Switzerland, in circumstances shaped by the First World War, his separation from Russia, and severe material constraints. The project developed with Charles-Ferdinand Ramuz also responded to a practical need: to create a production small enough to travel between different locations. The reduction of resources affected more than the number of musicians. The theatrical apparatus was similarly condensed, bringing together a narrator, actors, dance, and a small instrumental ensemble. Borém (2001) notes that the

forces were reduced to seven instrumentalists — violin, double bass, clarinet, bassoon, trumpet, trombone, and percussion — within an equally economical theatrical conception.

It would be insufficient to explain this instrumentation solely in terms of the scarcity produced by the war. Cox (1995) shows that the conception of *L'Histoire* also deliberately draws on the world of the *théâtre forain*, itinerant performance, and the small ensembles associated with fairground theatre. Material limitation thus becomes an aesthetic choice. The instrumentation functions as more than a reduced orchestral model, constituting instead a distinct sonic organisation in which each instrument acquires considerable autonomy and presence.

In such a small ensemble, attacks, rhythmic displacements, anticipations, delays, and divergences of pulse become particularly exposed. There is little sonic mass capable of absorbing small differences between performers. Temporal precision therefore becomes part of the very conditions under which the ensemble can function, extending beyond its role as an abstract requirement of Stravinsky's notation. Instrumental transparency also produces temporal transparency.

This condition is intensified by the theatrical conception of the work. *L'Histoire du Soldat* was conceived to be read, played, and danced. Music, narrative, and movement do not stand in a relationship of simple subordination. Tysseland (2009) draws attention to the conception of three components — narrator, actors or dancers, and musicians — whose cooperation was intended to form a unity through alternating moments of prominence and combination. From the outset, the problem of the work's unity is therefore also a problem of coordination between different temporal modalities.

Speech has its own rhythm. Scenic gesture has duration, direction, and tempo. Music has pulse, metre, tempo, and articulation. When these elements coexist, it is not enough for each to be internally coherent. It is also necessary to determine when they begin, when they cease, when they overlap, and how much time separates one event from another. Dramaturgy thus comes to depend on temporal relationships that cannot be located exclusively within the instrumental part.

Stravinsky does not seek to dissolve these layers into an undifferentiated continuity. The work preserves the perceptible autonomy of its different components. At certain moments, the music sustains the action. At others, it gives way to speech. Elsewhere, dance, narrative, and instrumental ensemble coexist under specific conditions of synchronisation. Theatrical temporality emerges precisely from the articulation of planes that continue to retain their own identities.

The succession of musical numbers likewise prevents the work from being conceived in terms of a single quality of movement. Marches, chorales, tango, waltz, ragtime, and different kinds of incidental music place contrasting models of organisation side by side. In his study of the

eclecticism of *L'Histoire*, Verrier (1994) identifies the presence of several stylistic archetypes, including the march, pasodoble, Protestant chorale, tango, waltz, and ragtime.

Eclecticism thus becomes temporally consequential. When Stravinsky moves from a march to a dance, from a dance to a chorale, or from a stable episode to an asymmetrical metrical organisation, it is not only the thematic material or stylistic reference that changes. The way in which the listener can organise succession also changes. Different numbers project different relationships between pulse and accent, continuity and interruption, predictability and displacement.

The resulting discontinuity remains highly organised. Sharply differentiated blocks establish relationships with one another through recurrence, contrast, proportion, and dramatic position. Difference itself becomes one of the conditions through which form is made perceptible.

L'Histoire du Soldat contains cross-rhythms, displaced accents, syncopations, asymmetrical metres, and passages in which the underlying pulse must remain intelligible despite instability in the grouping of beats. Writing from his own experience of preparing and conducting the work, Tysseland (2009) identifies the combination of cross-rhythms, asymmetrical metres, and precisely defined tempo markings as one of the principal challenges facing the conductor.

The analytical significance of this phenomenon extends far beyond technical difficulty. In certain passages, what changes is the organisation of the units rather than necessarily their rate of succession. The pulse may retain its continuity while metre redistributes the points of emphasis. The experience of instability may therefore emerge from transformations in the internal relationships between units moving forward under a relatively stable temporal reference.

L'Histoire du Soldat offers a particularly clear example of the distinction established in the previous chapter between tempo and temporality. Here, that conceptual distinction becomes structurally audible. The same tempo may sustain different metrical organisations, and a change in metrical organisation may profoundly alter the experience of movement without requiring a proportional change in tempo.

The *Marche du Soldat* makes this condition especially evident. Its march-like character does not produce elementary regularity. Displacements between bass and percussion, asymmetrical groupings, and shifting relationships between strong and weak beats continually disturb what the genre itself seems to promise. Tysseland (2009) even describes the difficulty of grasping some of these groupings aurally before reconstructing them from the notation, noting that the organisation of asymmetrical bars significantly alters the way the passage is perceived and conducted.

The tension between referential regularity and internal instability is one of the work's most productive features for the present study. Pulse provides orientation but does not eliminate

displacement. Metre establishes organisation but does not guarantee predictability. Tempo defines a region of speed but does not by itself determine the temporal experience produced within it. The stability of one level may coexist with the transformation of another.

Within this context, metronome markings acquire an important function. They do not appear within temporally homogeneous music. They are embedded in a work whose identity is constructed through a succession of contrasting temporal states. A tempo marking determines the speed of a particular number while also shaping its relationship to what precedes and follows it.

For this reason, the different tempi of *L'Histoire* form a network of relationships rather than a collection of independent values. The temporal meaning of a march, a chorale, or a dance emerges from its internal rhythm, its contrast with neighbouring regions, the duration it occupies within the larger trajectory, and the way its entrance reorganises the perception of what has just occurred.

The work becomes even more revealing when recurrence is considered. Certain materials return at different points in the narrative, sometimes in modified form. The *Marche du Soldat*, for example, reappears later, but not as a neutral repetition of its first occurrence. The dramatic context has changed. The relationships established by everything that has happened between the two appearances mean that the return is heard from a different temporal position.

The same principle can be observed in the music associated with scenes. Tysseland (2009) draws attention to reappearances that accompany dramatically distinct situations. A recognisable musical material may preserve much of its identity and yet fulfil a different function because narrative time has altered the conditions under which it is heard. Recurrence reinscribes the past within a present that already contains what has occurred since its first appearance.

When two regions contain similar or recurring material, their return provides a basis for examining how temporal relationships are preserved or transformed. Does the recurrence preserve the same tempo? Does it maintain the same degree of stability? Are pauses articulated differently? Does it occupy the same proportion? Recurrence thus provides points of comparison within the work itself, making both continuities and differences perceptible.

Pauses deserve similar attention. In *L'Histoire*, silence performs several temporal and dramatic functions: it may delimit actions, interrupt continuity, allow the entrance of a character, or alter the relationship between music and scene. The textual history of the work itself shows how important such decisions were. Craft (1980) demonstrates that revisions made after the première altered the instrumentation, the length of movements, pauses, interruptions, and the relationships between music and stage action. In one passage from the second scene, for example, the revision introduces a complete interruption through a silent bar with a fermata, associated with the entrance of the Devil.

Stravinsky therefore revised what should sound, when sound should cease, how much space should separate events, and how silence and action should relate to one another. The work's temporality was thus implicated in the process of revision itself.

Craft (1980) further shows that the version premièred in Lausanne on 28 September 1918 differed significantly from the form later established. Most of the score underwent modification, with only a few numbers remaining unchanged, and the *Marche triomphale du Diable* was substantially expanded. This editorial history has an important conceptual consequence: the temporal prescription of *L'Histoire du Soldat* itself has a history.

This observation should not be confused with the performative transformation examined in this book. A compositional revision alters the transmitted text. A performative transformation alters the way in which a given text is realised. The distinction between the two becomes especially important precisely because *L'Histoire* presents both phenomena. Before comparing performances, it is therefore necessary to establish with precision which textual state is being taken as the point of reference.

Borém (2001) addresses this problem by discussing inconsistencies among different sources and editions of the work, as well as the later revision prepared by John Carewe based on manuscript material and the 1924 edition. For a study of temporality, this is not merely a philological issue. If pauses, extensions, barlines, or instrumental configurations have been altered, then the basis against which a performance is analysed also changes.

The work's temporal sensitivity extends from the level of the bar and tempo to longer-range relationships between individual numbers and between music and dramaturgy. In his analysis of the sequence formed by the *Petit Choral*, *Couplet du Diable*, and *Grand Choral*, Borém (2001) shows how form, harmonic coherence, proportion, and the relationship between text and music jointly contribute to the construction of dramatic action. This observation is relevant here because it demonstrates that temporal organisation also extends across broader formal scales.

The *Grand Choral* is particularly revealing in this respect. Its function emerges from the interaction of harmonic material, pauses, fermatas, changes of register, the succession of phrases, and the gradual shift in musical energy, all of which contribute to the construction of the anticlimax identified by Borém (2001). The dramatic effect depends on the way these elements are distributed across the temporal trajectory. Form acquires perceptible direction through its unfolding in time.

This point clarifies the sense in which the expression "temporal laboratory" is used here. The term functions as an analytical category through which *L'Histoire du Soldat* can be examined as a particularly revealing context for the study of musical time. Within a relatively compact span and with remarkable structural transparency, the work brings together different ways of organising

succession: pulse, metrical asymmetry, accentual displacement, tempo contrast, repetition, return, pause, fermata, interruption, coordination between speech and music, and the articulation of scenic movement with sound.

These dimensions do not remain isolated from one another. A metrical change may alter the sense of movement without changing the tempo. A pause may reorganise the action without introducing new material. A return may preserve notes and rhythms while changing their dramatic function. The same metronome value may sustain different internal behaviours. A minimal change in duration may become structurally significant precisely because it occurs at the point where music, text, and gesture must converge.

Its reduced instrumentation makes these decisions audible. Its stylistic diversity provides contrasting forms of organisation. Its metrical writing allows pulse to be distinguished from grouping. Its tempo markings offer measurable points of reference. Its recurrences create internal points of comparison. Its pauses and fermatas introduce moments in which duration must be actively determined. Its theatrical dimension requires different agents to share and negotiate time. And its history of revision shows that some of these relationships were themselves reconsidered by the composer.

For this reason, the choice of *L'Histoire du Soldat* rests primarily on the work's particular suitability for the study of temporality. The availability of Stravinsky's recordings provides an invaluable methodological resource that makes this investigation possible across different historical moments. The work is relevant because its musical identity depends to an unusual degree on how temporal relationships are established, maintained, and articulated.

This claim requires some qualification. The temporal identity of L'Histoire allows for multiple legitimate configurations and for variations in tempo that preserve the identity of the work. What remains structurally consequential are the relationships among marches, dances, recurrences, pauses, metrical groupings, contrasts, and scenic actions. Alterations to these relationships may affect both the speed at which the music unfolds and the way its parts relate to one another over time.

It is in this sense that *L'Histoire du Soldat* becomes a particularly revealing object for the investigation of temporality. Time functions as one of the organising principles through which the work articulates its internal relationships, differentiates its materials, enables recurrence, and sustains forward movement. This temporal sensitivity will later make it possible to examine both the duration of different performances and the relationships each performance constructs over time.

2.4 One Work, Three Moments

What does it mean to hear the same composer return to the same work after twenty, thirty, or forty years? To what extent do three recordings separated in time document the persistence of a single conception, and at what point do their differences begin to reveal another way of organising the work temporally? Before that, what must remain sufficiently constant for those differences to be compared without the comparison itself becoming artificial? These questions define the corpus of the present study. The aim is to observe the same musical configuration across three historically distinct recordings, each shaped by the actions of the same composer-conductor.

The expression 'the same work', however, requires some qualification. *L'Histoire du Soldat* did not pass through the twentieth century as an entirely fixed textual object. Craft (1980) demonstrates that the score premièred in Lausanne in 1918 underwent substantial revisions in the years that followed, affecting instrumentation, the length of movements, pauses, and relationships between music and action. The identity required for longitudinal comparison should therefore not be confused with an unchanged textual essence preserved since the moment of composition. In this study, it is established operationally using the same instrumental concert version, with a recognisable musical sequence, corresponding instrumentation, and prescribed points of reference that can be compared across different performances.

It is precisely for this reason that the corpus focuses on the concert suite. Stanley (2007) identifies three formal studio recordings of this version conducted by Stravinsky over a period of almost three decades: Paris in 1932, New York in 1954, and Hollywood in 1961. The *K Catalog* confirms these three stages in the work's recording history and explicitly identifies the 1932 and 1961 recordings as performances of the suite. The available discographic documentation also places the 1954 recording within the same concert corpus (Kirchmeyer, 2021). Stanley (2007) takes these three recordings as the basis for comparing Stravinsky's realised tempi with the indications in the score.

The choice of the suite does not constitute a reduction adopted merely for methodological convenience. It is Stravinsky's own recording history that establishes the common ground for comparison. The three formal studio recordings that make it possible to follow his practice across almost thirty years correspond to this instrumental configuration. To compare these sources is therefore to work with a musical object sufficiently constant for the temporal differences between performances to acquire significance.

There is also a deeper reason. The original scenic conception of *L'Histoire du Soldat* presupposes a work to be 'read, played, and danced', integrating speech, action, movement, and

music. Kirchmeyer (2021) preserves this distinction by separating the scenic version from the suite version recorded by Stravinsky in the three selected recordings. In addition to the suites, the discographic documentation includes a 1960 audio recording with actors and sound effects under Stravinsky's direction, while the original scenic conception, with its full integration of spoken text, instrumental performance, and dance, remains undocumented in a complete recording.

A complete scenic realisation would introduce temporal variables belonging to the dramaturgy itself: speech rate, the duration of gestures, actors' movements, dance, scenic pauses, and coordination between participants. All of these form part of the temporality of *L'Histoire du Soldat*, as discussed in the previous section, but they are not present in a comparable form across the three selected historical recordings. Without claiming to exhaust the work, the suite makes it possible to isolate the temporal dimension of instrumental realisation under Stravinsky's direction.

This delimitation also narrows the scope of the conclusions. The analysis therefore concerns specifically the temporality of the concert suite as performed, with its conclusions applying to this dimension of *L'Histoire du Soldat* rather than to the work's complete theatrical temporality. The methodological advantage of this delimitation lies precisely in its clarity. Variables associated with speech and scenic movement are removed from the comparison, allowing us to observe more precisely how Stravinsky organises substantially equivalent instrumental forces in time at three different historical moments.

The suite also preserves an important feature for the present investigation: an explicit network of tempo references. Kirchmeyer (2021) describes the concert version as a sequence organised into sections that are also delimited by metronome markings, comprising the *Marche du Soldat*, *Le Violon du Soldat*[15], *Pastorale*, *Marche royale*, *Petit concert*, *Trois Danses*, *Danse du Diable*, *Choral*, and *Marche triomphale du Diable*. These markings therefore provide prescribed points of reference that remain available across all three recordings. What may change is the way in which each performance relates to them.

Without a relatively stable prescribed reference, differences between the recordings could still be identified, but it would be more difficult to determine their position in relation to a common frame of reference. If only one recording were available, we could observe the distance between prescription and performance, but we would not know whether that configuration persisted when Stravinsky returned to the work. It is the combination of a written reference and the historical recurrence of performance that makes it possible to investigate continuity and transformation.

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[15] The titles and sequence of movements presented in Table 1 correspond to the **concert suite**, the version adopted in this study and common to the recordings of 1932, 1954, and 1961. For this reason, the second movement is identified as *Le Violon du Soldat*, rather than *Musique au bord du ruisseau*, the title used in the complete scenic version. The metronome markings were transcribed from the 1987 Chester edition prepared by John Carewe, which was also used by Lima and Oliveira (2013).

The designation "suite" requires documentary precision here. Kirchmeyer (2021) catalogues a *Concert Suite* organised into eight sections. The 1932, 1954, and 1961 Stravinsky recordings examined in this study, however, preserve a concert configuration in which *Le Violon du Soldat* and *Pastorale* appear as separate numbers. Since the aim of this investigation is to compare these three performances longitudinally, the operational point of reference adopted here is the configuration recorded by the composer, compared against the prescriptions of the 1987 Chester edition[16], also used by Lima and Oliveira (2013).

No.	ORIGINAL TITLE	METRONOME MARKING
I	*Marche du Soldat*	♩ = 112
II	*Le Violon du Soldat*	♩ = 100
III	*Pastorale*	♩ = 48
IV	*Marche royale*	♩ = 112
V	*Petit concert*	♩ = 120
VI	*Trois Danses*	—
	Tango	♩ = 80
	Valse	♪ = ♩ = 184–192
	Ragtime	♩ = ♪ = 184–192
VII	*Danse du Diable*	♩ = 138
VIII	*Grand Choral*	♩ = 54
IX	*Marche triomphale du Diable*	♩ = 112

Table 1. Prescribed metronome markings in the suite version of *L'Histoire du Soldat*
Source: Author's own elaboration based on Stravinsky and Ramuz (1987), Chester edition.

- **1932 — Paris.** The first recording in the corpus was made in Paris, fourteen years after the composition of *L'Histoire du Soldat*. It was recorded for Columbia Records, originally issued on 78 rpm discs, and identified by Hamilton (1968, as cited in Borém, 2001) as Columbia M-184. The recording was conducted by Stravinsky himself and featured Marcel Darrieux (violin), Alphonse-Joseph 'Boussagol' Delmas (double bass), Émile Godeau (clarinet), Gustave Dhérin (bassoon), Eugène Foveau (trumpet), Raphaël Delbos (trombone), and Jean-Paul Morel (percussion) (Kirchmeyer, 2021). Later discographic documentation dates the sessions to 6 and 7 May 1932 in Paris. This first recording provides the starting point for the longitudinal comparison and still belongs to the European phase of Stravinsky's recording activity, before the LP became established as the dominant long-playing format.
- **1954 — New York.** The second recording was made on 27 January 1954 in New York, twenty-two years after the first. Issued by Columbia Records as ML-4964, it belongs to the era of the monaural LP, placing it within a technological context distinct from that of 1932

[16] The Chester *Authorised New Edition* (1987), prepared by John Carewe, revises and rationalises the textual transmission of *L'Histoire du Soldat* on the basis of the 1920 copyist's autograph and the 1924 Chester edition, with corrections of particular significance in the percussion parts and the *Marche triomphale du Diable* (Borém, 2001). The same edition was used by Lima and Oliveira (2013) and serves as the textual reference for the present study.

(Hamilton, 1968, as cited in Borém, 2001). Conducted by Stravinsky, the recording featured Alexander Schneider (violin), Julius Levine (double bass), David Oppenheim (clarinet), Loren Glickman (bassoon), Robert Nagel (trumpet), Erwin Price (trombone), and Alfred Howard (percussion) (Kirchmeyer, 2021). This recording also presents an important documentary feature: part of the recording session itself was filmed, making it possible to observe Stravinsky working directly with the musicians in the studio, material already used by Lima and Oliveira (2013). The 1954 recording therefore occupies an intermediate position in the corpus both chronologically and methodologically, as it provides visual documentation of aspects of the process preceding the final phonographic product.

- **1961 — Hollywood.** The third recording was made in Hollywood, seven years after the 1954 recording and twenty-nine years after that of 1932. It was issued by Columbia Records in two versions, ML-5672 in mono and MS-6272 in stereo, making it the only recording in the corpus originally released in both formats (Hamilton, 1968, as cited in Borém, 2001). Stravinsky conducts members of the Columbia Chamber Ensemble: Israel Baker (violin), Richard Kelley (double bass), Roy D'Antonio (clarinet), Don Christlieb (bassoon), Charles Brady (trumpet/cornet), Robert Marsteller (trombone), and William Kraft (percussion) (Kirchmeyer, 2021). The recording therefore belongs to a substantially different phonographic context from that of 1932, both in terms of recording technology and the possibility of stereophonic reproduction. As a point of documentary interest, there is some disagreement over the exact date of the sessions. Kirchmeyer (2021) gives 10–13 October 1961, whereas documentation accompanying the later Sony Classical edition dates the 1961 material to 10–13 February 1961 at the American Legion Hall in Hollywood (Sony Classical, 2007). The latter dating appears particularly plausible, since the LP is documented as having been commercially available before October of that year.

The three recordings, however, occupy very different positions in the composer's career. The 1932 recording was made only fourteen years after the composition of the work and still belongs to the early decades of Stravinsky's recording activity. The 1954 recording followed twenty-two years later, by which time the composer had long been living in the United States and his relationship with the recording studio had acquired a different degree of regularity and systematisation. In 1961, seven years later, Stravinsky returned once again to the suite for what Stanley (2007) identifies as his third and final formal studio recording of *L'Histoire*. Together, the three documents span twenty-nine years of the same interpretative practice.

This chronology should not, however, be understood as a progressive sequence. The recordings of 1932, 1954, and 1961 will not be treated as three stages leading from an initial

interpretation towards a final, more mature, or more truthful version. Cook (2003) cautions precisely against constructing an overarching narrative from Stravinsky's successive recordings. Chronological order allows us to recognise what came earlier and what came later, but it does not justify turning posteriority into improvement.

Such caution is even more necessary because Stravinsky is not the only element that changes from one recording to another. The musicians, studios, recording technologies, and production circumstances also differ. The 1932 ensemble consisted of European musicians, the 1954 recording involved studio musicians in New York, and the 1961 performance featured players assembled under the designation Columbia Chamber Ensemble (Kirchmeyer, 2021; Stanley, 2007). A difference observed between two recordings cannot therefore be attributed automatically to an internal change in the composer's intentions.

This point determines how the expression Stravinsky's temporal transformation will be used in this study. The term refers to observable changes across performances conducted under his direction, without presuming that every measured difference was deliberately conceived by him or that the psychological cause of each decision can be reconstructed. The continuing presence of the composer-conductor provides historical continuity while allowing for the participation of other agents.

The comparison therefore combines stable and variable elements. What remains are the composer-conductor, the instrumental version adopted as the reference, much of its textual configuration, and an identifiable set of prescribed temporal indications. What changes are the performers, the material conditions, the historical moment, and, potentially, the temporal relationships produced. It is precisely this balance between continuity and difference that makes the corpus analytically significant. If everything remained the same, there would be no history to investigate. If everything changed, there would be no secure basis for comparison.

Stanley (2007) provides an important precedent. His study compares the metronome markings in the score with estimates of the tempi realised in the three recordings, showing that the relationship between prescription and performance does not display the degree of consistency that a literal reading of Stravinsky's discourse might lead us to expect. At the same time, this procedure also reveals the analytical step that remains to be taken. An approximate value for a section may indicate that one performance was faster or slower than another. By itself, however, it does not reveal how that speed was constructed over the course of the section.

It is precisely here that the problem formulated in the first chapter returns in concrete historical form. Two recordings may produce similar global values while following different internal trajectories. Others may display widely separated averages while preserving similar relationships

between their parts. A performance may vary considerably within a section and yet reproduce that same logic of variation decades later. The question can no longer be simply 'what was the tempo?', or even 'how far did Stravinsky depart from the marking?'. It becomes necessary to ask what temporal configuration each performance constructs and which relationships persist when that configuration changes.

The years 1932, 1954, and 1961 therefore function less as three dates in a discography than as three positions within a comparable temporal history. Each recording preserves a particular performance at one of those historical moments. Taken together, the three make it possible to observe continuities, shifts, and possible reconfigurations. None of them possesses, *a priori*, the status of origin, correction, or culmination. Each constitutes a complete performative present under its own historical conditions.

It is in this sense that the title of this section should be understood: one work, three moments describes an identity sufficiently stable for difference to become intelligible across time. The same suite returns. The same composer conducts it. The same prescriptions remain available. Yet realised time must be produced anew on each occasion.

The problem addressed in the following chapter arises directly from this condition. If transformation cannot be inferred from an isolated difference in tempo, and if global values are insufficient to reveal the internal organisation of a performance, then a mode of observation is required that can preserve position, trajectory, and relationship simultaneously.

How can temporal continuity and transformation across these performances be made analytically observable?



3 Methodological Procedure: Measuring Realised Time



Comparing three performances temporally requires transforming the sonic flow into data capable of preserving both its position in time and its relationship to musical structure. The methodological problem is to establish a procedure that makes it possible to observe how tempo behaves over the course of a performance and to compare that behaviour across historically distinct recordings.

The corpus defined in the previous chapter comprises the three recordings of *L'Histoire du Soldat* conducted by Stravinsky in 1932, 1954, and 1961. For the temporal analysis, each recording was initially treated as a continuous sonic sequence and then divided into corresponding units, so that musically equivalent positions could be compared across the three performances.

The segmentation was based on the organisation of the score and the configuration of the suite adopted in this study. Eleven analytical segments were defined: *Marche du Soldat*, *Le Violon du Soldat*, *Pastorale*, *Marche royale*, *Petit concert*, *Trois Danses* (*Tango*, *Valse*, *Ragtime*), *Danse du Diable*, *Grand Choral*, and *Marche triomphale du Diable*. The three dances were treated separately because they constitute distinct temporal units, each with its own metronome marking, even though they are grouped under the title *Trois Danses*.

Applied to the three recordings, this procedure resulted in 33 audio files, corresponding to the same 11 units in 1932, 1954, and 1961. The material was organised so that each segment had direct counterparts in the other two recordings. The subsequent comparison therefore begins with musically equivalent units rather than with the total duration of the recordings.

The start and end points were determined through correspondence between the recorded sound and the score. The aim was to preserve in each file the temporal span actually produced in that performance, since standardising the excerpts to identical durations would remove precisely some of the differences the analysis seeks to observe. The same movement may therefore have different durations across the three recordings without losing its structural equivalence.

The comparison rests on musical equivalence across the chronologically distinct recordings. If the same movement occupies different lengths of time in 1932, 1954, and 1961, that difference constitutes analytical data rather than a problem to be corrected before measurement. Segmentation establishes only common boundaries of observation within which each performance retains its own temporal organisation.

These 33 files formed the basis for extracting temporal events. The next stage was to determine how those events could be identified with sufficient consistency to support comparison across the three performances.

3.1 Temporal Event Detection and Algorithm Selection

The initial stage of the analysis of temporal profiles involved identifying successive events capable of providing a consistent temporal reference throughout each recording. This procedure was carried out using Sonic Visualiser v5.2.1 for macOS (Cannam et al., 2010), an environment that makes it possible to visualise the audio signal, overlay analytical layers, and export detected events as time series. At this stage, the analysis focused on obtaining a sufficiently stable sequence of temporal markers to support the subsequent calculations, prior to the direct estimation of musical tempo.

The first extraction was performed using the QM Tempo and Beat Tracker, through the Vamp plugins available in Sonic Visualiser. The algorithm initially produced plausible results, but inspection of the resulting series revealed an important methodological problem: the detected events did not always remain associated with the same metrical level within a single performance. In some passages, the markers followed a unit close to the principal pulse, while in others they shifted to subdivisions or broader groupings.

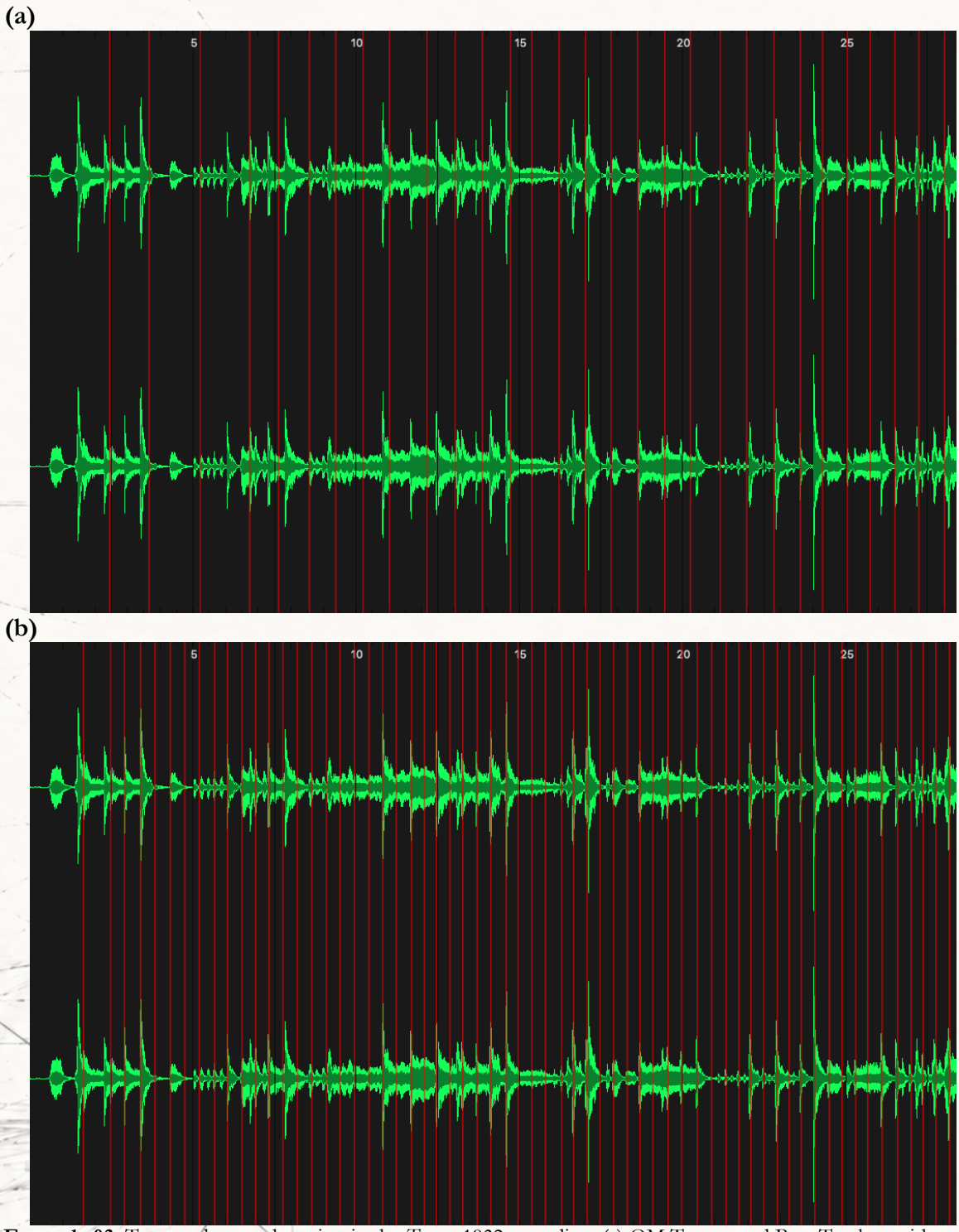
This change of level directly affects the rate calculated between events. If, for example, a detector shifts from one marker per pulse to two markers within the same metrical interval, the numerical rate may approximately double even though no equivalent acceleration has occurred in the performance. The reverse produces an apparent reduction. A curve constructed directly from such events may therefore suggest substantial changes of tempo that in fact result from a change in the metrical level tracked by the algorithm.

The problem became particularly evident in the *Trois Danses*. In some recordings of *Valse* and *Ragtime*, the QM produced successive regions with markedly different event rates, while listening suggested a much greater continuity in the temporal flow. Visual comparison with the metrical organisation of the score confirmed that some of these discontinuities corresponded to the detector itself shifting between different pulse levels. The methodological task was therefore to distinguish a genuine transformation in performance from a transformation produced by the detection process.

This finding is methodologically significant because it shows that the output of a beat tracker cannot automatically be treated as tempo. The algorithm identifies recurring events in the signal, but the musical interpretation of those events depends on their relationship to the observed metrical structure. Before converting intervals between markers into values of musical time, it is therefore necessary to establish whether the detector consistently follows the same metrical unit.

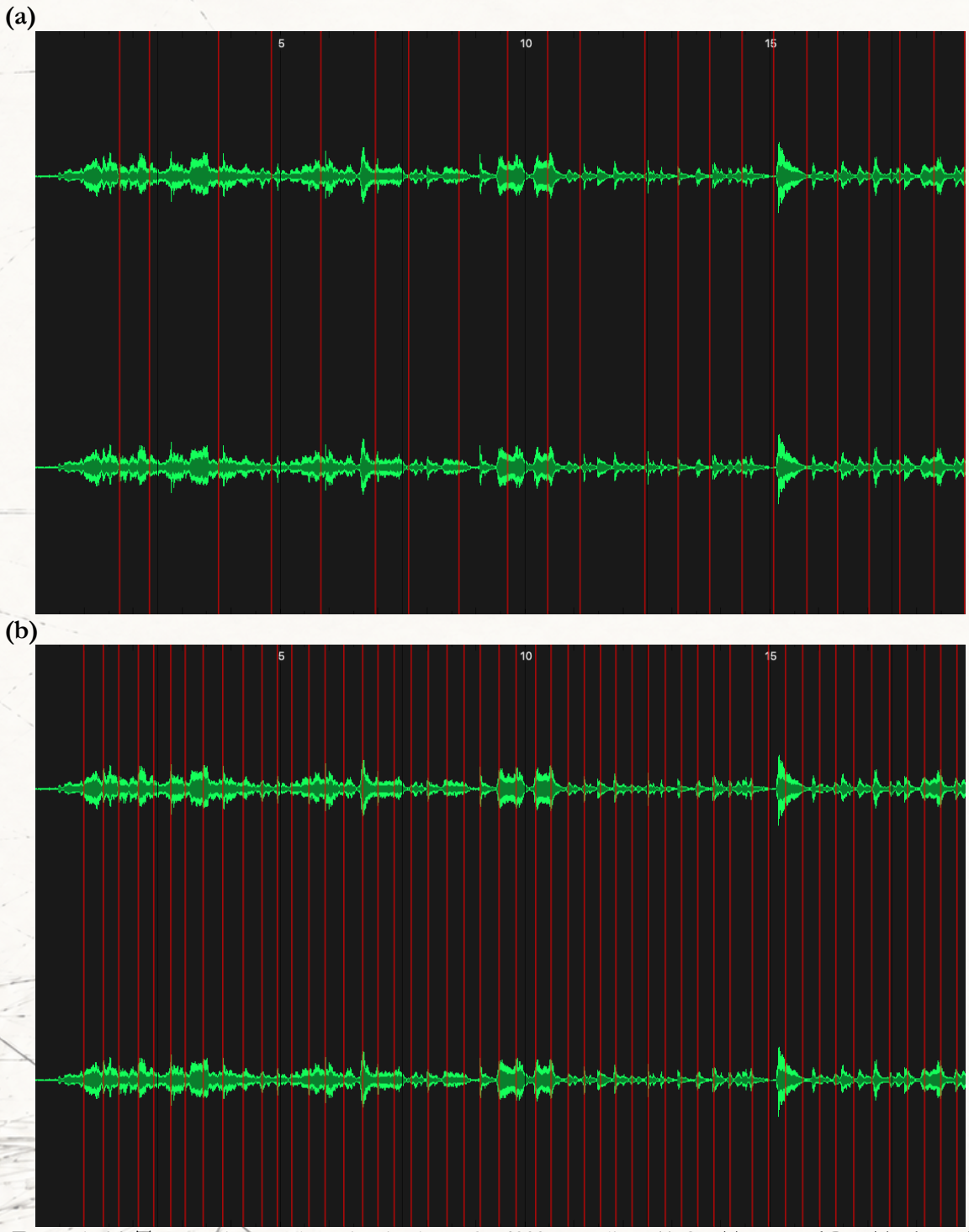
In response to this behaviour, a benchmark comparison between the QM Tempo and Beat Tracker and the BeatRoot Beat Tracker was carried out. The comparison used the same audio files

and initially focused on the *Trois Danses*, selected precisely because they had exposed the instabilities of the first detector most clearly. The analysis examined the temporal distribution of events, their visual correspondence with the musical pulse, and, above all, the continuity of the selected metrical level throughout each performance.



Example 03. Temporal event detection in the *Tango*, 1932 recording. (a) QM Tempo and Beat Tracker, with more widely spaced markers; (b) BeatRoot Beat Tracker, with a denser temporal grid in the same excerpt. The comparison demonstrates that the two detectors select different metrical levels.
Source: Author's own elaboration based on analysis carried out in Sonic Visualiser.

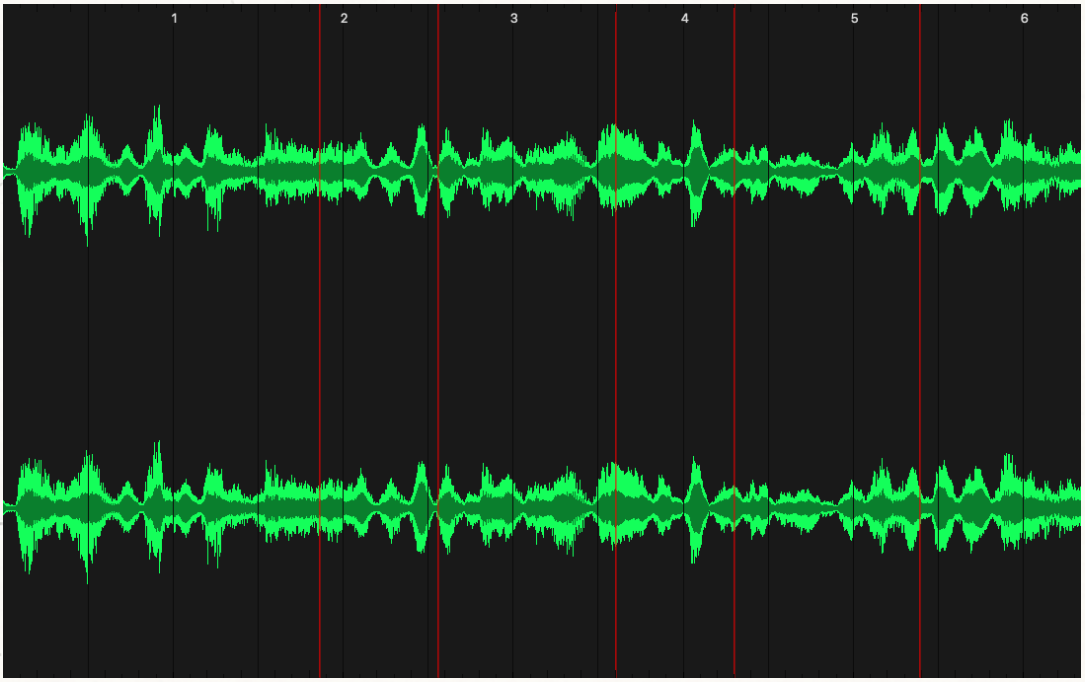
In the 1932 *Tango*, both detectors produce relatively regular sequences, but at different event densities. The QM Tempo and Beat Tracker generate more widely spaced markers, whereas BeatRoot establishes a denser temporal grid, indicating that the two algorithms are tracking different metrical levels. The detected event rate therefore cannot be interpreted directly as tempo.



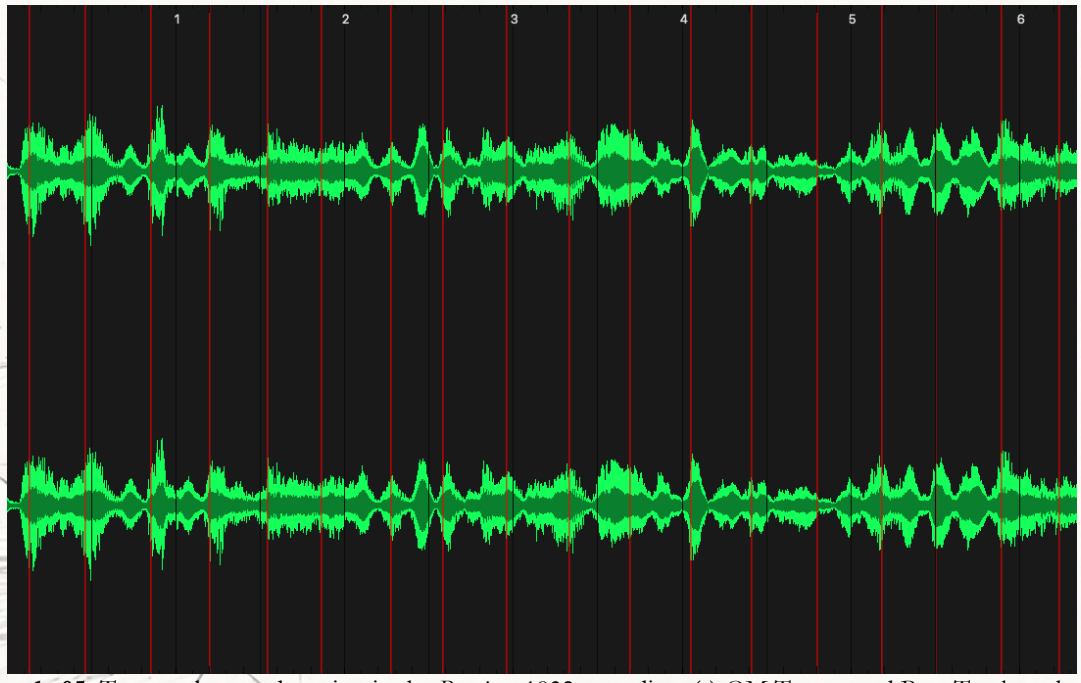
Example 04. Temporal event detection in the *Valse*, 1932 recording. (a) QM Tempo and Beat Tracker, with markers associated with a broader metrical level; (b) BeatRoot Beat Tracker, with denser markers corresponding to a finer subdivision.
Source: Author's own elaboration based on analysis carried out in Sonic Visualiser.

The same distinction is evident in the 1932 *Valse*. The QM follows a broader metrical level, while BeatRoot tracks a finer subdivision and consequently generates more events within the same temporal interval. Taken together, the two examples demonstrate that the metrical unit represented by the detected events must first be identified before those events can be converted into tempo values.

(a)



(b)



Example 05. Temporal event detection in the *Ragtime*, 1932 recording. (a) QM Tempo and Beat Tracker, showing greater irregularity in the distribution of events; (b) BeatRoot Beat Tracker, with a more homogeneous sequence of markers throughout the same excerpt.
Source: Author's own elaboration based on analysis carried out in Sonic Visualiser.

In the 1932 *Ragtime*, the distinction also concerns the stability of detection. The QM shows greater irregularity in the distribution of events, with changes in the intervals between markers, whereas BeatRoot maintains a more homogeneous sequence throughout the same passage. In this case, BeatRoot's greater internal consistency reduces the risk of interpreting changes produced by the detector as genuine variations in the performance tempo.

The three examples show that the discrepancy between the detectors was not an isolated occurrence, but a recurring behaviour across different movements of the *Trois Danses*. In each case, the difference took a particular form — a change in event density, the selection of different metrical levels, or greater irregularity in the succession of events — yet produced the same methodological consequence: the detector output could not be converted automatically into musical tempo. The recurrence of this pattern justified a systematic comparison of the algorithms and supported the choice of BeatRoot as the basis for the subsequent stages of calibration and temporal analysis.

Taken across the tests, BeatRoot provided the most suitable conditions for the continuation of the analysis. This does not mean that it necessarily identified the same metrical unit in every movement or recording. In some cases, its events corresponded to the principal pulse, while in others they reflected a regular subdivision. The decisive factor was its tendency to preserve, within each performance, a sufficiently consistent metrical relationship to allow that level to be identified and subsequently calibrated.

This internal stability provides a more secure analytical basis. A detector may, for example, track two subdivisions per crotchet, provided that this relationship is preserved throughout the performance and can be identified unambiguously. In that case, the sequence still represents the temporal variations of the performance adequately, even though a subsequent metrical conversion is required. More problematic would be a detector that alternates between different levels within the same recording, since each shift would introduce discontinuities that do not necessarily belong to the interpretation itself.

The choice of BeatRoot was based on the consistency of the detection, the possibility of relating the observed events to an identifiable metrical unit, and the stability of that relationship throughout each performance. Using proximity to the metronome markings in the score as a selection criterion would introduce a circularity incompatible with the aims of the study, since it would amount to selecting or correcting the data according to the very values against which they are subsequently compared.

Following the initial tests, the procedure was extended to all three recordings and all eleven analytical units, producing a total of 33 cases. Inspection confirmed the pattern observed in the benchmark. Although BeatRoot could adopt different metrical levels across movements or

recordings, its event marking remained sufficiently regular within each individual performance to provide a reliable basis for the analysis.

The intervals produced by BeatRoot are initially treated as automatically detected temporal events rather than as musical beats. The rate calculated from those intervals therefore represents a raw event rate. Only after identifying the relationship between those events and the notated metrical unit can that rate be converted into realised musical tempo.

Algorithm selection concludes only the first stage of the procedure. BeatRoot provides a stable time series, but it does not, by itself, provide the metrical interpretation of that series. The transition from automatic detection to musical measurement therefore depends on a subsequent stage of metrical calibration, in which each sequence of events is related to the temporal unit it represents.

With BeatRoot established as the primary detector, the markers corresponding to each performance were exported from Sonic Visualiser in CSV (*Comma-Separated Values*) format. For each combination of recording and movement, the file records the temporal position, in seconds, of every detected event, preserving the chronological sequence produced by the algorithm. These files constitute the raw temporal data used in the subsequent computational stages. They contain neither tempo values nor any metrical correction, but only the occurrence times of the detected events. Across the three recordings and eleven analytical units, the corpus therefore produced 33 BeatRoot event files, all of which were preserved unchanged throughout processing.

The separation between the raw files and the derived data allows the calculations to be reproduced from the same original events, thereby preserving the traceability of the procedure.

3.2 Metrical Calibration and Calculation of Realised Tempo

The stability of the sequence produced by BeatRoot resolves only part of the problem. The detected events have precise temporal positions but no inherent metrical identity. A marker may correspond to a crotchet, a quaver, or another regular subdivision. Before interpreting the series as tempo, it is therefore necessary to determine what proportion of the metronomic unit adopted for the analysis is represented by each detected event.

This stage was termed metrical calibration. For each combination of recording and movement, the BeatRoot markers were compared with the metrical organisation of the passage as notated in the score, establishing the correspondence between the succession of detected events and the written unit. The procedure serves solely to establish the relationship between the temporal grid provided by the detector and the musical unit subsequently expressed per minute, independently of any expected tempo value.

The distinction is fundamental. A sequence containing approximately 150 events per minute does not necessarily indicate a tempo of 150. If BeatRoot produces two markers for each crotchet, each event corresponds to half of that unit, resulting in approximately 75 crotchets per minute. Similarly, three events corresponding to one crotchet require a conversion factor of one third. The raw event rate acquires musical meaning only once this metrical relationship has been established. Calibration was therefore carried out individually for each of the 33 combinations of recording and movement.

Once this relationship has been established, the processing begins with the timestamps recorded in the CSV files exported from Sonic Visualiser. Each timestamp corresponds to the temporal position, in seconds, of an event detected by BeatRoot. The difference between two consecutive values provides the temporal interval on which the subsequent calculations are based.

Formally, let t_i and t_{i+1} denote the times, in seconds, of two successive events. The interval between them is given by:

$$\Delta t_i = t_{i+1} - t_i$$

From this interval, the raw event rate is calculated as:

$$E_i = \frac{60}{\Delta t_i}$$

where E_i is expressed in events per minute (EPM). The designation EPM is retained deliberately at this stage, rather than BPM, because it has not yet been established that each event corresponds to a beat or to a specific metronomic unit.

Conversion to musical tempo is carried out using a calibration factor (k), defined as the proportion of the metronomic unit represented by each detected event:

$$T_i = E_i \times k$$

or, equivalently,

$$T_i = \frac{60}{\Delta t_i} \times k$$

where T_i represents the realised tempo in the unit adopted for the movement. Dimensionally, the operation can be expressed as:

$$\frac{\text{events}}{\text{minute}} \times \frac{\text{metronomic unit}}{\text{event}} = \frac{\text{metronomic unit}}{\text{minute}}$$

This formulation allows different detection levels to be treated uniformly. When one event corresponds to one crotchet, (k=1). When two events correspond to one crotchet, (k=0.5). When three events correspond to one crotchet, (k=1/3). In the *Ragtime*, where the analytical unit adopted is the quaver, an event corresponding to one quaver likewise gives (k=1), but the result is expressed in quavers per minute.

The calibration showed that BeatRoot did not necessarily select the same metrical level across all recordings. This variation does not constitute a problem provided that the relationship remains stable within each performance and can be identified unambiguously. Table 2 summarises the calibration factors used across the 33 cases.

Movement	**1932**	**1954**	**1961**	**Resulting unit**
I. Marche du Soldat	1	1	1	♩/min
II. Le Violon du Soldat	0,5	0,5	1	♩/min
III. Pastorale	0,5	1	0,5	♩/min
IV. Marche royale	1	1	1	♩/min
V. Petit concert	1	1	1	♩/min
VIa. Tango	0,5	0,5	0,5	♩/min
VIb. Valse	1	1	1	♩/min
VIc. Ragtime	1	1	1	♪/min
VII. Danse du Diable	1	1	1	♩/min
VIII. Grand Choral	1/3	1/3	1/3	♩/min
IX. Marche triomphale du Diable	1	1	1	♩/min

Table 2. Metrical calibration factors used in the three recordings of *L'Histoire du Soldat.*
Source: Author's own elaboration based on the correspondence between BeatRoot events and the metrical units of the score.

The factors represent observed metrical relationships and therefore should not be interpreted as numerical corrections imposed on the data. In the *Tango*, for example, two BeatRoot markers correspond to one crotchet, which is why the raw event rate is multiplied by (0.5). In the *Grand Choral*, three events correspond to one crotchet, resulting in (k=1/3). In the *Valse*, by contrast, each event corresponds directly to one crotchet.

The *Ragtime* requires particular attention. The analytical unit remains the quaver, preserving the temporal reference specific to the passage. Converting these values to an equivalent rate in crotchets would reduce the numerical value, but it would introduce a unit that does not correspond

to the metronomic reference used in the analysis. The results are therefore retained in ♪/min. The same principle governs the procedure throughout: values are expressed in the musically relevant unit rather than artificially normalised to a common one.

This decision also avoids the ambiguity associated with the generic use of BPM. A value such as "170 BPM" is incomplete unless the unit being counted is made explicit. In the present study, the calibrated results are therefore presented directly as ♩/min or ♪/min, depending on the movement. This notation makes explicit both the rate and the unit to which that rate refers.

One methodological point requires particular attention: the metronome markings in the score do not contribute to the determination of the calibration factors. Using ♩ = 80, for example, to decide whether a sequence of 150 events per minute should be divided by two would introduce circular reasoning, since the reference that will later be compared with the performance would already have been used to construct the performance data itself.

Calibration was therefore based exclusively on the correspondence between the detected events and the observable metrical organisation of the passage. Only after the realised tempo had been calculated were the metronome markings from the score introduced. This separation preserves the independence between measurement of the performance and comparison with the prescription. Operationally, the pipeline can be summarised as follows:

BeatRoot timestamps → Δt → EPM → metrical calibration → ♩/min or ♪/min

The timestamp files constitute the raw input and remain unaltered. All transformations are carried out subsequently by the computational pipeline, which calculates successive intervals, converts them into event rates, and applies the corresponding calibration factor to each case. Separating the original data from the derived data makes it possible to reconstruct every stage of the calculation and to trace the origin of any value used in the analysis.

The result of this operation is a time series of realised tempi, which provides the basis for the subsequent global characterisation of the performance. Each interval between events is assigned a value expressed in the appropriate musical unit and a defined position within the course of the recording. It is this calibrated series, rather than the raw rate produced by the detector, that provides the basis for constructing the temporal profiles and for the statistical procedures developed in the following stage.

3.3 Statistical Treatment and Construction of Temporal Profiles

The calibration described in the previous section produces, for each recording and movement, a sequence of local tempo values associated with the intervals between successive events. This series preserves the temporal variation of the performance, but direct inspection alone is insufficient for comparing performances with different durations and event densities. Statistical procedures were therefore adopted to distinguish two complementary scales of observation: a global summary of the performance and the evolution of tempo across its temporal trajectory.

A first problem arises from the nature of the data itself. Each local tempo value is calculated from an interval Δt_i. Shorter intervals generate more events within the same amount of time. Consequently, faster regions of a performance produce a greater number of observations than slower regions. A statistic calculated simply from the number of events would therefore assign greater influence to passages that generate more markers, even when they do not occupy a larger proportion of the total performance duration.

To avoid this bias, the principal global descriptors were weighted by the effective duration of each interval. For each observation (i), a weight (w_i) was assigned, defined by the duration of the corresponding interval:

$$w_i = \Delta t_i$$

In this way, the contribution of a local value to the statistical summary is proportional to the amount of time it represents in the recording, rather than to the number of events generated by the detector. The fundamental unit of weighting therefore shifts from the individual occurrence to the duration occupied within the performance.

The weighted mean is calculated as:

$$\bar{T}_w = \frac{\sum_{i=1}^{n} w_i \, T_i}{\sum_{i=1}^{n} w_i}$$

where (T_i) corresponds to the realised tempo in interval (i) and (w_i) to its duration. This measure provides a global estimate that weights each value in proportion to the amount of time it occupies over the course of the performance.

The duration-weighted median was adopted as the principal measure of central tendency. Its calculation does not depend on the chronological position of the events, but on the distribution of tempo values in relation to the total amount of time they represent. The values (T_i) are ordered,

and their corresponding weights (w_i) are accumulated. The median is the first value for which the cumulative duration reaches 50% of the total sum of the weights.

More generally, for a weighted quantile $Q_w(q)$, one identifies the tempo value at which the cumulative duration reaches the proportion (q) of the total duration considered. Thus,

$$Q_w(0{,}50)$$

corresponds to the weighted median, while

$$Q_w(0{,}25) \text{ e } Q_w(0{,}75)$$

define the first and third weighted quartiles, respectively.

The choice of the median as the principal descriptor reflects an important characteristic of the performance data. Exceptionally high or low local values may occur because of musical features, poorly defined attacks, or minor irregularities in detection. Although such values are not automatically discarded, the median is less sensitive to extreme observations than the mean. The weighted mean is retained among the results as a complementary measure, making it possible to identify cases in which the distribution of values is sufficiently asymmetrical to produce a divergence between the two estimates.

The quartiles add a measure of central dispersion without reducing the performance to a single value. The interval between $Q_w(0{,}25)$ and $Q_w(0{,}75)$ contains the central region of the temporal distribution of realised tempi. A narrow range indicates that a substantial proportion of the performance duration remained concentrated around similar values, whereas a wider range reveals greater diversity in local speeds. These values are not interpreted in isolation as measures of expressivity or instability, but as descriptive indicators of the temporal distribution of each performance.

Means and medians calculated from the simple count of events were retained only as secondary diagnostics. Comparing them with the duration-weighted measures makes it possible to assess the effect of event density on the statistical summary. The interpretative analyses in this study, however, rely primarily on the duration-weighted measures.

A global summary does not reveal where transformations occur. Two performances may have similar medians and still follow different trajectories. One may maintain a relatively stable tempo, while another may begin more slowly and accelerate progressively. To recover this

dimension, a second analytical scale was constructed based on the relative position of each interval within the total duration of the performance.

Temporal position was normalised between 0 and 100%. For each interval, its midpoint (m_i) was used, calculated from the initial and final timestamps. The normalised position is defined as:

$$P_i = \frac{m_i - t_0}{t_f - t_0} \times 100$$

where (t_0) corresponds to the beginning of the analysed series and (t_f) to its final timestamp. The beginning of the performance is therefore represented by 0%, and the end by 100%.

This normalisation applies exclusively to temporal position, not to tempo values. No tempo is converted into percentages, adjusted to the score, or rescaled to produce similarity between recordings. The values on the vertical axis remain in their respective musical units — ♩/min or ♪/min. Normalisation serves only to place performances of different absolute durations within a common proportional frame of progression.

The comparison is therefore made according to relative position within the performance, rather than absolute seconds. The point corresponding to 50%, for example, represents the temporal midpoint of each recording, even though that moment occurs at different chronological times. This operation is particularly important for the present corpus, in which the three realisations of the same movement do not necessarily have the same duration.

To summarise the internal evolution without relying exclusively on visual inspection of the curves, each performance was also divided into ten equivalent temporal regions. Each decile corresponds to 10% of the normalised duration: $0–10\%, 10–20\%, (\ldots), 90–100\%.$

Within each region, the duration-weighted median is calculated again. This produces a sequence of ten values that summarises the tempo trajectory from the beginning to the end of the performance without eliminating its temporal ordering.

The deciles serve a different function from the quartiles. The quartilhes describe the distribution of tempo values regardless of when they occur, whereas the temporal deciles preserve the position of those values within the unfolding of the performance. A recording may, for example, have a narrow interquartile range while still displaying a slight progressive trend from the first to the final deciles. Conversely, localised fluctuations may increase dispersion without producing a persistent temporal direction.

As auxiliary indicators of stability, the lowest and highest values among the ten temporal medians were recorded, together with the range between them:

$$R_D = D_{\max} - D_{\min}$$

where $D_{\max}$ and $D_{\min}$ correspond, respectively, to the highest and lowest decile medians. This range provides a compact description of the extent of change across regions of the performance but does not indicate its direction or shape. Its interpretation therefore remains tied to the complete sequence of deciles and to the graphical profile.

The graphical representation preserves the calibrated local values and adds a five-event moving median to facilitate the reading of broader trends. At each position in the series, the smoothed line represents the median of a centred window containing up to five consecutive observations. The use of a short window is intended to reduce isolated fluctuations without obscuring changes occurring on a broader scale.

This smoothing serves a strictly visual function. The resulting line does not replace the calibrated values and is not used in the calculation of means, medians, quartiles, or deciles. This distinction is important because a window defined by number of events does not necessarily represent the same chronological duration in every passage. Regions with a higher event density correspond to temporally shorter windows. Using the smoothed curve as a statistical basis would therefore introduce a renewed dependence on detection density, precisely the effect that duration weighting is intended to avoid.

For each movement, the comparative profiles bring together the smoothed curves from the 1932, 1954, and 1961 recordings on a common horizontal axis ranging from 0 to 100%. Because calibration preserves the metronomic unit specific to each movement, the three curves can be compared directly within the same musical unit. The score reference is subsequently superimposed on the graph as a horizontal line or, when the indication specifies a range, as a reference band.

The presence of this graphical reference does not intervene in the construction of the profile. All performance values, their statistics, and their temporal normalisation are calculated beforehand and independently. At this stage, the score functions as an external parameter for comparison, making it possible to observe the overall relationship between prescribed and realised *tempi* and to determine how that relationship changes over the course of the performance.

The statistical treatment therefore produces three complementary levels of information. The duration-weighted median, mean, and quartiles characterise the global distribution of tempo. The temporal deciles summarise its internal trajectory. The normalised profiles preserve the local continuity required to compare the three recordings. None of these representations is treated in isolation as equivalent to the temporality of the performance. Taken together, they provide

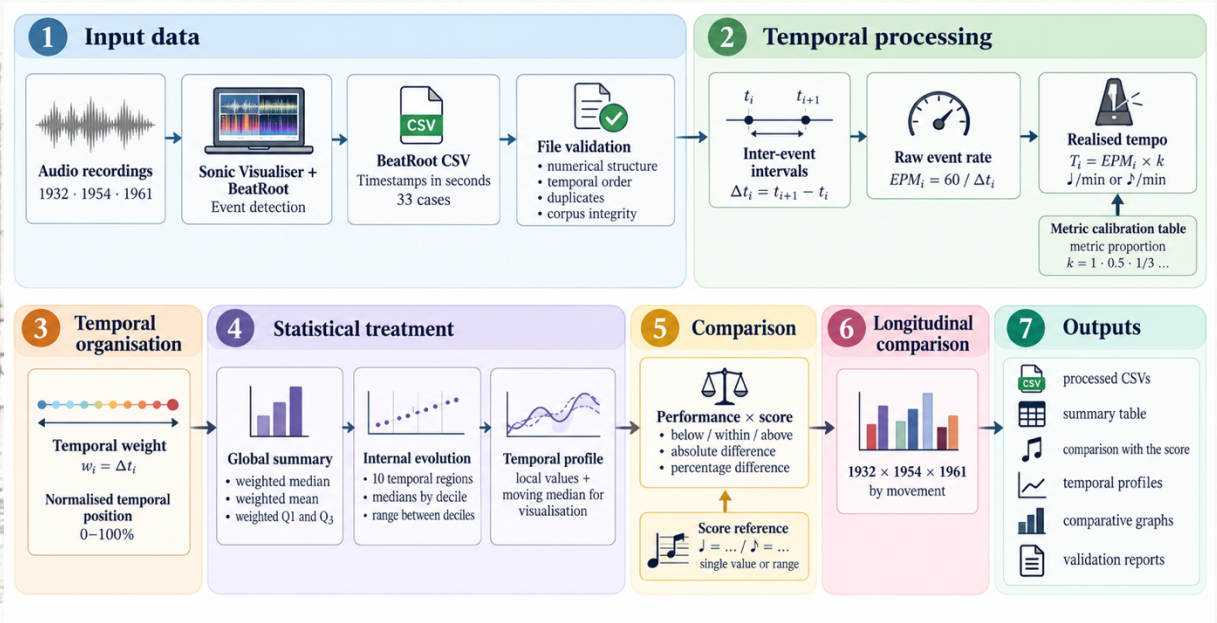
different scales of observation of the same phenomenon and make it possible to distinguish global value, dispersion, and transformation over time.

3.4 Computational Implementation, Traceability, and Reproducibility

The operations defined in the preceding sections were integrated into a computational pipeline developed in Python specifically for this study. Its function is to apply the same processing rules uniformly across the 33 combinations of recording and movement, from the reading of the timestamps exported by BeatRoot to the production of the tables and temporal profiles used in the analysis. The code serves to operationalise, in an explicit and verifiable manner, musical and methodological decisions established in advance.

This distinction is central to understanding the status of the computational processing. The choice of BeatRoot, the identification of the metrical unit, the assignment of calibration factors, and the definition of the relevant statistical procedures are not inferred by the program. They constitute external parameters determined through the procedures described in the preceding sections. The pipeline receives these decisions as input and ensures that they are applied according to an invariant sequence.

The general logic of this processing is illustrated in the following diagram, which summarises the relationship between the input data, the external parameters, and the principal transformation stages carried out by the pipeline.



Example 06. Computational pipeline for processing and analysing temporal data.
Source: Author's own elaboration.

As the Exemple 06 shows, the processing was structured to preserve the separation between performance data, calibration parameters, and score-based references. This distinction organises both the methodological exposition and the computational design of the study itself.

The architecture was organised around the separation of four classes of information: raw performance data, calibration parameters, score prescriptions, and derived data. This separation prevents information belonging to different analytical stages from being combined prematurely and makes it possible to reconstruct the path of each result back to its source.

The CSV files exported from BeatRoot constitutes the primary layer. They contain only the temporal sequence of detected events and remain unchanged throughout the pipeline. All subsequent calculations are performed on copies loaded into memory or on new files generated during processing. Preserving the original data is a basic requirement of traceability: any result can be recalculated from the same sequence of timestamps without altering the source of the measurement.

The second layer corresponds to the metrical calibration table. For each combination of year and movement, it records the analytical unit, the factor (k), the observed relationship between the BeatRoot markers and the notated unit, as well as the information used to document the validation. Calibration therefore remains external to the code itself. This choice avoids embedding analytical decisions implicitly within programming instructions and makes it possible to inspect them independently of the processing.

A third table contains the metronome references from the score, including the reference unit and, depending on the case, either a single value or a range of values. Its physical separation from the calibration table reflects a methodological principle embedded in the computational design itself: the score prescription remains independent of the construction of realised tempo.

The program also checks the compatibility between the unit used in calibration and the unit defined for the score reference. A discrepancy between, for example, crotchets and quavers causes processing for that case to stop rather than allowing a dimensionally inconsistent comparison to proceed. This check acts as a safeguard against silent errors, which are particularly important in cases where numerically plausible results may conceal different musical units.

Before any calculation is performed, the input files undergo a stage of structural validation. The pipeline accepts only files consisting of a single numerical column of timestamps, removes non-finite values, and requires the sequence to be strictly increasing. Empty files, files with too few events, files containing multiple columns, or rows incompatible with the expected format are rejected and logged separately. The purpose of this validation is to ensure that an unsuitable file is not processed simply because it carries a CSV extension.

This control proved necessary because the CSV format alone does not guarantee the nature of the content. A waveform export, a table containing several variables, and a temporal-event file may all share the same extension. Methodological consistency therefore depends on validating the expected content, rather than relying only on the filename or external file format.

The pipeline also checks for duplicate files. When more than one valid candidate is found for the same combination of recording and movement, the files are compared using a SHA-256 cryptographic hash. This makes it possible to distinguish byte-for-byte identical copies from genuinely different versions. Both the occurrence and the selected file are recorded in a dedicated report, ensuring that the choice between duplicate inputs remains transparent to the researcher.

These mechanisms still require supervision. Their function is to make explicit situations that might alter the results without being noticed. Automation is therefore used not to reduce critical control over the data, but to increase the capacity to detect inconsistencies before they propagate through subsequent stages.

After validation, each file is associated with its corresponding recording and movement through a naming convention. The program then retrieves the relevant factor from the calibration table and sequentially performs the calculations defined in Sections 3.2 and 3.3. For each interval, the processing preserves both the intermediate values and the calibrated results.

This is important for auditability. The processed file does not contain only the final tempo value. For each interval, it records the initial timestamp, final timestamp, midpoint, inter-event interval, temporal weight, raw event rate, applied metrical factor, analytical unit, realised tempo, and normalised position within the performance. The path from raw data to interpretable data therefore remains recoverable line by line.

The transformation is non-destructive. The raw rate in EPM is retained alongside the calibrated value, making it possible to verify subsequently the exact effect of the metrical factor. Preserving these intermediate states is particularly important because any future revision to the metrical interpretation of a particular case does not require the events to be detected again. The conversion can instead be recalculated from the same timestamps, allowing the resulting values to be compared directly.

Statistical treatment is applied only after this conversion. For each performance, the program calculates the mean and quantiles weighted by interval duration, while retaining in parallel means and medians based solely on event counts as diagnostic information. The coexistence of these measures makes it possible to assess the extent to which event density influences an unweighted statistic without confusing that diagnostic function with the descriptor adopted for the principal analysis.

The division into ten temporal regions is likewise automated. Each interval is assigned to the proportional position it occupies between the first and final timestamps of the performance, and weighted medians are calculated separately for each decile. The minimum, maximum, and range of the decile medians are also derived from this operation. The procedure is identical across all 33 cases, thereby eliminating local decisions about where segments should begin or end based on the observed behaviour of the curves.

For graphical representation, the pipeline also calculates a five-event moving median. As established above, this result serves a visual function and remains separate from the statistics used for global characterisation. The code retains both the unsmoothed local series and the smoothed curve, making it possible to distinguish between calculated data and a graphical aid to interpretation.

The automatic generation of figures follows the same architecture. For each case, the pipeline produces a diagnostic profile of the raw BeatRoot event rate and a profile of the calibrated tempo. Subsequently, the three recordings of each movement are brought together on a common normalised temporal axis. The score indication is added only at this stage of comparison, in the form of a line when there is a single value, or of a band when the prescription comprises a range.

This order of execution serves as a safeguard against computational circularity. No function responsible for calculating realised tempo uses the metronome marking from the score to select the factor, correct the curve, or adjust the data. The written reference is retrieved only after the construction of the performance series has been completed. The independence between measurement and comparison, established conceptually in the methodology, is therefore preserved in the structure of the code as well.

Comparison with the score is calculated from the duration-weighted median of the performance. When the reference consists of a single value, the relationship is direct. When it takes the form of a range, the program determines whether the median lies below, within, or above its limits. Absolute and percentage differences are also calculated, including the distance from the midpoint of the range when this measure is required for aggregated comparisons. These results are derived from data that have already been calibrated and do not feed back into any earlier stage.

The processing produces several levels of output. An individual file preserves the interval-by-interval data. A summary table brings together the global descriptors and temporal deciles for each performance. Another table concentrates the relationship between performance and prescription. The sets of figures document both the individual profiles and the comparisons between 1932, 1954, and 1961. Processing failures, rejected files, and duplicates are recorded in separate reports, so that the absence of a case cannot be mistaken for a valid result.

Corpus completeness provides an additional check. The program expects 33 valid combinations, corresponding to the eleven analytical units across the three recordings. A different count is not silently normalised. Instead, it generates a warning and remains documented. In the version used for the final analysis, all 33 cases were processed successfully, with no execution failures.

This structure makes it possible to distinguish three forms of consistency that should not be conflated:

1. **Computational consistency** means that the same operations are applied to every case.
2. **Traceability** means that each result can be linked back to the data and parameters that produced it.
3. **Computational reproducibility** means that, given the same input files, parameter tables, and version of the code, the derived results can be obtained again.

Reproducibility, however, has a limitation here that must be made explicit. The pipeline begins its processing from the timestamps already exported by BeatRoot. It therefore makes fully reproducible the pathway from detected events to analytical results but does not by itself reproduce the preceding stage of detection from the audio. Full reproduction of that stage also depends on the availability of the recordings used, the version of Sonic Visualiser, the version of the BeatRoot plugin, and the corresponding execution conditions.

To document the technical conditions under which the procedure was carried out, Table 3 presents the computational environment, the analytical tools, and the principal libraries used in the final data processing.

Component	**Version / specification**	**Role in the study**
Sonic Visualiser	v5.2.1, macOS	Audio visualisation, inspection of detected events, plugin execution, and export of temporal events
QM Tempo and Beat Tracker	QM Vamp Plugins v1.8.0, macOS	Initial beat detection and methodological benchmark against BeatRoot
BeatRoot Beat Tracker	Distributed with Vamp Plugin Pack v2.0, macOS	Primary algorithm used for the final detection of temporal events
Python	3.13.5	Execution of the computational analysis pipeline
NumPy	2.3.5	Numerical operations and array processing
pandas	2.2.3	Reading, validation, organisation, and export of tabular data
Matplotlib	3.10.8	Generation of temporal profiles and comparative figures
Input data format	CSV	Storage of BeatRoot timestamps in seconds
Analysis corpus	33 cases	Eleven analytical units across the 1932, 1954, and 1961 recordings
Pipeline	Custom Python implementation	Validation, metric calibration, tempo calculation, duration-weighted statistics, temporal normalisation, comparison with the score, and generation of analytical outputs

Table 3. Computational environment and software used in the temporal analysis.
Source: Author's own elaboration.

This distinction prevents the code from being attributed a greater degree of reproducibility than it provides. Preserving the original CSV files fixes the observed output of the detector and makes all subsequent processing independent of a new detection procedure. Re-running event

detection from the audio constitutes a separate level of reproduction, dependent on the preservation of the computational environment and the external tools employed.

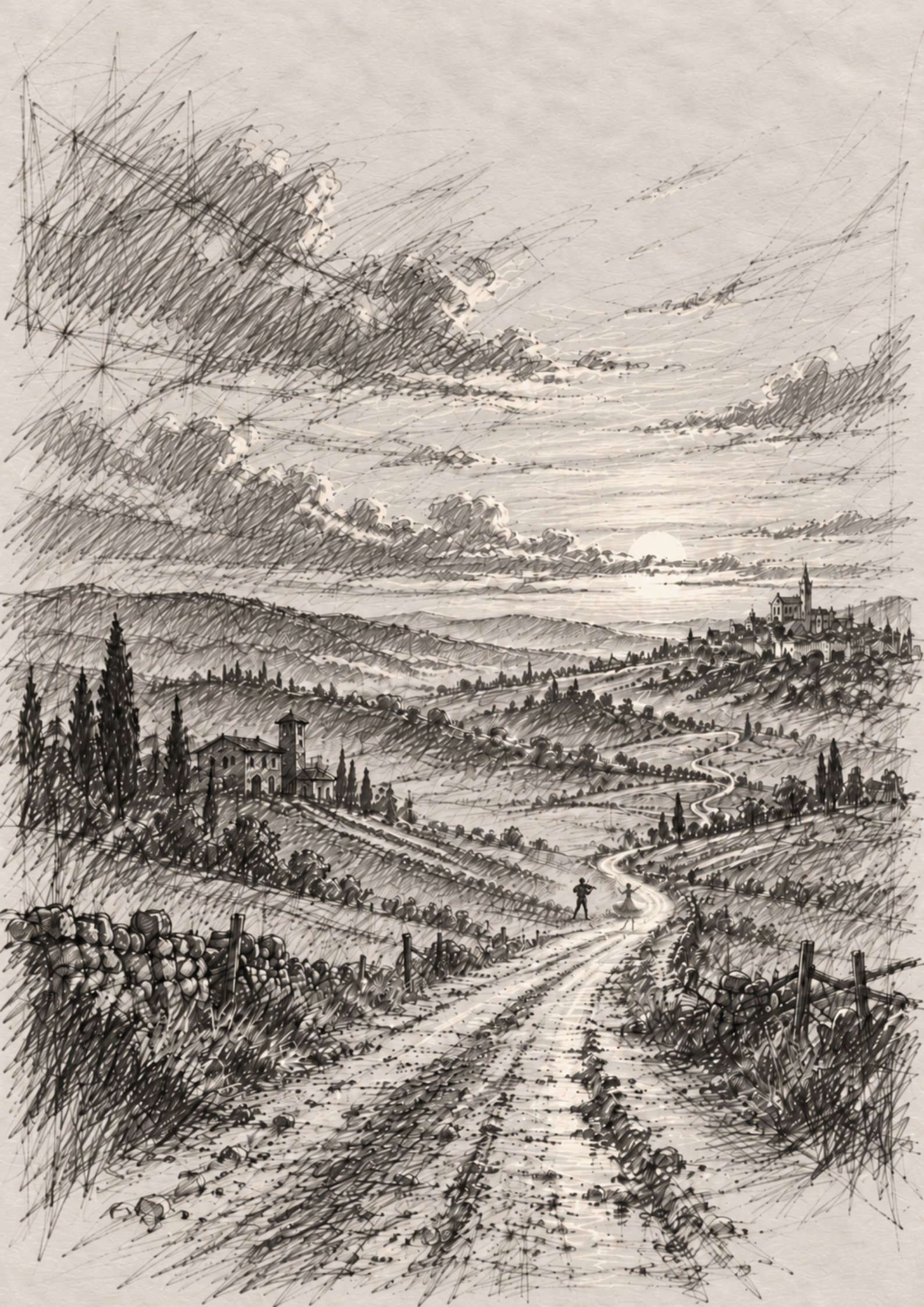
The final version of the pipeline therefore functions as a formal implementation of the methodological protocol. Its principal contribution lies in the controlled integration of data validation, musical calibration, statistical treatment, temporal normalisation, comparison with the score, and the generation of analytical outputs within a single workflow.

The code should consequently be understood as part of the study's epistemological infrastructure rather than as an autonomous source of interpretation. It reduces procedural variation, makes transformations explicit, and allows the analytical results to be traced back to the data from which they were derived. Automation ensures procedural consistency, while musical validity continues to depend on the analytical decisions formalised by the procedure.

The processing therefore produces comparable temporal profiles for all 33 combinations of movement and recording. These profiles make it possible to observe global differences in tempo as well as continuities, variations, and transformations over the course of each performance. The following chapter takes these profiles as its point of departure, examining the recordings of 1932, 1954, and 1961 movement by movement.



4 Temporal Profiles of *L'Histoire du Soldat*



This chapter examines the temporal profiles of *L'Histoire du Soldat* through a movement-by-movement analysis. Each unit is treated separately to preserve its metrical organisation, metronome marking, and the formal particularities that condition its temporal realisation. This approach avoids reducing the corpus to a global comparison of "speeds" and makes it possible to observe how different temporal behaviours emerge in distinct musical contexts.

Within each movement, the recordings of 1932, 1954, and 1961 are initially considered on their own terms. The analysis begins by describing the specific temporal configuration of each performance: its global tempo level, its degree of stability over time, the presence of local variation, and the direction of any internal transformations.

Comparison between the three recordings takes place only after this individual characterisation. This procedure makes clear that similar global values may correspond to different temporal trajectories, just as differences in average tempo may coexist with comparable internal patterns. The analytical focus therefore falls both on how far each performance shifts temporally and on how that shift is distributed across the form.

The metronome marking in the score is incorporated as an external parameter for comparison. Its purpose is to provide a point of reference for examining relationships of proximity, divergence, continuity, and transformation across the performances. The analysis distinguish between quantitative differences in tempo and broader differences in temporal behaviour.

Each subsection brings together three scales of observation: the statistical summary of the performance, the normalised temporal profile, and the longitudinal comparison of the three recordings. This combination makes it possible to identify relatively stable configurations as well as progressive changes, localised contrasts, or broader reorganisations of temporality.

The priority of this chapter is to establish the temporal behaviour of each movement in each of the three recordings, preserving their differences before identifying broader patterns across them. An overarching interpretation of Stravinsky's temporal trajectory will be developed later, in Chapter 5.

4.1 *Marche du Soldat*

The *Marche du Soldat* provides a particularly clear first case in which the distinction between prescribed metronome value and realised temporal configuration can be observed. The score specifies ♩ = 112, while the three recordings occupy different positions in relation to this reference and, more importantly, distribute tempo differently over the course of the performance. The analysis therefore considers the difference between a central value and the metronome marking together with the degree of stability constructed by each performance, the points at which variation

is concentrated, and whether those variations form persistent tendencies or remain localised changes. The individual graphs represent the local tempo values and the five-event moving median across the normalised temporal position of each performance.

Table 4 brings together the principal descriptors used to guide this reading. The weighted median provides the main global reference. The weighted mean makes it possible to identify possible asymmetries in the distribution, while Q1 and Q3 delimit the central region occupied by 50% of the performance duration. The range of the decile medians, in turn, indicates the extent of the differences between successive temporal regions of the performance.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 112
1932	108.11	107.90	103.45–111.11	5.84	−3.89 (−3.48%)
1954	122.45	121.71	117.65–125.00	9.62	+10.45 (+9.33%)
1961	117.65	116.08	112.82–119.47	8.89	+5.65 (+5.04%)

Table 4. Statistical summary of the *Marche du Soldat* across the three recordings
Source: Author's own elaboration based on the results of the computational pipeline.

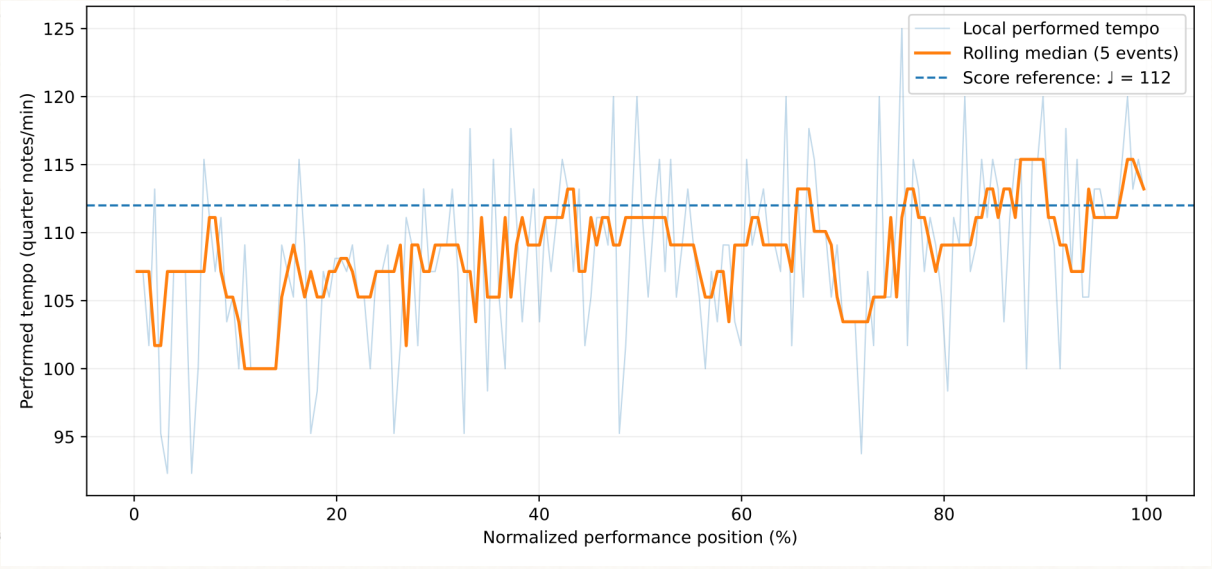
The 1932 recording presents the lowest overall temporal level of the three performances. Its weighted median is 108.11 ♩/min, 3.89 units below the score indication, corresponding to a difference of −3.48%. The close agreement between the weighted median and weighted mean — 108.11 and 107.90 ♩/min, respectively — indicates a stable global characterisation with limited influence from extreme values. The distribution is shifted downwards.

This position is reinforced by the quartiles. The central interval lies between 103.45 and 111.11 ♩/min, meaning that even the third quartile remains below ♩ = 112. This is more informative than the simple difference between the median and the score, as it shows that the divergence extends across a substantial proportion of the performance rather than being confined to isolated slower episodes. Much of the performance duration consistently occupies a region below the written reference.

The deciles help distinguish between directional tendency and oscillation. Their medians are, successively, 107.14, 105.27, 107.14, 109.09, 111.11, 107.14, 110.08, 105.27, 111.11, and 111.11 ♩/min. There is no linear progression. Clear regressions occur in the sixth and eighth deciles, yet comparison between the two ends of the performance reveals a net increase of approximately 4 ♩/min from the first to the final region. The performance therefore displays a general upward tendency interrupted by local oscillations rather than a continuous acceleration.

The range between the decile medians, 5.84 ♩/min, is the smallest of the three recordings. This result is significant because the graph contains sharper local fluctuations than this figure alone

might suggest. The difference indicates that some of these fluctuations are relatively short-lived: they remain visible in the local series and in the moving median, while only the more persistent changes emerge as distinct tempo levels when the performance is examined in regions corresponding to 10% of its duration. This makes it possible to distinguish local variability from persistent temporal reorganisation.



Example 07. Temporal profile of the *Marche du Soldat* in the 1932 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording establishes a substantially different configuration. Its weighted median, 122.45 ♩/min, lies 10.45 ♩/min above the score, corresponding to a difference of +9.33%. This is the largest global divergence among the three recordings and represents a reversal in direction relative to 1932: the first performance lies overall below the reference, whereas the second is clearly above it.

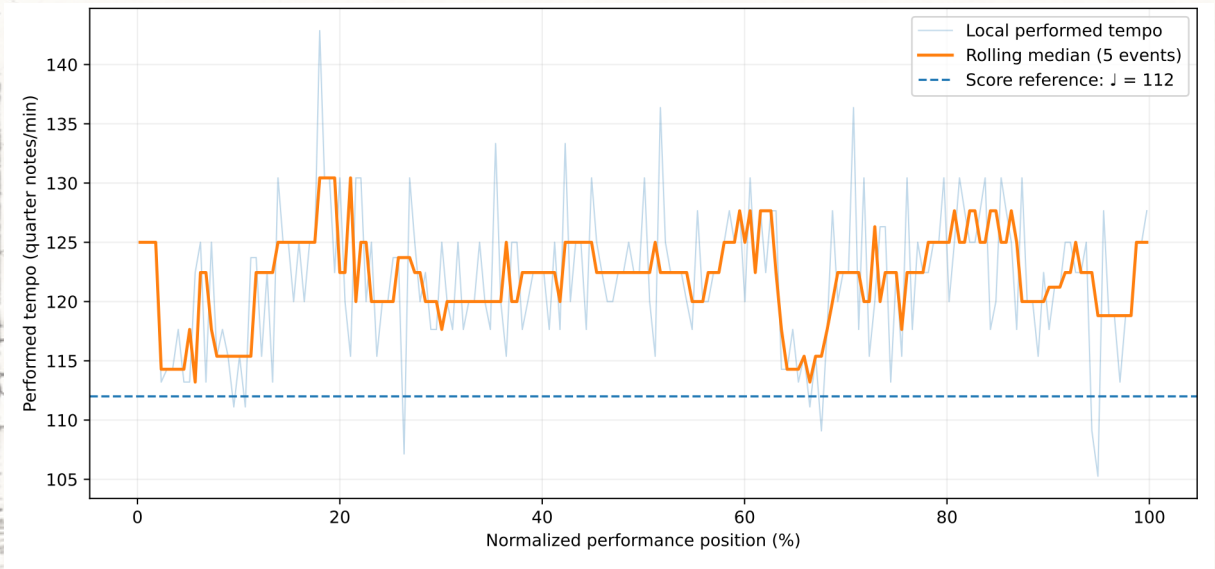
The distribution confirms that the shift extends across the central region of the performance. The first quartile already lies at 117.65 ♩/min, while the third reaches 125 ♩/min. The entire interquartile range therefore lies above ♩ = 112, placing the written reference below the region in which most of the performance duration is concentrated.

The individual curve shows, however, that this higher tempo level retains a clear internal structure. Following an initial region marked by a temporary decrease, the moving median rises to around 125–130 ♩/min and then remains, for much of the performance, approximately between 120 and 125 ♩/min. A further decline occurs at around two-thirds of the way through the performance, temporarily bringing the tempo closer to the reference before the higher level is re-established.

The sequence of deciles reveals a broadly stable higher tempo level articulated by local fluctuations. The first decile stands at 115.38 ♩/min, followed by 123.71 ♩/min, while the central deciles are concentrated predominantly between 120 and 122.45 ♩/min. The ninth reaches 125.00 ♩/min, and the final decile returns to 121.21 ♩/min. The behaviour can therefore be described more precisely as the establishment of a higher temporal regime, internally articulated by localised declines and recoveries.

The decile median range, 9.62 ♩/min, is the largest of the three recordings. This value reflects local variation within an overall level of stability, as the interquartile range, approximately 7.35 ♩/min, is similar to that found in 1932. Taken together, these measures suggest that the global distribution remains relatively concentrated, while regions of the performance shift persistently enough to alter the medians of entire temporal segments. In 1954, variation therefore manifests itself less as indiscriminate dispersion than as differentiation between regions of the temporal trajectory.

The difference between the weighted mean and median also remains small: 121.71 versus 122.45 ♩/min. The slower episodes are sufficient to pull the mean slightly downwards, but they do not alter the fundamental characterisation of the performance. In global terms, the 1954 realisation should therefore be understood as a reading that is clearly faster than the prescribed tempo and, internally, as a high-tempo configuration articulated by local inflections.



Example 08. Temporal profile of the *Marche du Soldat* in the 1954 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording occupies an intermediate position between the two earlier performances, while retaining a distinct temporal profile. Its weighted median is 117.65 ♩/min, corresponding to +5.65 ♩/min or +5.04% relative to the score. The overall tempo therefore remains above the written reference but falls by approximately 4.80 ♩/min in comparison with 1954.

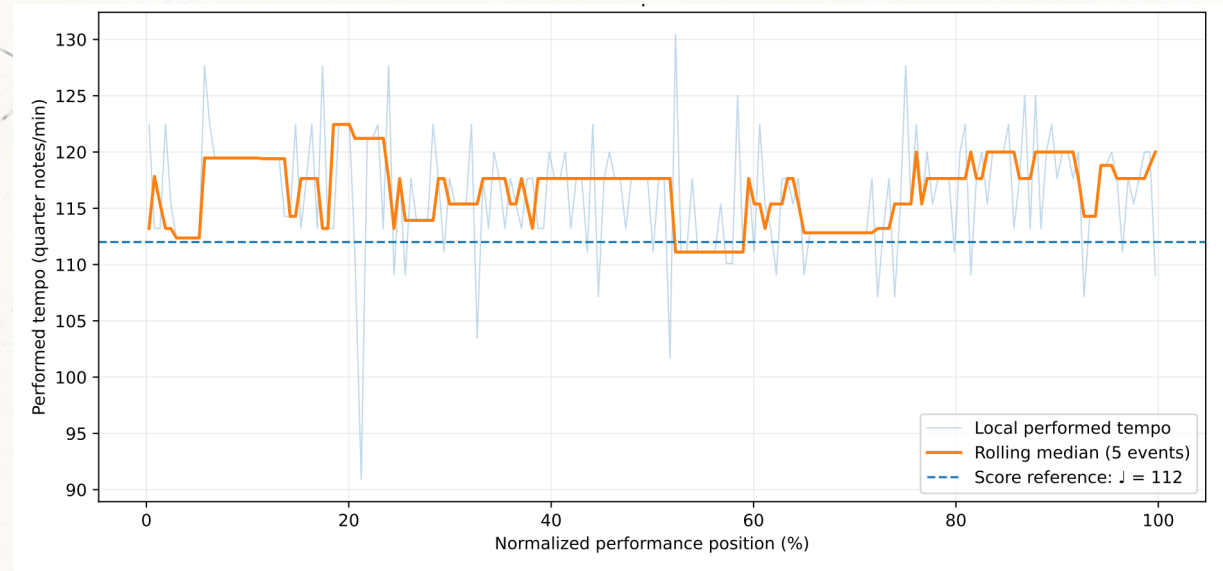
The quartiles delimit an interval from 112.82 to 119.47 ♩/min. The first quartile lies only slightly above ♩ = 112, while the third remains clearly higher. This configuration distinguishes 1961 from both 1932, whose interquartile range lies entirely below the reference, and 1954, whose central interval lies considerably above it. The 1961 performance therefore keeps the centre of its distribution above the score while establishing greater proximity to the written reference in its lower region.

The internal profile reveals a particularly well-defined organisation. The first two deciles have medians of 119.47 and 119.40 ♩/min. From this point onwards, a gradual decrease occurs: 117.65 in the third decile, 115.38 in the fourth and, after a partial recovery in the fifth, 111.11 ♩/min in the sixth. This marks the most sustained slower region of the performance. The following deciles show a recovery: 112.82, 115.38, 120.00, and 117.65 ♩/min.

The performance begins above the written reference, undergoes a broad reduction through its central region, and rises again during the final third. The 1961 performance is characterised by a central temporal depression followed by recovery, producing a profile distinct from both the net upward tendency observed in 1932 and the predominantly high-tempo level of 1954.

The range between the decile medians, 8.89 ♩/min, confirms that this reorganisation extends across a substantial portion of the performance. At the same time, the difference between the weighted mean and median is greater than in the other two recordings: 116.08 versus 117.65 ♩/min. The mean is pulled downwards by the slower regions, while the median preserves the predominant tempo level. Although moderate, the discrepancy between the two descriptors is consistent with the asymmetry produced by the central reduction observed in the temporal trajectory.

Taken together, these indicators allow the 1961 recording to be characterised as a performance that is globally faster than the prescribed tempo, but internally less uniform in its relationship to it. The proximity of certain segments to ♩ = 112 forms part of a broader trajectory in which the tempo approaches the written reference in the central region of the performance before moving away from it again later.



Example 09. Temporal profile of the *Marche du Soldat* in the 1961 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The superimposition of the three curves makes clear that the differences between the recordings cannot be reduced to parallel shifts of the same trajectory. First, there is a clear change in global temporal level: 108.11 ♩/min in 1932, 122.45 ♩/min in 1954, and 117.65 ♩/min in 1961. Between 1932 and 1954, the median increases by 14.34 ♩/min, or approximately 13.27% relative to the 1932 value. Between 1954 and 1961, it decreases by 4.80 ♩/min. Even so, 1961 remains 9.54 ♩/min above 1932.

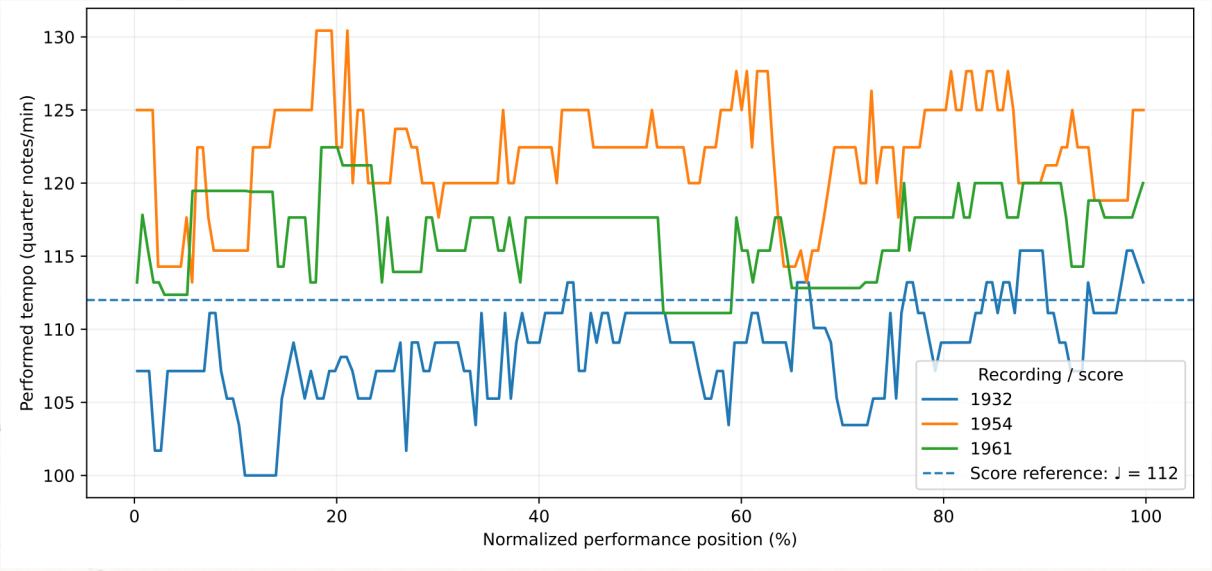
The longitudinal trajectory therefore follows a non-monotonic pattern: 1932 occupies the lowest position, 1954 establishes the highest level, and 1961 partiallyrecedes to an intermediate position between them. The relationship with the score follows the same pattern: −3.48% in 1932, +9.33% in 1954, and +5.04% in 1961.

The comparative graph also shows that the differences are not constant over the course of the performances. The distance between 1932 and 1954 is generally substantial but varies according to normalised temporal position. At certain points, 1961 approaches the 1954 trajectory, while at others it moves towards the region occupied by 1932 or by the metronome marking itself. The superimposition therefore reveals three distinct temporal organisations rather than three versions separated by a fixed difference in speed.

The normalised horizontal axis enables comparison of the proportional temporal position within each performance, but it does not constitute bar-by-bar alignment between the recordings. A point located at 60% in two performances indicates the same relative position within their respective durations, not necessarily the same musical event. For this reason, longitudinal comparison is particularly well suited to identifying broader configurations — tempo levels,

tendencies, depressions, or recoveries — whereas specific local correspondences would require direct alignment with the score.

Even so, the distinction between the three conceptions is unequivocal at the global level. In 1932, the central region of the distribution remains below the prescribed tempo. In 1954, it shifts entirely into a higher region. In 1961, it remains above the reference but approaches it significantly during the central region of the performance. Each recording establishes a distinct relationship between global level, dispersion, and internal trajectory.



Example 10. Comparison of the temporal profiles of the *Marche du Soldat* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Marche du Soldat* thus reveals a temporal transformation that cannot be adequately described simply in terms of greater or lesser proximity to the metronome marking. The 1932 recording presents a globally slower realisation, with a slight upward shift over the course of the performance. The 1954 recording establishes the fastest regime, sustained despite local inflections. The 1961 recording retains a level above the prescribed tempo but organises it through a central reduction followed by recovery. The change across the three recordings therefore affects both the global position of the tempo and the way in which it is distributed over time. It is this combination, rather than the average value in isolation, that defines the temporal profile of the movement.

4.2 *Le Violon du Soldat*

In *Le Violon du Soldat*, the relationship among the three recordings presents a different configuration from that observed in the *Marche du Soldat*. The metronome marking is ♩ = 100, but

the performances are not distributed symmetrically around this value. The 1932 and 1954 recordings remain globally below the prescribed tempo, whereas 1961 shifts into a region very close to it and ultimately moves slightly above it in terms of central tendency. More significantly, the comparison shows that each recording organises its relationship to the written reference and its internal tempo variation in a distinct way.

The statistical summary makes it possible to delineate these differences before turning to a more detailed reading of the temporal profiles.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 100
1932	88.24	87.62	83.33–90.92	5.19	−11.76 (−11.76%)
1954	92.30	92.00	88.24–95.24	2.84	−7.70 (−7.70%)
1961	101.69	101.17	98.36–104.35	5.09	+1.69 (+1.69%)

Table 5. Statistical summary of *Le Violon du Soldat* across the three recordings
Source: Author's own elaboration based on the results of the computational pipeline.

The 1932 recording establishes the slowest temporal regime of the three. Its weighted median is 88.24 ♩/min, while the weighted mean is 87.62 ♩/min. The difference between them is small, approximately 0.62 ♩/min, indicating that the performance's overall position below the score characterises the temporal distribution as a whole rather than a small number of extreme episodes.

The distance from ♩ = 100 is substantial: −11.76 ♩/min, equivalent to −11.76%. More significant still is the interquartile range, which lies between 83.33 and 90.92 ♩/min. The entire central region of the distribution therefore remains clearly below the reference. Even the third quartile lies around 9 ♩/min below the written value. This makes it possible to state that the 1932 performance occupies a structurally lower position in relation to the score, rather than merely reflecting several localised decelerations.

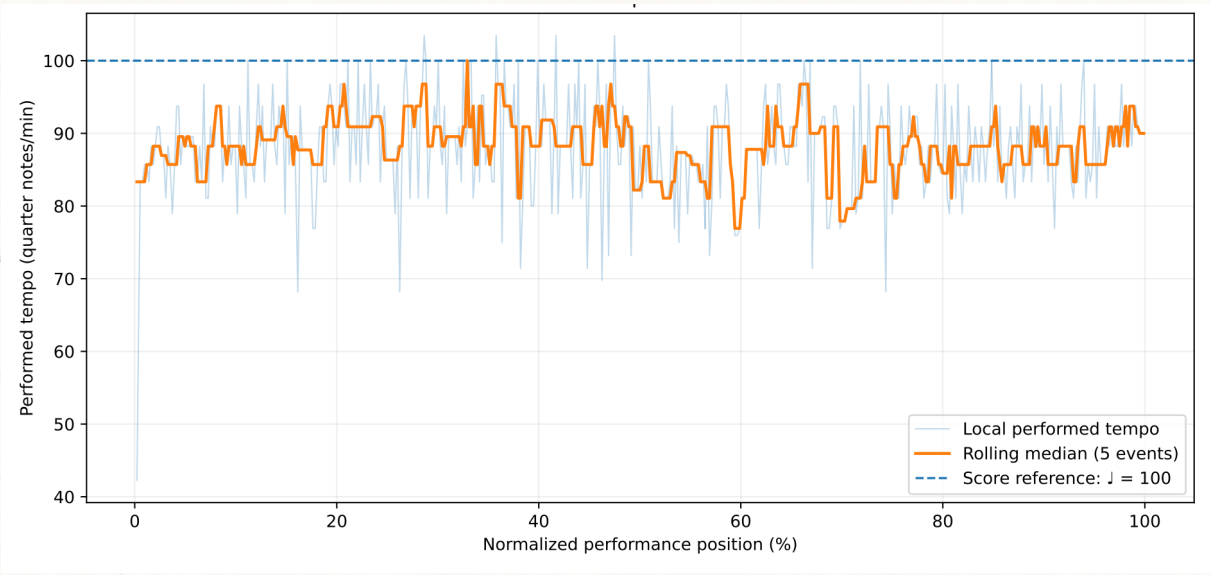
The individual profile confirms this configuration. The moving median remains below ♩ = 100 for almost the entire performance, concentrating predominantly in the region between approximately 85 and 92 ♩/min. Some local values reach or momentarily exceed the written reference, but they do not become established as a new temporal level. The difference between the local events and the smoothed curve shows precisely that these episodes have only limited influence within the overall trajectory.

The distribution of the deciles reinforces this reading. Their medians are 88.24, 87.72, 90.90, 89.55, 88.24, 85.71, 88.24, 85.72, 88.24, and 88.24 ♩/min. The third decile constitutes the fastest region, while the sixth and eighth present the lowest values. There is, however, no progressive

direction leading the performance from one initial level to a different final one. The first and final deciles occupy virtually the same tempo level.

The range between the decile medians is 5.19 ♩/min. This measure reveals moderate regional variation, but its organisation is essentially oscillatory. The performance moves around a relatively stable temporal centre, with declines and recoveries, without producing a sustained tendency towards acceleration or deceleration.

This distinction separates two phenomena that the graph might initially appear to bring together: the presence of local fluctuations and the transformation of the overall trajectory. In 1932, there is fluctuation, at times pronounced at the event-by-event level, but the temporal regime remains notably persistent when observed over broader temporal scales.



Example 11. Temporal profile of *Le Violon du Soldat* in the 1932 recording in relation to the reference ♩ = 100.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording shifts the movement to a higher tempo level, while still maintaining a global position clearly below the metronome marking. The weighted median reaches 92.30 ♩/min, approximately 4.07 ♩/min above the 1932 value, while the weighted mean, 92.00 ♩/min, remains very close to the median. The divergence from the score decreases to −7.70%, but ♩ = 100 still lies outside the central region of the distribution.

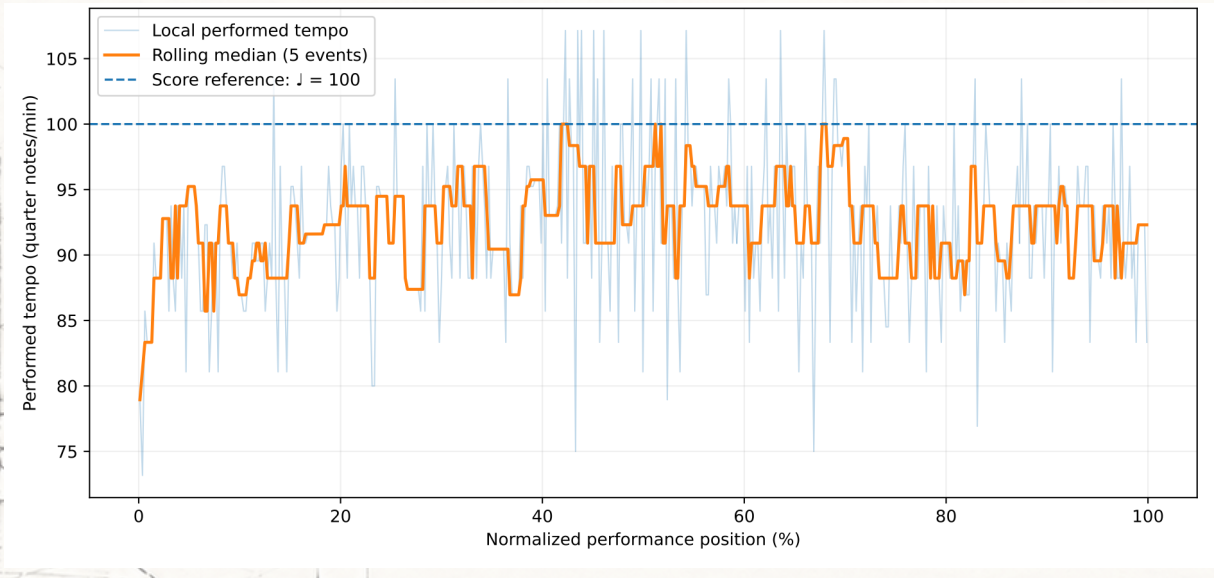
The interquartile range extends from 88.24 to 95.24 ♩/min. As in 1932, the entire central interval remains below the reference, although it has shifted upwards. The transformation between the first two recordings consists in a broader upward repositioning of the tempo distribution, with the second recording occupying a higher overall level.

There is, however, an important difference in internal organisation. The range between the decile medians falls to Only 2.84 ♩/min, the smallest value among the three performances. The deciles are organised within an extremely narrow domain: 90.91, 90.91, 93.75, 93.75, 93.02, 93.75, 93.75, 90.91, 90.91, and 92.30 ♩/min. At the regional scale, the 1954 recording is the most stable performance of the three.

This stability coexists with continuous local variation. The graph shows continuous small declines and recoveries, together with occasional approaches to ♩ = 100. The moving median fluctuates mainly between approximately 88 and 98 ♩/min, reaching the written reference itself only at a few points. These variations remain localised within an otherwise stable temporal regime.

The distinction between local variability and regional stability is particularly clear in this case. The individual events show relatively broad dispersion, yet when the performance is examined in segments corresponding to 10% of its duration, the medians remain tightly concentrated. This indicates that short-lived perturbations are absorbed within a more persistent temporal structure.

The 1954 recording can therefore be characterised as faster than 1932, yet still systematically below the prescribed tempo, while also being the most stable of the three at the mesotemporal scale. The change from one recording to the next affects the position of the temporal regime more than the form of its internal evolution.



Example 12. Temporal profile of *Le Violon du Soldat* in the 1954 recording in relation to the reference ♩ = 100.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording substantially alters the relationship established in the two earlier performances. Its weighted median is 101.69 ♩/min, while the weighted mean is 101.17 ♩/min. For

the first time, the centre of the distribution lies above the score indication, although only by a small margin: +1.69 ♩/min, corresponding to +1.69%.

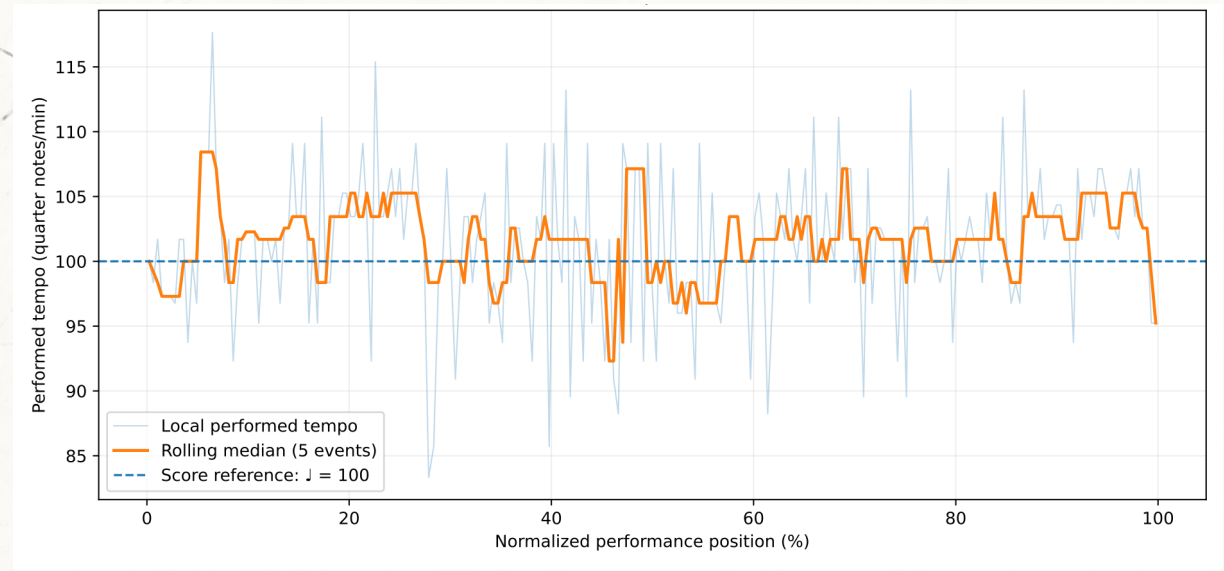
The proximity to ♩ = 100 is confirmed by the interquartile range of 98.36 to 104.35 ♩/min. Unlike in 1932 and 1954, the reference now lies within the central interval of the distribution. This change is conceptually important. It is not simply a third, faster performance because the statistical relationship between performance has itself been reorganized. The written value, previously outside the central region of the realised tempi, now forms part of the temporal space occupied for a substantial proportion of the performance.

The profile shows a realisation organised around this reference without adhering rigidly to it. The moving median repeatedly crosses the ♩ = 100 line and remains slightly above it for extended segments. The opening region shows a pronounced rise, followed by stabilisation around 100–105 ♩/min. Around the central region, a clearer reduction can be observed, after which the performance recovers to values close to or above the reference.

The deciles define this architecture more precisely. Their medians are 100.00, 102.27, 103.45, 100.00, 101.69, 98.36, 101.69, 101.69, 101.69, and 103.45 ♩/min. The trajectory begins exactly at the reference, rises during the first third, then gradually declines until reaching its minimum in the sixth decile, before recovering and ending at the same maximum value observed in the third decile.

The decile median range, 5.09 ♩/min, is similar to that of 1932, but the form taken by this variation is different. In 1932, the regional values oscillate below the score's prescription without a clear longitudinal direction. In 1961, the oscillation is organised around the reference itself and displays a more clearly defined structure of initial rise, central depression, and final recovery.

The difference between the weighted mean and median remains small, at approximately 0.53 ♩/min. Although the central reduction is clearly perceptible, it does not shift the distribution sufficiently to alter the global characterisation of the performance. The 1961 profile should therefore be understood as a realisation centred very close to the written marking but internally articulated through movements away from and back towards it.



Example 13. Temporal profile of *Le Violon du Soldat* in the 1961 recording in relation to the reference ♩ = 100.
Source: Author's own elaboration based on the results of the computational pipeline.

Taken together, the three recordings reveal a particularly clear transformation: the temporal centre of the movement shifts progressively upwards from 1932 to 1954 and 1961. The weighted medians rise from 88.24 to 92.30 and finally to 101.69 ♩/min. Unlike the *Marche du Soldat*, the longitudinal trajectory of this movement is monotonic at the global level.

Between 1932 and 1954, the median increases by 4.07 ♩/min, approximately 4.61% relative to the 1932 value. Between 1954 and 1961, the increase is more pronounced: 9.39 ♩/min, or around 10.17% relative to 1954. Across the full period, 1961 lies 13.46 ♩/min above 1932, corresponding to an increase of approximately 15.25%.

In 1932, the median lies 11.76% below the prescribed value. In 1954, the divergence narrows to 7.70% below, while in 1961 the direction reverses and the median lie 1.69% above it. The transformation therefore consists of more than a gradual reduction in distance from ♩ = 100. Between 1954 and 1961, there is an actual crossing of the metronome marking.

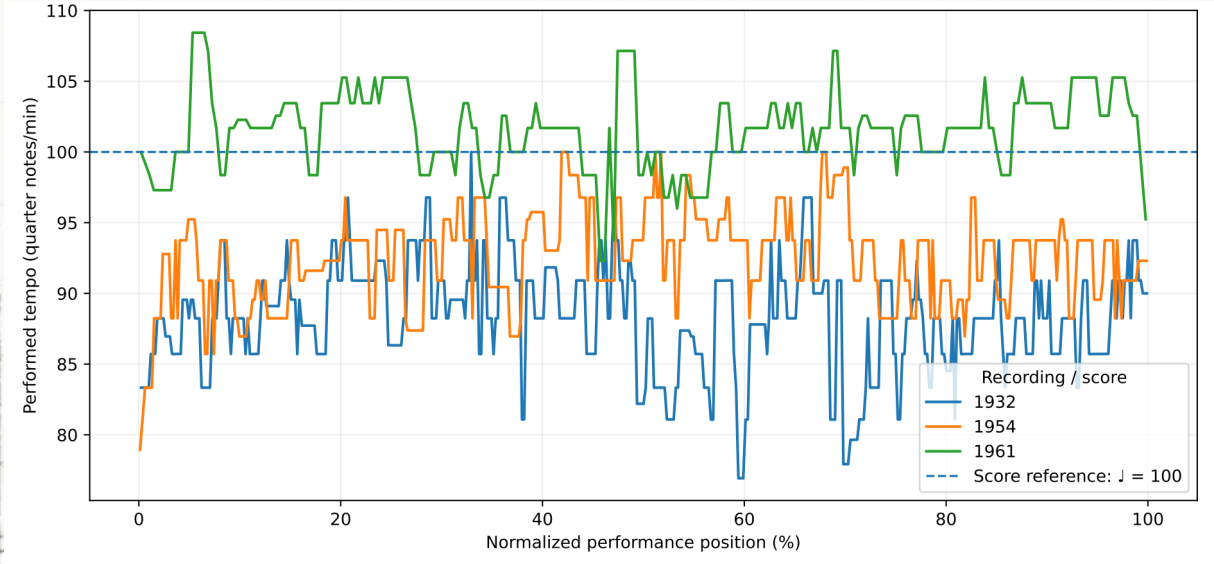
The comparative graph (14) makes this ordering visible across much of the normalised duration. The 1932 curve predominantly occupies the lower region, the 1954 curve establishes an intermediate band, and the 1961 curve remains largely around or above the written reference. Although there are regions of convergence and local crossings, the three profiles remain sufficiently distinct at the global level to indicate three successive temporal levels.

The longitudinal transformation also involves a change in stability. The 1954 recording is not merely intermediate in terms of tempo level. It presents the smallest decile median range, 2.84 ♩/min, compared with 5.19 in 1932 and 5.09 in 1961. The movement across the three recordings

therefore involves distinct trajectories in global tempo and internal organisation. Global tempo rises from 1932 to 1954 and then partially recedes in 1961, while internal organisation follows a different pattern: moderate stability in 1932, maximum regional concentration in 1954, and a renewed degree of internal differentiation in 1961.

There is also an important difference in the relationship between the written reference and the full distribution. In both 1932 and 1954, even the third quartile remains below ♩ = 100. In 1961, the score value lies between Q1 and Q3. This shift reveals a more substantial transformation than a simple change in the median: the central domain of the performance itself moves sufficiently to incorporate the metronome marking.

The comparison must, however, respect the meaning of the normalised axis. Equivalent percentage positions represent proportionally similar points within the duration of each recording rather than automatic bar-by-bar correspondences. The graph therefore supports comparison of temporal tendencies and regimes at global and regional scales; attributing peaks located at around 30% in each recording to the same musical event, however, requires additional alignment with the score.



Example 14. Comparison of the temporal profiles of *Le Violon du Soldat* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 100.
Source: Author's own elaboration based on the results of the computational pipeline.

Le Violon du Soldat presents one of the clearest longitudinal trajectories observed so far: a progressive shift of the temporal regime towards the metronome marking and, by 1961, slightly beyond it. In 1932, the performance is organised persistently below ♩ = 100. In 1954, this regime shifts upwards while simultaneously becoming more stable. In 1961, the written reference enters

the central region of the distribution, accompanied by an internal trajectory of initial rise, central reduction, and recovery. The transformation across the three recordings therefore occurs both in the global tempo level and in the structural position that the metronome marking itself comes to occupy within the temporal distribution of the performance.

4.3 *Pastorale*

The *Pastorale* constitutes, at this stage of the analysis, the clearest case of tension between metronomic prescription, realised temporal level, and longitudinal transformation. The score indicates ♩ = 48, yet none of the three recordings organises its central temporal region around this value. The weighted medians are 60 ♩/min in 1932, 100 ♩/min in 1954, and 71.72 ♩/min in 1961. The result does not describe a linear progression: the intermediate recording produces an exceptional rise in the temporal regime, while 1961 falls substantially without returning to the 1932 level. The comparative graph (18) makes this stratification visible, with 1954 consistently occupying the upper region, 1961 an intermediate position, and 1932 the lower band.

The magnitude of these differences requires three questions to be kept distinct: the global level of each realisation, its internal variability, and its distance from the score. Table 6 brings together the descriptors needed to make this distinction.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 48
1932	60.00	58.69	56.07–62.50	7.08	+12.00 (+25.00%)
1954	100.00	98.91	95.24–103.45	6.67	+52.00 (+108.33%)
1961	71.72	70.97	69.51–75.00	5.96	+23.72 (+49.41%)

Table 6. Statistical summary of the *Pastorale* across the three recordings.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1932 recording presents the temporal regime closest to the composer's prescribed tempo, although this proximity is only relative to the other two performances. Its weighted median, 60 ♩/min, lies 12 ♩/min above the score indication, corresponding to a difference of 25%. Thus, even the slowest recording realises the *Pastorale* at a level substantially above ♩ = 48.

The weighted mean, 58.69 ♩/min, lies approximately 1.31 units below the median. This difference is consistent with the presence of slower local episodes that pull the mean downwards without redefining the centre of the distribution. The interquartile range, from 56.07 to 62.50 ♩/min, is particularly revealing: even the first quartile remains around 8 ♩/min above the score.

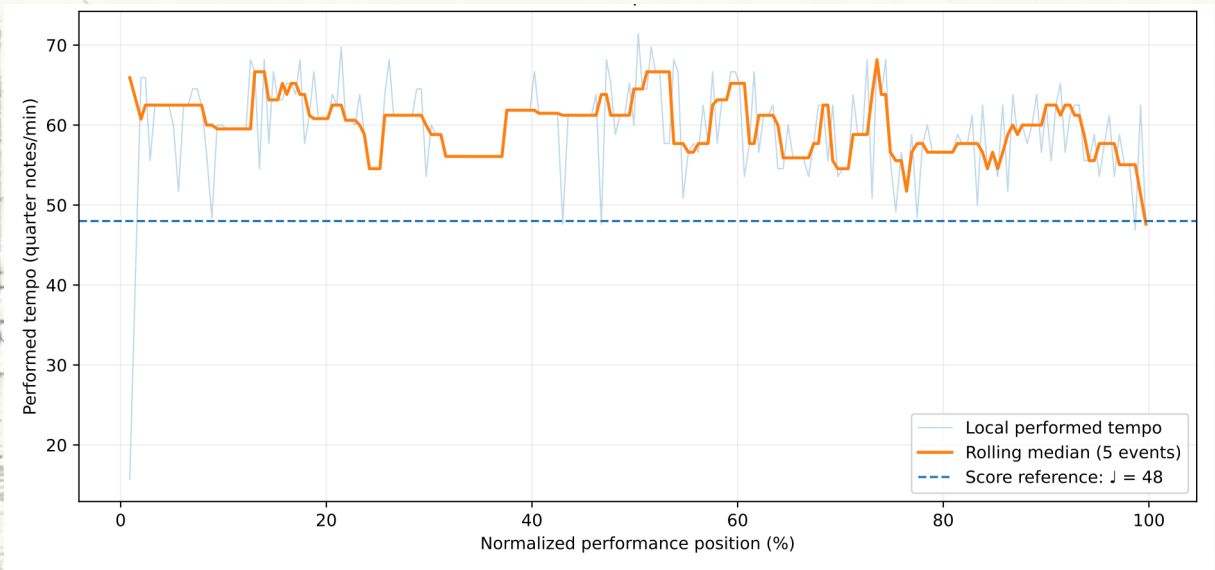
The individual profile confirms this separation. For most of the performance, the moving median occupies approximately the region between 56 and 65 ♩/min. There are local fluctuations,

including occasional rises and some reductions, but ♩ = 48 remains below the predominant temporal regime. Only at the very end does the curve approach the written reference directly, without this late convergence altering the recording's overall position.

The sequence of deciles — 60, 61.22, 61.22, 56.08, 61.23, 63.16, 56.60, 56.60, 57.69, and 56.61 ♩/min — clarifies the structure of this variation. The first three segments remain close to 60–61 ♩/min. The fourth introduces a reduction, while the fifth and, especially, the sixth recover and raise the tempo level. From the seventh decile onwards, a predominantly lower region becomes established, around 56–58 ♩/min.

The trajectory is articulated by alternations throughout the first half, reaches its regional maximum in the sixth decile, and then settles more persistently into a lower tempo level. The difference between the first and final deciles is just over 3 ♩/min, but the full range between decile medians reaches 7.08 ♩/min, revealing an internal organisation more complex than a simple comparison between beginning and end would suggest.

It is also important to distinguish regional range from event-by-event fluctuations. The graph contains local values that are considerably more dispersed than the decile medians. This indicates that some of the variability occurs over short timescales, while longer temporal segments remain concentrated within a relatively narrower domain. The 1932 performance therefore combines pronounced local variation with a clearly defined global regime above the tempo indicated in the score.



Example 15. Temporal profile of the *Pastorale* in the 1932 recording in relation to the reference ♩ = 48.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording constitutes the most exceptional result for this movement. Its weighted median is exactly 100 ♩/min, while the weighted mean reaches 98.91 ♩/min. Relative to the indication ♩ = 48, the median differs by +52 ♩/min, or +108.33%. In strictly quantitative terms, the temporal centre of the performance lies at more than twice the prescribed metronome value.

At first sight, the magnitude of this divergence might suggest a problem of metrical level. This possibility, however, must be assessed independently of proximity to the score. The calibration for this case was established through visual correspondence between the BeatRoot events and the written unit: one event marked in Sonic Visualiser corresponds to one crotchet. Halving the result simply because ♩ = 50 would appear closer to ♩ = 48 would introduce circularity by allowing the prescribed value to determine the calibration subsequently used to evaluate it.

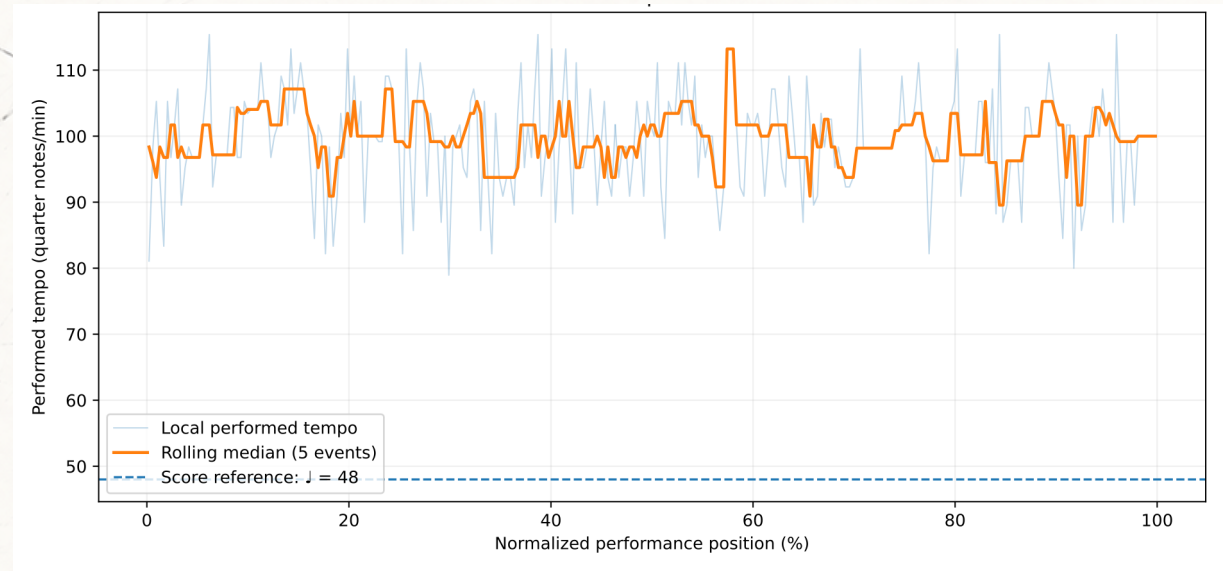
Within the calibrated dataset, 100 ♩/min must therefore be treated as an analytical result, rather than as a value to be corrected because of its exceptional character.

The statistical distribution shows that the elevated tempo extends across a substantial portion of the performance. The first quartile is 95.24 ♩/min, the median 100 ♩/min, and the third quartile 103.45 ♩/min. Thus, the central 50% of the performance duration lies approximately between 95 and 103 ♩/min. Even the lower bound of this region is almost twice the written reference.

The individual profile presents a remarkably persistent regime around 100 ♩/min. The moving median fluctuates mainly between approximately 94 and 105 ♩/min, with occasional rises above this region and some local reductions. A particularly prominent peak occurs shortly before 60% of the normalised duration, but the curve quickly returns to its previous level. The defining feature the prolonged persistence of the trajectory within a tempo band far removed from ♩ = 48.

The deciles — 97.17, 103.45, 100.00, 96.77, 98.36, 101.69, 98.36, 98.18, 97.17, and 100.00 ♩/min — confirm this stability at the regional scale. The total range is 6.67 ♩/min, slightly smaller than in 1932. There is no tendency towards acceleration or deceleration that could account for the divergence from the score. Instead, there is a high temporal regime established from the outset and maintained through to the end, with relatively limited internal modulation.

This finding prevents the 1954 recording from being interpreted as a performance that gradually "moves away" from the written marking. It already occupies a different temporal domain. The difference from ♩ = 48 is therefore, above all, a difference of tempo level, rather than the accumulated result of an internal trajectory.



Example 16. Temporal profile of the *Pastorale* in the 1954 recording in relation to the reference ♩ = 48.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording reorganises the movement once again. Its weighted median falls to 71.72 ♩/min, while the weighted mean reaches 70.97 ♩/min. The decline relative to 1954 is substantial, but it does not return the performance either to the 1932 level or to the prescribed tempo. Relative to ♩ = 48, the median remains 23.72 ♩/min higher, equivalent to +49.41%.

The interquartile range, from 69.51 to 75.00 ♩/min, is the narrowest of the three recordings, with a width of approximately 5.49 ♩/min. The range between the decile medians is also the smallest, at 5.96 ♩/min. These two indicators converge on an important characterisation: at both global and regional scales, the 1961 recording presents the most concentrated distribution of the three performances.

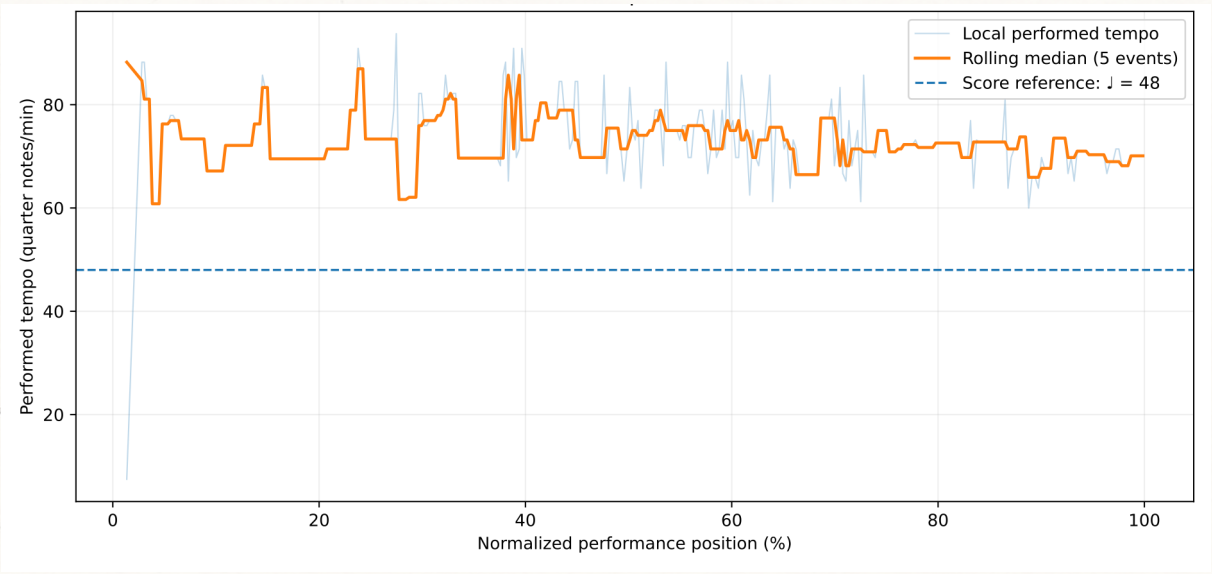
The opening of the profile contains more pronounced local changes, including an initially elevated region followed by a rapid decline. This behaviour, however, occupies only a limited proportion of the performance. As the performance progresses, the moving median becomes concentrated predominantly around 70–77 ♩/min, and the trajectory appears visually more compact in the final section.

The deciles make this process clearer: 73.37, 69.51, 73.35, 71.43, 75.47, 75.00, 71.43, 71.71, 72.58, and 70.10 ♩/min. There is no monotonic direction. The second decile introduces a reduction, the fifth and sixth form the highest region, and the final part returns to a zone around 70–72 ♩/min.

The relatively narrow range of these values shows that the changes visible at the local level remain contained within a limited regional span. The 1961 recording therefore displays a form of mesotemporal stability, even as the event-by-event series continues to fluctuate. This distinction is

particularly important in 1961: local movement coexists with a remarkably consistent central distribution and set of regional medians.

The relationship with the tempo prescribed in the score nevertheless remains unequivocally asymmetrical. The first quartile, 69.51 ♩/min, lies more than 21 ♩/min above the written reference. As in 1932 and 1954, ♩ = 48 remains well below the central region of the distribution. The reduction observed relative to 1954 therefore represents a shift towards the prescribed tempo while preserving a substantial overall divergence from it.



Example 17. Temporal profile of the *Pastorale* in the 1961 recording in relation to the reference ♩ = 48.
Source: Author's own elaboration based on the results of the computational pipeline.

The longitudinal trajectory of the *Pastorale* is marked by a change of considerable magnitude between 1932 and 1954, followed by a partial reversal in 1961. The weighted medians rise from 60 to 100 and then fall to 71.72 ♩/min. The pattern is therefore strongly non-monotonic.

Between 1932 and 1954, the median increases by 40 ♩/min, representing a rise of 66.67% relative to the initial recording. Between 1954 and 1961, it decreases by 28.28 ♩/min, equivalent to approximately −28.28% relative to the 1954 level. Despite this decline, 1961 remains 11.72 ♩/min, or around 19.53%, above 1932.

This configuration rules out an interpretation based on progressive convergence towards the score. All three recordings lie above ♩ = 48, but the distance changes dramatically: +25.00% in 1932, +108.33% in 1954, and +49.41% in 1961. The sequence describes neither continuous convergence nor continuous divergence. Instead, it reveals a radical reconfiguration in 1954, followed by a partial reorganisation in 1961.

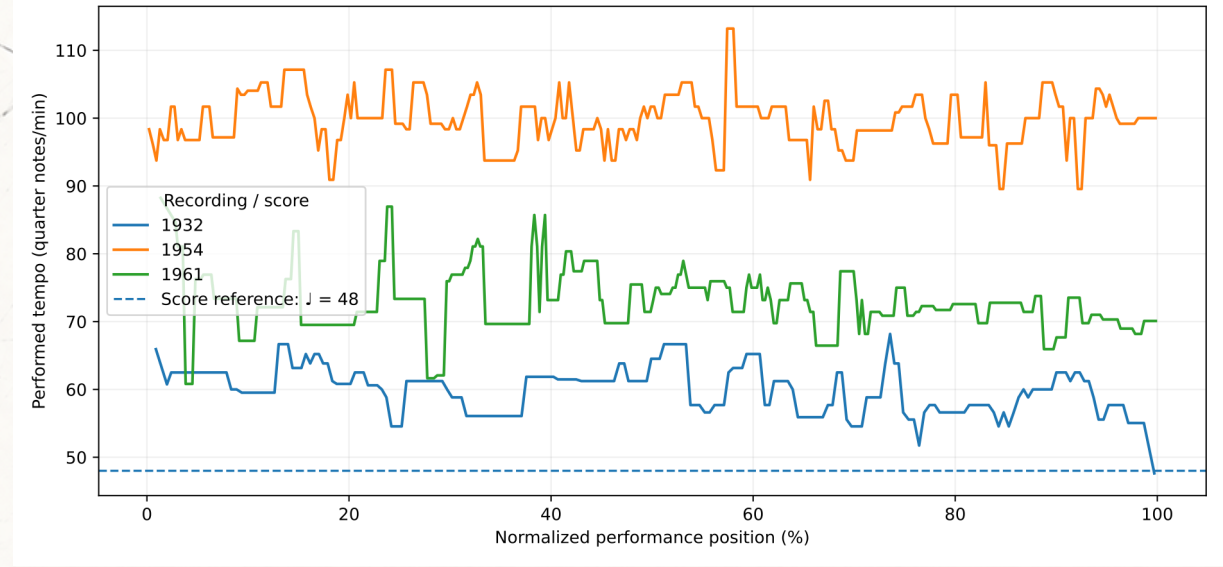
The comparative graph (18) makes this structure particularly clear. For much of the normalised duration, the three curves occupy distinct strata: 1932 is concentrated approximately in the 56–63 ♩/min region, 1961 around 70–75, and 1954 close to 95–103. There is minimal overlap between their central regimes. The longitudinal difference is therefore greater than the typical internal variation within each recording.

The interquartile ranges of the three performances — 56.07–62.50, 95.24–103.45, and 69.51–75.00 ♩/min — do not overlap. This means that the central regions of the distributions are completely separated. The differences between the recordings therefore do not depend on extreme values or on the choice of a single statistical descriptor. They are embedded in the displacement of the distributions.

This lack of overlap has an important analytical consequence. In the *Marche du Soldat* and *Le Violon du Soldat*, part of the transformation could be described in terms of convergence towards, divergence from, or crossing of the composer's prescribed reference. In the *Pastorale*, the situation is more radical: each recording establishes its own temporal regime, and all three lie above the prescribed tempo. The ♩ = 48 marking functions less as a centre around which the performances vary than as an external lower boundary to the observed distributions.

Internal stability also follows a different trajectory from that of global tempo. The decile median ranges decrease progressively: 7.08 ♩/min in 1932, 6.67 in 1954, and 5.96 in 1961. While the global temporal level undergoes the pronounced sequence 60, 100, 71.72, regional differentiation becomes progressively smaller. Thus, global speed and internal stability do not evolve according to the same longitudinal logic.

This result precludes a one-dimensional reading of the three performances. The 1954 recording is simultaneously the fastest without being the most unstable. The 1961 recording, although intermediate in terms of realised tempo, presents both the narrowest central dispersion and the smallest decile median range. The choice of a global tempo and the degree of internal temporal differentiation therefore emerge as partially independent dimensions of performance.



Example 18. Comparison of the temporal profiles of the *Pastorale* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 48.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Pastorale* presents a longitudinal transformation of a different kind from those observed in the two preceding movements. Rather than shifting progressively in a single direction, it passes through three clearly separated temporal regimes: an initial regime already substantially above the prescribed tempo, an extreme elevation in 1954, and a decline in 1961 to an intermediate level. The absence of overlap between the interquartile ranges confirms that this differentiation extends through the central regions of the distributions rather than being confined to peripheral episodes.

Perhaps the most significant feature is the relative independence of two dimensions of change. The global level varies dramatically across the recordings, while the regional range decreases progressively. In other words, the performances under Stravinsky's direction substantially alter the speed at which the *Pastorale* is realised, while the later recordings display increasingly concentrated internal regimes. The movement's temporal transformation therefore consists not simply in playing 'faster' or 'slower', but in the combination of tempo repositioning and the reorganisation of its stability over the course of the performance.

In the specific case of 1954, the exceptional nature of the result warrants remaining explicitly open to detailed musical verification. The calibrated data consistently support a regime around 100 ♩/min. Its magnitude, however, makes this case a priority for subsequent manual alignment between the recording and the score. Such verification may establish more precisely how the observed regime relates to the formal structure realised in performance, without retrospectively altering the metrical criteria used to derive the data.

4.4 *Marche royale*

The *Marche royale* presents a particularly clear longitudinal configuration because two transformations occur simultaneously: the global tempo level rises from 1932 to 1954 and 1961, while variation between regions of the performance progressively contracts. The score reference, ♩ = 112, lies close to the centre of this displacement: the 1932 recording remains globally below it, whereas 1954 and 1961 establish themselves above it. The analytical interest of the movement therefore lies in the relationship between the change of speed and the gradual transformation of an initially more heterogeneous regime into a more concentrated temporal realisation.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 112
1932	109.09	108.61	105.26–113.21	9.75	−2.91 (−2.60%)
1954	115.95	117.02	113.21–120.00	4.44	+3.95 (+3.52%)
1961	117.65	116.88	114.65–120.00	2.26	+5.65 (+5.04%)

Table 7. Statistical summary of the *Marche royale* across the three recordings
Source: Author's own elaboration based on the results of the computational pipeline.

The 1932 recording has a weighted median of 109.09 ♩/min, approximately 2.91 ♩/min below the score reference, corresponding to a difference of −2.60%. The numerical proximity to ♩ = 112 might suggest a realisation essentially coincident with the prescribed tempo. The internal distribution, however, reveals a more complex situation.

The weighted mean, 108.61 ♩/min, remains very close to the median, indicating that the centre of the distribution is not being determined by a small number of extreme values. The interquartile range extends from 105.26 to 113.21 ♩/minand, unlike in some of the earlier recordings, the score reference itself lies within this interval. This means that ♩ = 112 forms part of the central domain occupied by the performance, although the central tendency lies slightly below it.

This proximity, however, coexists with a clear internal trajectory. The first two deciles have medians of 113.20 ♩/min, thus lying slightly above the score. From the third decile onwards, the tempo level falls to approximately 109 ♩/min and follows a generally downward tendency through much of the performance: 109.09, 109.09, 109.10, 107.14, 107.14, 103.45, 107.14, and 109.09 ♩/min.

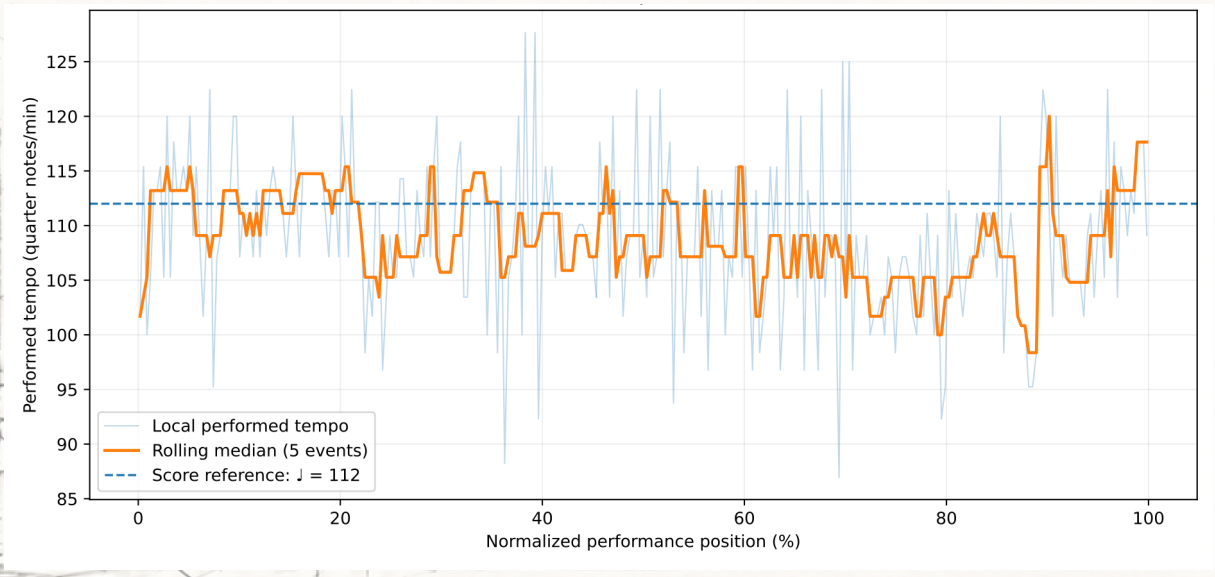
The sequence reveals an important directional organisation: the recording begins very close to, or slightly above, ♩ = 112 and gradually shifts into a lower tempo region. The eighth decile

constitutes the slowest regional point, at 103.45 ♩/min, followed by a partial recovery across the final two segments.

The individual profile makes this temporal asymmetry particularly visible. In the opening section, the moving median frequently remains close to or above ♩ = 112. As the performance unfolds, values between approximately 105 and 110 ♩/min become increasingly prevalent. At around 88% of the normalised duration, a more pronounced local depression occurs, followed by a rapid recovery and an ending once again above the reference.

This behaviour requires a distinction between central value and trajectory. A median of 109.09 ♩/min adequately describes the global position of the performance, but it does not reveal that the opening segments lie close to 113 ♩/min or that a substantial later portion is realised at a significantly lower level. The 1932 recording therefore has an asymmetrical temporal organisation: its overall tempo, relatively close to the score, results from the combination of higher regions at the beginning and slower regions as the performance unfolds.

The 9.75 ♩/min range between the decile medians is the largest of the three recordings. The interquartile range, with a width of approximately 7.95 ♩/min, is also the broadest. Both measures converge on the same conclusion: 1932 is not only the globally slowest version. It is also the performance in which the different regions display the greatest degree of temporal differentiation.



Example 19. Temporal profile of the *Marche Royale* in the 1932 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording shifts the temporal centre to the opposite side of the reference. The weighted median rises to 115.95 ♩/min, corresponding to +3.95 ♩/min or +3.52% relative to the

written marking. The difference is not numerically extreme, but it represents an important structural change from 1932: the movement is no longer organised predominantly below ♩ = 112 but establishes its temporal centre above it.

The weighted mean, 117.02 ♩/min, lies slightly above the median. The difference is small, but its direction suggests that faster episodes exert some influence on the mean. The interquartile range, from 113.21 to 120.00 ♩/min, lies entirely above the reference. Thus, ♩ = 112 no longer forms part of the central region of the distribution.

This displacement is more significant than the 3.95 ♩/min difference between the median and the tempo prescribed in the score might suggest on its own. In 1932, the reference lay within the interquartile range. In 1954, it falls below its lower bound. What changes is therefore not only the central value, but the position of the prescribed tempo relative to the entire performance distribution.

The individual profile shows an internally mobile performance, with frequent fluctuations between approximately 113 and 120 ♩/min and occasional episodes reaching still higher levels. There are localised reductions close to or slightly below the reference, particularly around one-third and again near the midpoint of the normalised duration, but these are brief and do not redefine the global regime.

The deciles confirm this characteristic: 117.65, 115.38, 115.38, 113.21, 113.92, 117.65, 115.95, 115.38, 117.65, and 117.65 ♩/min. The fourth decile presents the lowest regional value yet remains above the reference. After this depression, the performance recovers to levels around 116–118 ♩/min and ends at the same level observed in the first decile.

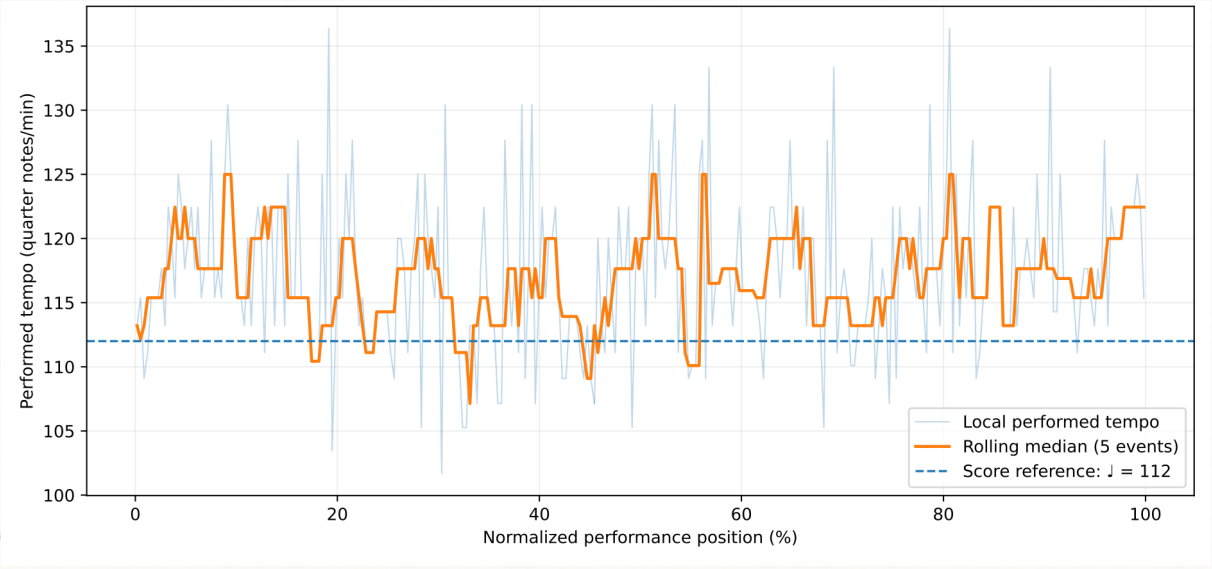
The absence of a net directional shift between beginning and end distinguishes 1954 from 1932. Whereas the earlier recording displayed a general downward tendency, 1954 is organised around a relatively persistent higher tempo level, modulated by local inflections. The trajectory is no longer strongly directional and instead becomes predominantly oscillatory.

This change is confirmed by the decile range. The interval between the lowest and highest regional values falls from 9.75 ♩/min in 1932 to only 4.44 ♩/min in 1954. This represents a reduction of more than half. At the same time, the interquartile width decreases from approximately 7.95 to 6.79 ♩/min. Both measures therefore provide convergent evidence of greater temporal concentration.

This concentration should not be confused with an absence of variability. The graph contains (20) numerous dispersed local values, some considerably above or below the moving median. What

changes in 1954 is the extent to which these fluctuations establish temporally differentiated regions. At broader scales, they are absorbed into a relatively constant regime.

The 1954 recording can therefore be characterised by two simultaneous transformations relative to 1932: an elevation of the global tempo level and reduced differentiation between regions of the performance.



Example 20. Temporal profile of the *Marche Royale* in the 1954 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording extends slightly the displacement already observed in 1954. Its weighted median is 117.65 ♩/min, equivalent to +5.65 ♩/min or +5.04% relative to the prescribed tempo. The difference between 1954 and 1961 is small compared with that observed between 1932 and 1954, but it confirms the continuation of the upward movement in the global tempo level.

The weighted mean, 116.88 ♩/min, lies approximately 0.77 units below the median. This small difference reflects the presence of local reductions that pull the mean slightly downwards without altering the predominant centre of the distribution.

The interquartile range, from 114.65 to 120.00 ♩/min, is the narrowest of the three recordings. Its width, approximately 5.35 ♩/min, continues the trajectory of contraction observed since 1932. Moreover, the entire interval remains above ♩ = 112. The written reference therefore lies once again outside the central region of the distribution, now at a slightly greater distance than in 1954.

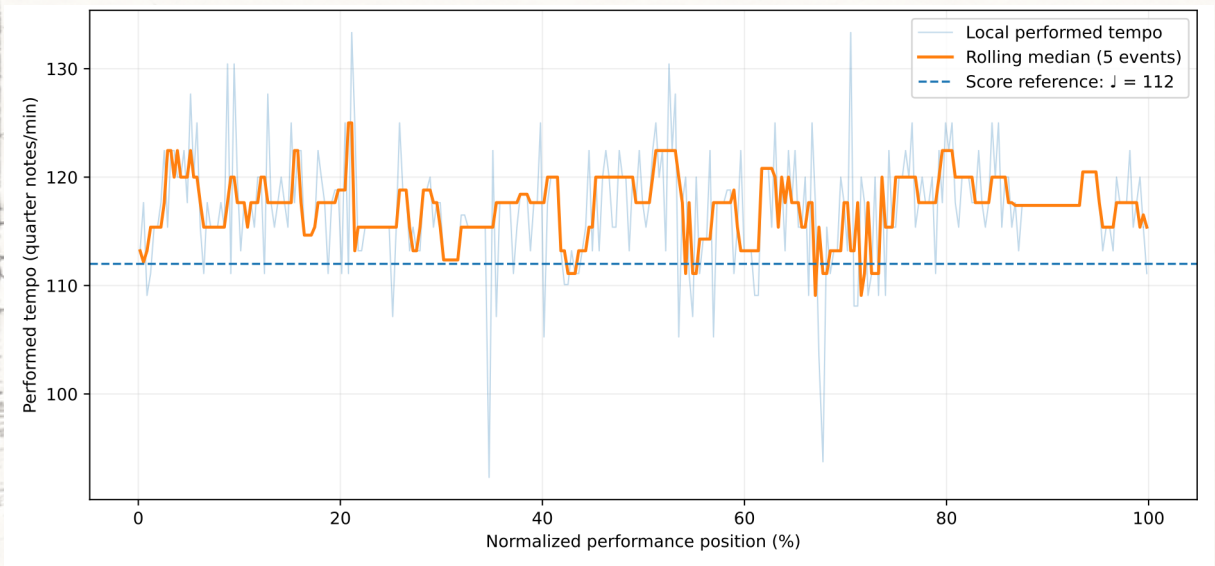
The most striking feature of 1961 is its regional stability. The decile medians are 117.65, 117.65, 115.38, 115.38, 117.65, 117.65, 115.38, 117.65, 117.65, and 117.39 ♩/min. The entire sequence is confined to a range of Only 2.26 ♩/min.

This range is especially striking when compared with the 9.75 ♩/min observed in 1932. At the regional scale, variability is reduced to less than one quarter of that found in the first recording. The longitudinal transformation of the *Marche Royale* therefore consists not only in performing the movement at a faster tempo. The 1961 realisation also establishes a far more homogeneous temporal regime across different regions of the performance.

The individual profile confirms this reading. For much of the performance, the moving median remains approximately between 115 and 120 ♩/min. There are brief reductions, some approaching ♩ = 112 and one falling slightly below it, as well as localised rises to around 125 ♩/min. These changes, however, are short-lived and do not produce persistent shifts between the deciles.

Visually, the 1961 recording still displays considerable mobility. Statistically, however, when the performance is examined in segments corresponding to 10% of its duration, almost all of them converge on the same two levels, approximately 115.4 or 117.6 ♩/min. This demonstrates that short-scale variability can coexist with a high degree of stability at the regional scale.

The 1961 profile differs from both earlier recordings. In 1932, a broad regional reduction reorganises the trajectory, while in 1954 the deciles still span approximately 4.4 ♩/min. By contrast, 1961 presents an almost flat structure at the mesotemporal scale. The tempo remains locally mobile, but stable in terms of its underlying regime.



Example 21. Temporal profile of the *Marche royale* in the 1961 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

Taken together, the three recordings reveal a longitudinal transformation that is monotonic at the global level. The weighted medians rise from 109.09 ♩/min in 1932 to 115.95 in 1954 and 117.65 in 1961. Between 1932 and 1954, the increase is approximately 6.86 ♩/min, equivalent to 6.29% relative to the initial recording. Between 1954 and 1961, the increase is smaller, at approximately 1.70 ♩/min or 1.47%. Across the full period, the rise reaches 8.56 ♩/min, around 7.85% relative to 1932.

The relationship with the score follows this displacement, but not in the form of progressive convergence. In 1932, the median lies 2.60% below ♩ = 112. In 1954, it crosses the reference and moves to 3.52% above it. In 1961, it moves slightly further away, reaching +5.04%. The prescribed tempo is therefore crossed over the longitudinal trajectory as one point within a broader temporal organisation centred at a different level.

This observation is theoretically significant for the broader problem addressed by the study. If the metronome marking functioned as a value towards which successive performances under the composer's own direction tended to converge, one would expect a progressive reduction in distance from it. The *Marche royale* shows the opposite: a performance initially slightly below the reference is followed by two progressively faster realisations. The consistent longitudinal feature is the elevation and stabilisation of the temporal regime.

The comparative graph makes this transformation clear. The 1932 curve occupies the lower region for much of the performance and presents a particularly pronounced depression in its later section. By contrast, the 1954 and 1961 curves remain predominantly above the reference and show considerable overlap with one another.

The relationship between 1954 and 1961 deserves particular attention. The difference between their medians is small, and their interquartile ranges overlap extensively: 113.21–120.00 ♩/min in 1954 and 114.65–120.00 in 1961. The principal transformation between these two recordings therefore lies in a further reduction in regional dispersion, accompanied by only a modest change in overall tempo.

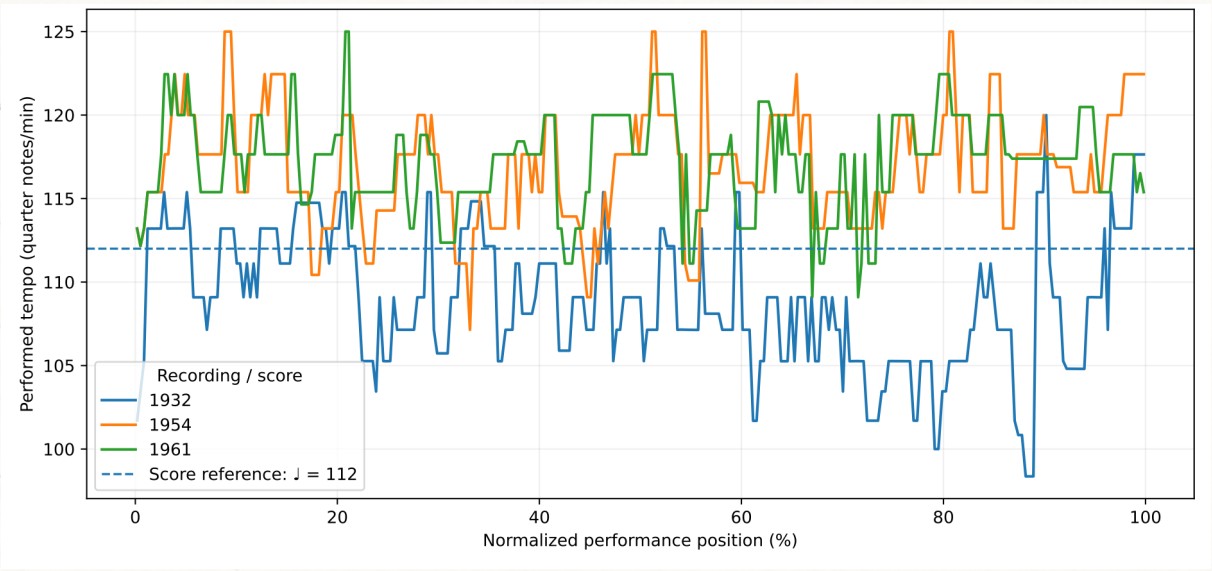
The sequence constitutes one of the most consistent longitudinal patterns observed so far. From 1932 to 1961, the temporal centre rises while the distance between the fastest and slowest regions of the performance decreases substantially.

Two statistics constructed in different ways — one describing the global distribution of values and the other the differences between temporal segments — converge on the same interpretation: the performances become progressively more temporally concentrated.

This convergence strengthens the analysis because it reduces the possibility that the observed stability is an artefact of a single measure. The quartiles disregard the chronological position of the values and describe the distribution, whereas the deciles preserve their organisation over the course of the performance. When both point in the same direction, there is evidence that increasing concentration occurs simultaneously in the statistical distribution and in the temporal trajectory.

There is a qualitative difference between this stabilisation and mechanically uniform performance. Even in 1961, perceptible local fluctuations remain, some of them relatively broad. What diminishes is the capacity of these fluctuations to shift extended portions of the performance into distinct temporal regimes. In other words, the transformation reduces the structural persistence of variation.

This distinction is important to the very notion of temporality adopted in this study. Stability can coexist with substantial event-by-event mobility when the broader temporal organisation remains consistent. The *Marche royale* provides a particularly clear example of this coexistence.



Example 22. Comparison of the temporal profiles of the *Marche royale* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Marche royale* reveals an internally coherent longitudinal transformation. In 1932, Stravinsky realises the movement at a global tempo level slightly below the prescribed value, marked by considerable differentiation between regions and by a downward tendency across part of the performance. In 1954, the temporal centre shifts above ♩ = 112, while regional differentiation decreases substantially. In 1961, the global level rises only slightly, but internal concentration increases further, producing the most regionally stable realisation of the three.

The decisive point is that speed and stability move in the same longitudinal direction, although they represent distinct analytical dimensions. The movement becomes progressively faster and, at the same time, less differentiated across its temporal regions. The transformation therefore combines a higher tempo with a reorganisation of internal temporal behaviour. A relatively flexible and asymmetrical conception gives way to one in which the higher tempo level is sustained more consistently throughout the performance.

The relationship with the score's prescription adds an important consequence. Across the later recordings, greater stability accompanies the consolidation of a tempo level above ♩ = 112. Temporal stability therefore develops alongside sustained divergence from the written reference. The *Marche royale* thus separates two concepts that might otherwise be conflated: temporal stability and metronomic conformity. A performance may become internally more regular without thereby converging on the prescribed tempo.

4.5 *Petit concert*

The *Petit concert* presents a longitudinal trajectory distinct from those observed in the preceding movements. The metronome marking is ♩ = 120, but the three recordings occupy different positions in relation to this value: 1932 lies globally below it, 1954 shifts unequivocally above it, and 1961 returns to a region very close to the prescribed tempo, although its median remains slightly lower. The sequence therefore follows a non-monotonic trajectory. Its most significant feature is the substantial shift in global tempo level in 1954, followed by a reconcentration of the temporal regime in 1961.

A combined reading of the global and regional measures makes it possible to distinguish this movement from the behaviours observed previously. Table 8 brings together the principal descriptors.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 120
1932	113.20	113.06	109.09–117.64	11.57	−6.80 (−5.66%)
1954	133.33	131.86	127.66–136.36	10.04	+13.33 (+11.11%)
1961	117.65	117.96	113.21–121.21	6.79	−2.35 (−1.96%)

Table 8. Statistical summary of the *Petit concert* across the three recordings.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1932 recording has a weighted median of 113.20 ♩/min, approximately 6.80 ♩/min below the reference, corresponding to a difference of −5.66%. The weighted mean, 113.06 ♩/min, is virtually identical to the median. This proximity indicates that the performance is centred consistently below ♩ = 120, with little influence from distributional asymmetry.

The interquartile range extends from 109.09 to 117.64 ♩/min. The reference therefore remains above the third quartile. This means that at least three quarters of the weighted duration lie at values below ♩ = 120. The local approaches to, or occasional crossings of, the reference are insufficient to shift the central core of the performance towards the prescribed tempo.

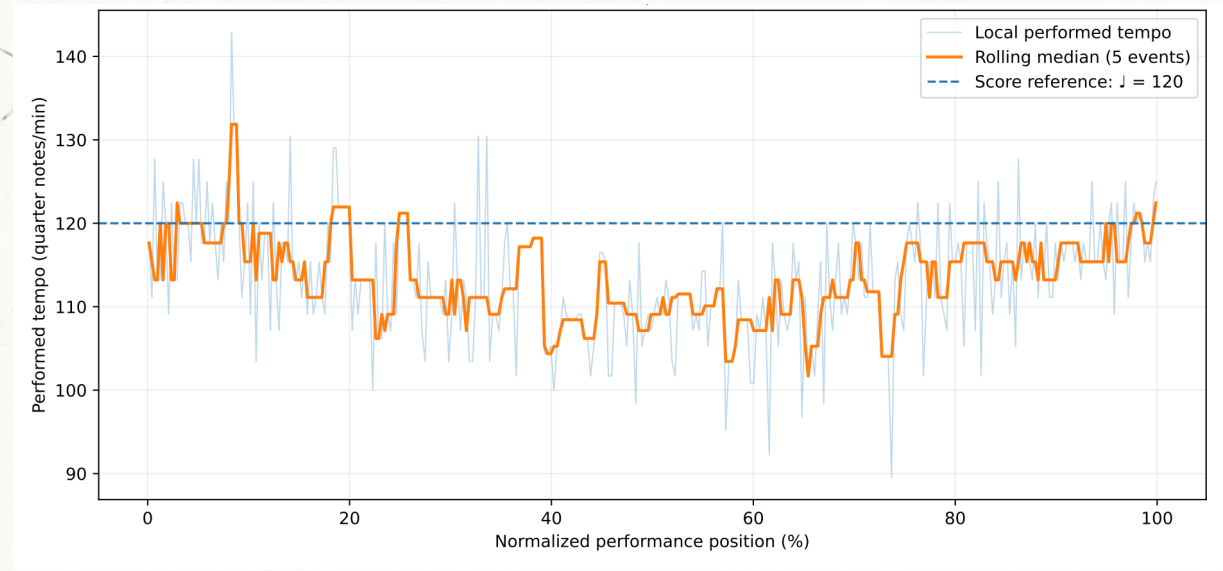
The internal behaviour is not uniform. The ten deciles have medians of 120.00, 115.38, 111.11, 111.11, 108.43, 109.10, 109.10, 111.81, 115.38, and 117.64 ♩/min. The sequence reveals a broad directional configuration: the first decile coincides with the score reference, followed by a progressive reduction to the minimum point in the fifth decile. The central region remains around 109 ♩/min, while the final three segments show a gradual recovery.

This pattern is more informative than the global median in isolation. The recording organises the movement according to an inverted-arch trajectory, with a relatively high initial level (approximately 113 ♩/min.), an extended central depression, and a recovery in the final portion. The difference between the maximum and minimum decile medians reaches 11.57 ♩/min, the largest range among the three recordings.

The individual graph (23) confirms this architecture. The opening region contains frequent approaches to the reference, together with a localised rise considerably above it, whereas a slower domain predominates across approximately 25% to 70% of the normalised duration. From the final third onwards, the moving median rises again and the performance ends close to ♩ = 120.

This configuration makes it possible to distinguish three analytical levels. The global centre lies below the score reference. The central distribution also remains entirely below it. The temporal trajectory, however, brings the outer portions of the performance closer to the reference, while concentrating the greatest divergence in the middle region. The departure from ♩ = 120 is therefore not spatially homogeneous over the course of the performance.

The width of the interquartile range, approximately 8.56 ♩/min, further indicates that the global distribution contains considerable variability. This dispersion, however, should not be confused with randomness. The deciles show that a substantial part of the differences between values is temporally organised, forming recognisable regions of reduction and recovery.



Example 23. Temporal profile of the *Petit concert* in the 1932 recording in relation to the reference ♩ = 120.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording produces the most pronounced transformation of the movement. The weighted median rises to 133.33 ♩/min, that is, 13.33 ♩/min above the prescription given in the score, corresponding to +11.11%. Relative to 1932, the increase is approximately 20.13 ♩/min, or 17.78% in relation to the level of the first recording.

The weighted mean, 131.86 ♩/min, lies approximately 1.47 ♩/min below the median. The difference remains moderate but indicates some influence of the slower regions on the mean. Even so, neither measure leaves any doubt about the global position of the performance: the 1954 temporal regime lies clearly above ♩ = 120.

The distribution reinforces this conclusion. The first quartile already reaches 127.66 ♩/min, while the third reaches 136.36 ♩/min. The entire interquartile range lies above the reference. The metronome marking not only ceases to coincide with the central tendency but comes to occupy a region below that in which the central half of the performance duration is concentrated.

The decile medians are 136.36, 132.35, 133.33, 132.35, 126.32, 130.43, 130.43, 133.33, 133.33, and 136.36 ♩/min. The structural similarity with 1932 is striking. Both recordings begin at relatively high levels, reach their slowest region approximately at the centre, and recover towards the end. The absolute level, however, has been shifted entirely upwards.

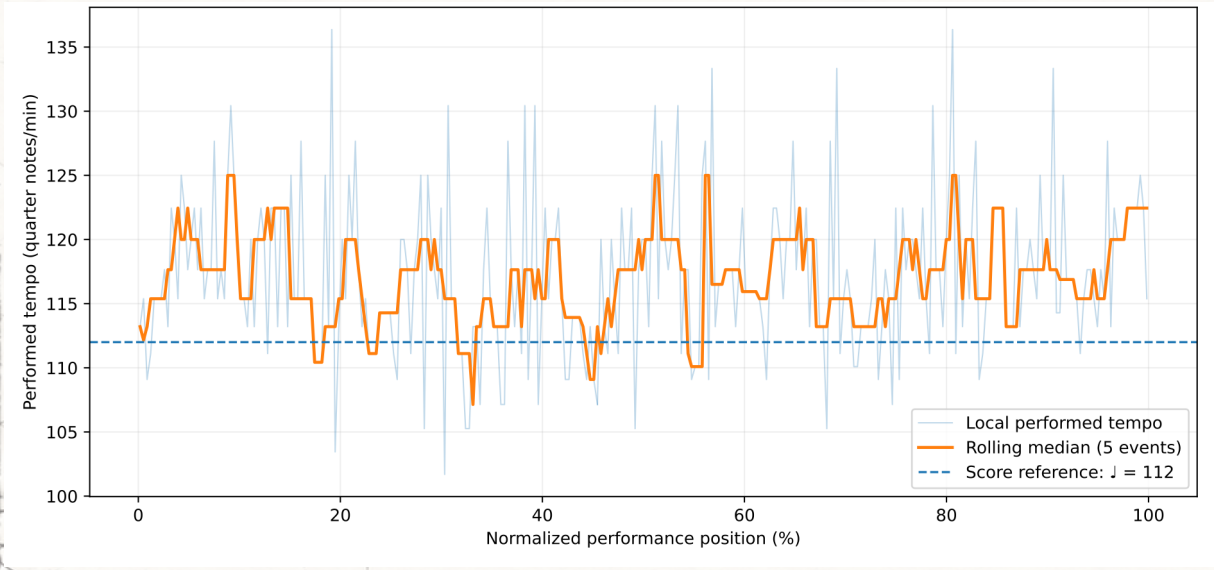
This similarity makes it possible to formulate an important distinction between trajectory shape and trajectory level. Between 1932 and 1954, Stravinsky's realisation radically alters the global tempo of the movement without eliminating the macroconfiguration of central reduction followed

by recovery. The longitudinal transformation therefore acts far more strongly upon the temporal level than upon the overall direction of the trajectory.

The individual profile makes this feature particularly clear. The moving median begins predominantly between approximately 133 and 139 ♩/min, falls at several points during the first half, and reaches its principal depressed region around the centre of the performance before returning to values above 130 ♩/min and remaining elevated through much of the final section.

The decile median range is 10.04 ♩/min, slightly lower than the 11.57 observed in 1932. This difference suggests a modest reduction in regional differentiation, but not yet a profound transformation of internal stability. The interquartile range, with a width of approximately 8.70 ♩/min, is virtually identical to that of 1932. Thus, with respect to the central dispersion of values, the two recordings are very similar despite the substantial difference in realised tempo.

The shift from 1932 to 1954 combines a substantial upward displacement of the tempo distribution with broadly preserved dispersion. The centre of the distribution rises by around 20 ♩/min, while its width remains almost unchanged. The later recording therefore establishes a higher tempo regime while retaining a comparable degree of local temporal mobility.



Example 24. Temporal profile of the *Petit concert* in the 1954 recording in relation to the reference ♩ = 120.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording produces a further reorganisation. The weighted median falls back to 117.65 ♩/min, while the weighted mean is 117.96 ♩/min. The difference from the score becomes small: −2.35 ♩/min, or Only −1.96%. Of the three recordings, 1961 is the one whose central tendency lies closest to the reference.

This proximity must be interpreted with care. The performance occupies a broader range around ♩ = 120 rather than remaining fixed at that value. The interquartile range extends from 113.21 to 121.21 ♩/min, placing the written reference within the central half of the distribution. In 1932, ♩ = 120 lay above Q3, and in 1954 below Q1; in 1961, by contrast, it falls within the central range of measured *tempi*.

The decile medians are 120, 118.11, 120, 117.65, 115.38, 113.21, 117.65, 120.00, 115.38, and 120.00 ♩/min. The trajectory retains a central depression, reaching its minimum in the sixth decile, but its range is smaller than in the earlier recordings. The first, third, eighth, and final deciles coincide with the reference, while the remaining segments stay moderately below it.

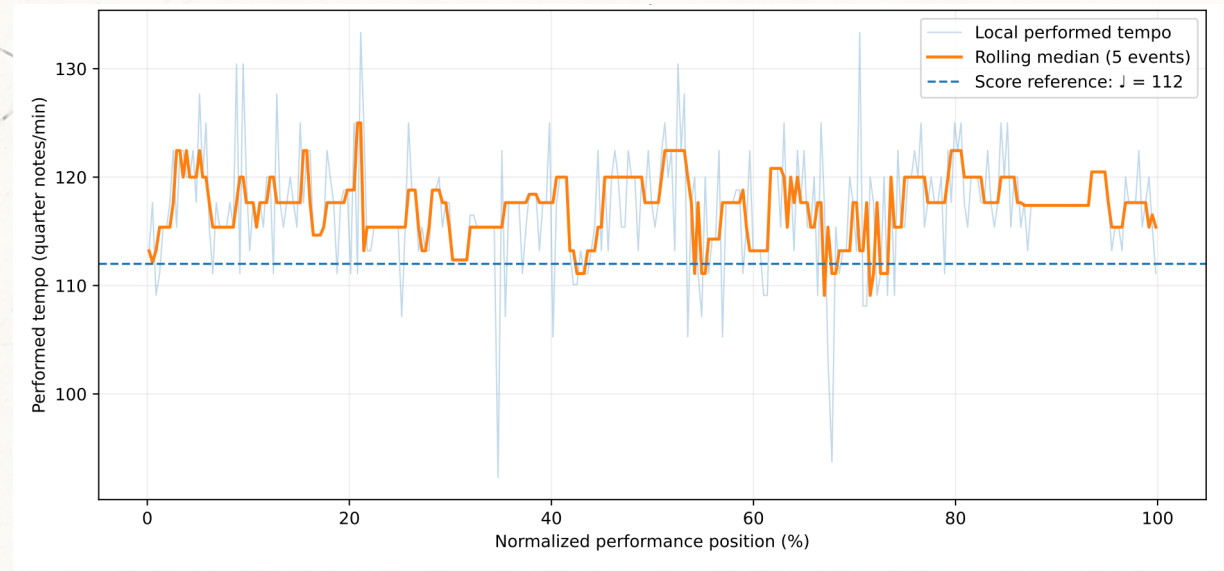
The individual profile shows this organisation clearly. The first part alternates among regions close to, below, and occasionally above ♩ = 120. Between approximately 35% and 65% of the normalised duration, the moving median tends to occupy lower values. From the final third onwards, a recovery becomes apparent, together with a greater recurrence of levels close to the reference.

The range between the decile medians, 6.79 ♩/min, is substantially smaller than in 1932 and 1954. This reduction constitutes a more important structural difference than the slight retreat or advance of local values. The 1961 recording presents the lowest degree of differentiation among the movement's broader temporal regions.

At the same time, the width of the interquartile range remains approximately 8.00 ♩/min, only slightly narrower than in 1932 and 1954. This apparent divergence between the two measures is revealing. The distribution of local values remains relatively broad, while the medians of successive regions become more similar to one another.

This means that 1961 does not eliminate short-scale variability. What diminishes is the organisation of that variability into extended zones characterised by distinct temporal levels. The performance remains mobile from event to event but becomes more uniform at the regional scale. This is a specific form of stabilisation: not a complete reduction of fluctuation, but a reduction in the regional persistence of differences.

The 1961 recording combines two characteristics that must remain conceptually distinct: greater global proximity to the prescription and greater regional homogeneity. In this case, both occur simultaneously, but they are described by independent indicators and should not be treated as expressions of the same phenomenon.



Example 25. Temporal profile of the *Petit concert* in the 1961 recording in relation to the reference ♩ = 120.
Source: Author's own elaboration based on the results of the computational pipeline.

The global trajectory of the *Petit concert* is strongly non-monotonic. The weighted medians move from 113.20 ♩/min in 1932 to 133.33 in 1954, before falling back to 117.65 in 1961. The 1954 performance represents a pronounced expansion of the temporal level, followed by a contraction towards the region occupied by the written reference.

The shift from 1932 to 1954 corresponds to an increase of 20.13 ♩/min, or approximately 17.78%. From 1954 to 1961, the median falls by 15.69 ♩/min, equivalent to around −11.76% relative to the 1954 value. Despite this retreat, 1961 remains 4.44 ♩/min, or approximately 3.93%, above 1932.

The reference is crossed twice over the longitudinal trajectory. The movement begins in a lower regime in 1932, shifts markedly upwards in 1954, and returns in 1961 to a slightly lower position, but one much closer to ♩ = 120.

This sequence precludes any simple interpretation based on progressive convergence towards, or progressive divergence from, the prescription. The closest proximity appears only in the final recording and results from a trajectory that had previously passed through its greatest positive displacement. The longitudinal course is therefore better described as reconfiguration rather than gradual correction.

The comparative graph makes (26) the exceptional character of 1954 particularly clear. Throughout almost the entire normalised duration, its curve occupies a region above both the other recordings and the reference itself. By contrast, 1932 and 1961 lie closer to one another, although 1961 tends to maintain slightly higher levels and more frequent contact with ♩ = 120, particularly in the opening and closing regions.

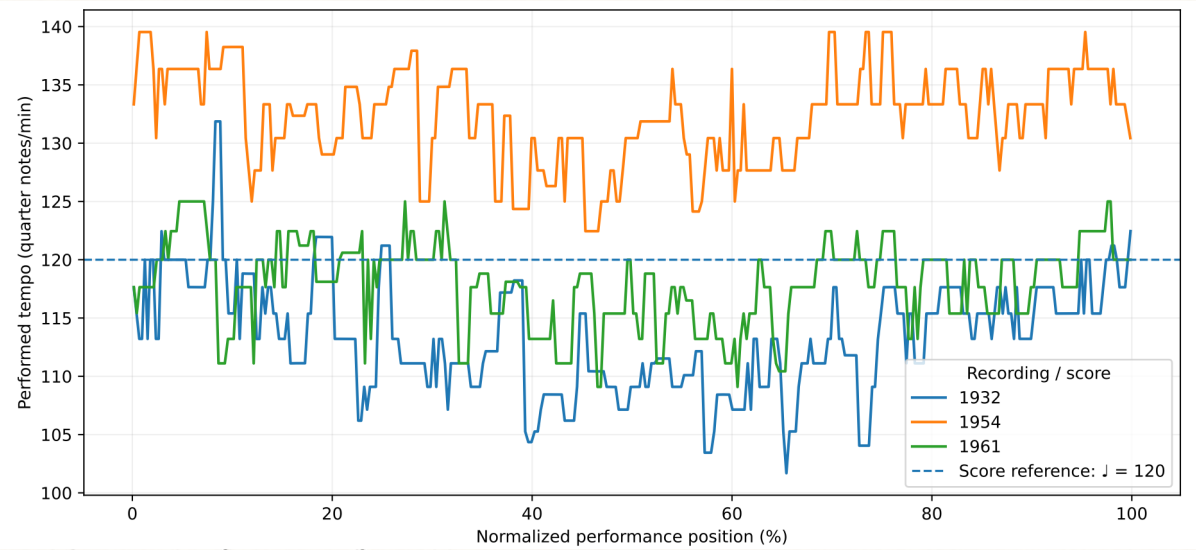
There is, however, a structural continuity across the three performances that is not visible in the global values. To different degrees, all three exhibit a reduction in the central region followed by a subsequent recovery. The pattern is particularly clear in the deciles: in 1932, the minimum occurs in the fifth decile; in 1954, likewise in the fifth; and in 1961, in the sixth. This recurrence suggests a shared macrotemporal organisation across the recordings, even when their absolute tempo levels differ widely.

This relative constancy of shape, combined with the mobility of the global level, is one of the movement's most significant findings. Certain features of the trajectory appear to persist across the three decades, while the speed at which that trajectory is realised is substantially reformulated. The result makes it possible to distinguish between a possible identity of temporal configuration and the absolute tempo value that sustains it.

There is a continuous contraction in the differences between regions, despite the non-monotonic movement of the global medians. In this sense, the *Petit concert* combines longitudinal instability in tempo level with a longitudinal increase in regional stability.

The global variability of local values remains broadly comparable across the three recordings. What declines more markedly is the distance between the representative levels of the different regions. In 1961, local variation remains present, while sustained temporal differentiation across the form is reduced.

This distinction reinforces the need to work across multiple scales. If we considered only Q1 and Q3, we might conclude that dispersion changes little over the decades. If we examined only the decile medians, we would identify a clear process of stabilisation. These two readings describe different temporal levels of the same performance.



Example 26. Comparison of the temporal profiles of the *Petit concert* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 120.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Petit concert* presents a longitudinal transformation organised around two independent tendencies. The first concerns the global level, which moves from a regime below the prescription in 1932 to a markedly faster realisation in 1954, before returning in 1961 to a position close to ♩ = 120. The second concerns its internal organisation, in which regional differentiation decreases progressively.

At the same time, the recurrence of an approximately central depression followed by recovery suggests that aspects of the movement's temporal shape persist across the recordings. The more substantial transformation concerns the tempo level at which that shape unfolds. The 1954 recording constitutes the greatest displacement, while 1961 combines a slightly higher level than 1932 with greater proximity to the score prescription and greater regional stability.

Taken together, this evidence makes the movement particularly significant for distinguishing between tempo, profile, and temporality. A single global value would correctly identify 1954 as the fastest version, but it would reveal neither the persistence of the central depression across the three recordings nor the progressive reduction in regional differentiation. The temporal transformation of the *Petit concert* lies in the interaction between what persists in the shape of the trajectory and what changes in its level and stability.

4.6 *Trois Danses*

The *Trois Danses* constitute a single movement within *L'Histoire du Soldat*, comprising the sections *Tango*, *Valse*, and *Ragtime*. Although they form part of the same formal unit, each presents its own metrical organisation, metronome marking, and temporal behaviour, which justifies their separate analytical treatment.

To preserve these specificities, the movement will be divided into three subsections. For each dance, the 1932, 1954, and 1961 recordings will be examined individually, considering the global tempo level, the internal distribution of variation, regional stability, and the relationship with the corresponding metronome prescription.

This procedure makes it possible to maintain two analytical scales simultaneously: the unity of the *Trois Danses* as a movement and the temporal individuality of each of its three components. It will then be possible to determine how the *Tango*, *Valse*, and *Ragtime* are transformed across the three recordings and whether these transformations reveal convergent behaviours or distinct temporal trajectories within the same movement.

4.6.1 *Tango*

The *Tango* presents a consistent longitudinal configuration. The metronome marking is ♩ = 80, and the weighted median remains below this value in all three recordings. The distance from the prescription, however, decreases successively across 1932, 1954, and 1961. The movement shifts from a regime clearly below the reference to one in which a substantial part of the distribution already reaches and exceeds ♩ = 80. The transformation therefore involves a progressive upward shift in the centre of the distribution, while the internal range remains relatively similar across the three performances.

Table 9 makes it possible to observe simultaneously the global position of each performance, its central dispersion, and the extent of its regional differences.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 80
1932	70.59	70.43	66.66–74.08	7.03	−9.41 (−11.76%)
1954	73.17	73.51	69.77–76.92	6.06	−6.83 (−8.54%)
1961	76.92	77.62	73.17–81.08	7.01	−3.08 (−3.85%)

Table 9. Statistical summary of the *Tango* across the three recordings.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1932 recording presents the lowest temporal level of the three. Its weighted median is 70.59 ♩/min, approximately 9.41 ♩/min below the score marking, corresponding to a difference of −11.76%. The weighted mean, 70.43 ♩/min, is virtually identical to the median, indicating a globally balanced distribution around this level.

The interquartile range extends from 66.66 to 74.08 ♩/min. Its position is analytically significant: the entire central core of the distribution remains below ♩ = 80, and even the third quartile lies approximately 6 ♩/min below the prescription. Local approaches to the reference therefore do not constitute the predominant regime of the performance.

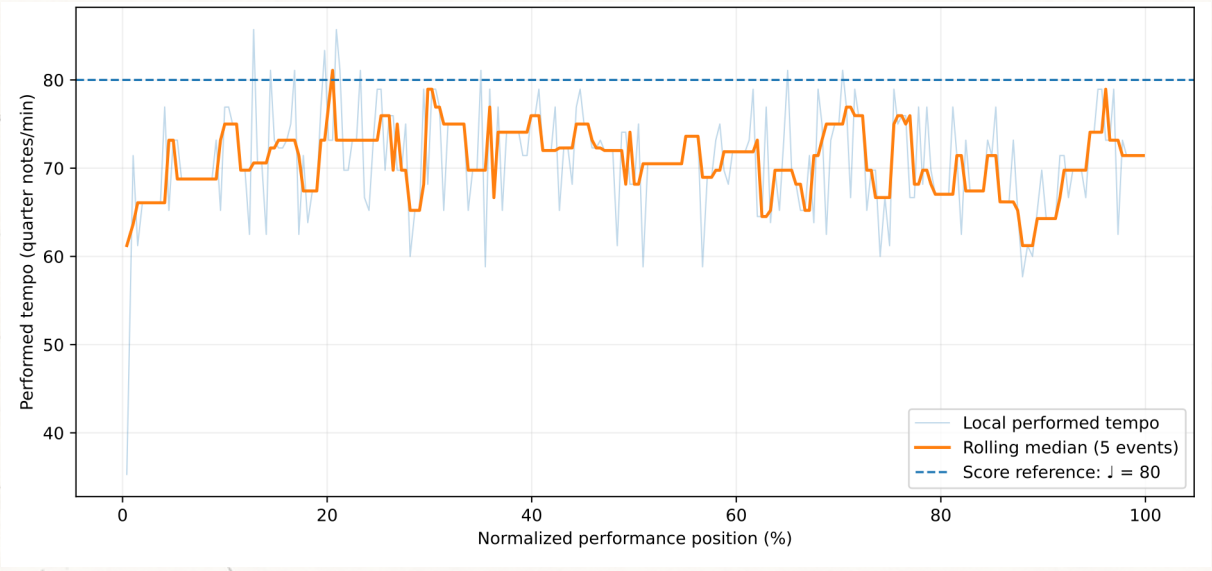
The internal trajectory presents a more complex organisation than this global value suggests. The medians of the ten deciles are 68.76, 72.29, 73.17, 74.08, 72.29, 70.50, 71.43, 69.77, 67.04, and 71.43 ♩/min. An upward movement is initially apparent: between the first and fourth deciles, the regional tempo rises from approximately 68.8 to 74.1 ♩/min. From that point onwards, the tendency reverses, although not continuously, culminating in the lowest value in the ninth decile.

The recording presents a three-part structure: initial rise, gradual reduction with intermediate oscillations, and final recovery. The final decile, at 71.43 ♩/min, lies above the first but well below the maximum reached in the fourth. It would therefore be inappropriate to describe the trajectory as a progressive acceleration. Its overall direction results from opposing local movements.

The individual profile reinforces this reading. The moving median remains predominantly between approximately 65 and 78 ♩/min, approaching the reference at certain points and exceeding it only briefly. A particularly visible rise occurs near the first fifth of the performance, while later regions show more pronounced depressions, especially towards the end.

The decile median range, 7.03 ♩/min, indicates a moderate degree of regional differentiation. The width of the interquartile range, approximately 7.41 ♩/min, is of broadly the same magnitude. The proximity between these two measures suggests that, in 1932, global variability and differentiation between broader temporal regions are comparable in scale. The changes are not confined to isolated events but also extend across relatively broad segments of the performance.

The central feature of the 1932 recording is the persistence of a temporal regime clearly below the prescription, internally mobile but without any sufficiently sustained displacement to establish ♩ = 80 as an effectively realised reference.



Example 27. Temporal profile of the *Tango* in the 1932 recording in relation to the reference ♩ = 80.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording raises the temporal centre to 73.17 ♩/min. The difference from the score is reduced to −6.83 ♩/min, equivalent to −8.54%. The weighted mean, 73.51 ♩/min, lies slightly above the median, but the difference of only 0.34 ♩/min confirms that both describe essentially the same global regime.

The interquartile range, from 69.77 to 76.92 ♩/min, also shifts upwards relative to 1932. Even so, it remains entirely below the reference. The transformation between the first two recordings

therefore consists of a systematic elevation of the distribution, but still without incorporating ♩ = 80 into its central core.

The deciles reveal an internal organisation distinct from that of the earlier performance: 75, 76.92, 75, 73.17, 74.07, 73.17, 74.38, 75, 72.92, and 70.87 ♩/min. The highest level appears as early as the second decile. From that point onwards, the overall movement is predominantly downward, although interrupted by recoveries in the intermediate segments.

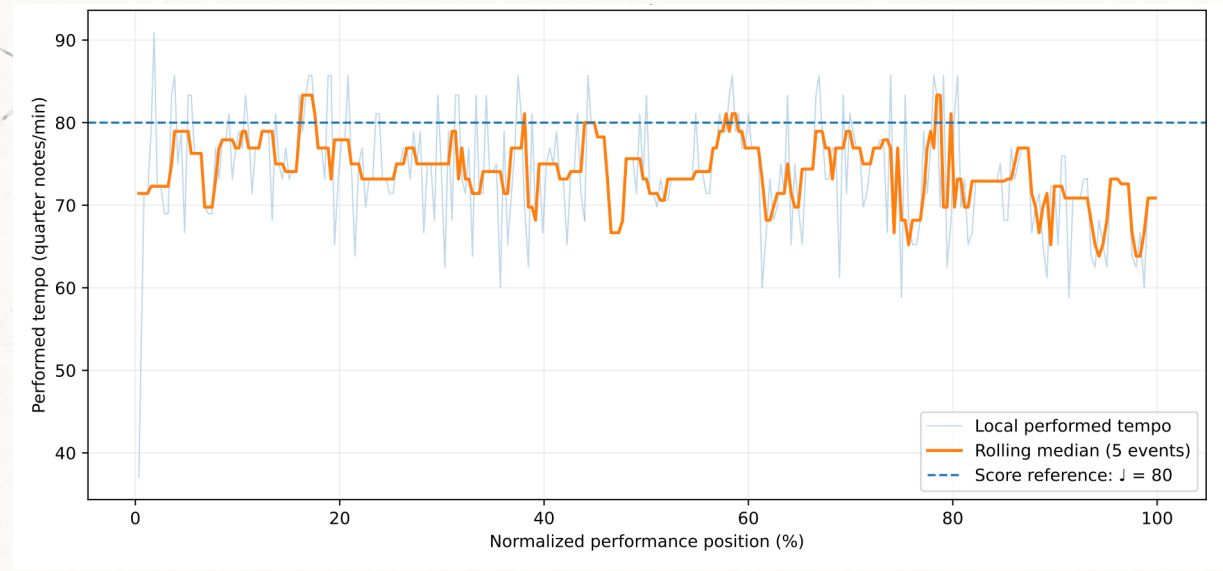
The difference between the first and final deciles is approximately −4.13 ♩/min. This distinguishes 1954 from 1932: whereas the first recording ends above its initial level, the second shows a net reduction over the course of the normalised duration. The decline is not linear, but the relative position of the two endpoints is unambiguous.

During the first half, the moving median frequently occupies the region around 73–79 ♩/min and briefly reaches or exceeds the reference. Recoveries continue to occur in the second half, including a marked rise near 80% of the performance, but the final segments concentrate lower values, with declines into the region of approximately 64–72 ♩/min.

The decile median range, 6.06 ♩/min, is the smallest of the three recordings, although only moderately lower than the values observed in 1932 and 1961. The interquartile width, approximately 7.16 ♩/min, is also very close to that found in 1932. There is therefore no evidence of a radical transformation in internal dispersion.

This is important for characterising the change between 1932 and 1954. The temporal centre rises by around 2.6 ♩/min, while the extent of variation remains virtually unchanged. The transformation primarily affects where the distribution is situated, rather than how widely it is dispersed.

The 1954 recording can therefore be understood as occupying a globally higher regime than that of 1932, while remaining below the reference and internally marked by a downward tendency from beginning to end. The longitudinal rise in tempo across the recordings coexists with internal stability in the 1954 performance. The across-recording and within-performance comparisons therefore reveal distinct temporal behaviours.



Example 28. Temporal profile of the *Tango* in the 1954 recording in relation to the reference ♩ = 80.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording establishes the highest temporal level of the three, with a weighted median of 76.92 ♩/min and a weighted mean of 77.62 ♩/min. The difference from the score falls to only −3.08 ♩/min, or −3.85%. Although the median remains below ♩ = 80, the relationship between performance and prescription changes qualitatively.

The interquartile range extends from 73.17 to 81.08 ♩/min. For the first time, ♩ = 80 lies within the central range of the distribution. This result is more informative than the mere proximity of the median. It means that the written reference now forms part of the domain occupied by a substantial proportion of the performance duration.

In the 1932 and 1954 recordings, even Q3 remained below the prescription. In 1961, the third quartile exceeds it. The longitudinal transformation is therefore not simply an arithmetic reduction in the distance between the median and the score. It also involves a change in the statistical position of the reference within the distribution itself.

The decile medians are 77.92, 77.92, 77.92, 78.95, 77.92, 77.92, 81.08, 76.92, 77.59, and 74.07 ♩/min. The first six segments are notably concentrated around 78 ♩/min, with a slight rise in the fourth. The seventh decile is the only region whose median clearly exceeds the reference, reaching 81.08 ♩/min.

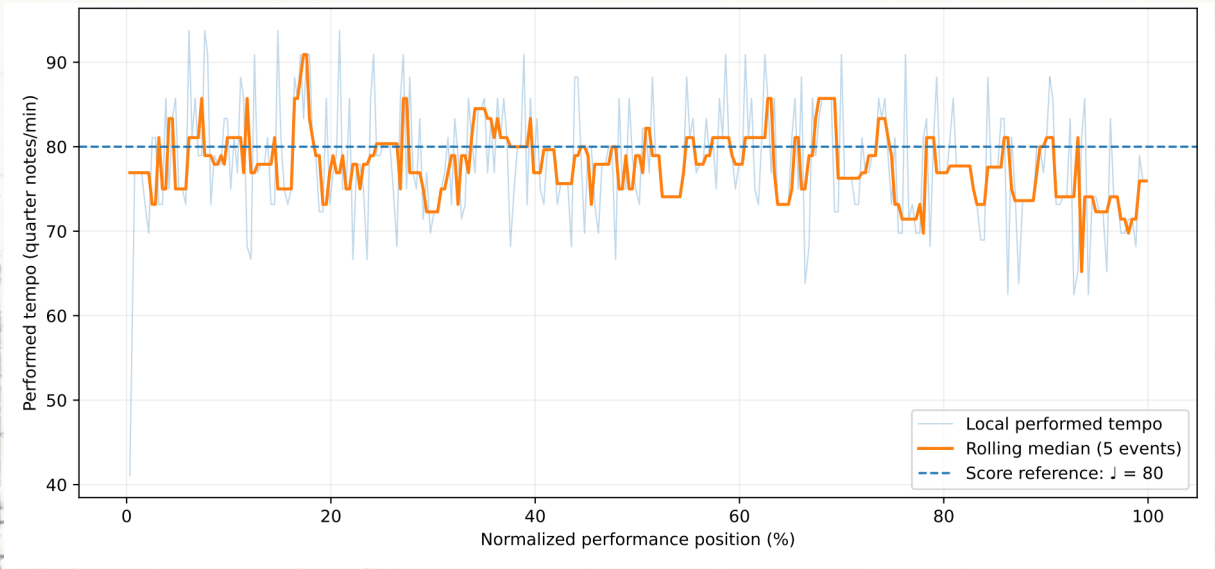
After this peak, the trajectory declines. The eighth and ninth deciles return to the region of approximately 77 ♩/min, while the final decile falls to 74.07 ♩/min. As in 1954, there is a negative difference between beginning and end of approximately −3.85 ♩/min. The globally fastest recording of the set therefore ends in a lower regime than the one in which it began.

The individual profile shows that this structure emerges from a performance that is highly mobile at the local scale. The moving median crosses the ♩ = 80 line repeatedly, particularly during the first half and between approximately 55% and 75% of the normalised duration. There are also rises to values close to or above 85 ♩/min and reductions into the region of 70–74 ♩/min.

Despite this mobility, the medians of the first six deciles are remarkably close to one another. The contrast between short-scale graphical variability and regional concentration once again shows that local fluctuation and mesotemporal stability are not equivalent. A performance may repeatedly cross the reference without establishing broadly distinct regional regimes.

The decile median range, 7.01 ♩/min, is virtually identical to that of 1932. The interquartile width, 7.91 ♩/min, is in fact slightly greater than in the two earlier recordings. The global elevation observed in 1961 is therefore not accompanied by a reduction in variability. The profile has shifted upwards, while retaining a comparable internal range.

This result distinguishes the *Tango* from movements in which a longitudinal increase in tempo occurred alongside progressive stabilisation. Here, the dominant process is primarily a shift in temporal level, while the extent of temporal mobility remains relatively constant.



Example 29. Temporal profile of the *Tango* in the 1961 recording in relation to the reference ♩ = 80.
Source: Author's own elaboration based on the results of the computational pipeline.

The comparison across the three recordings reveals a monotonic global trajectory. Between 1932 and 1954, the median rises by 2.58 ♩/min, equivalent to approximately 3.66% relative to the 1932 level. Between 1954 and 1961, the increase is greater: 3.75 ♩/min, or around 5.13%. Across the full period, the total rise is 6.33 ♩/min, approximately 8.97% relative to the first recording.

Between 1932 and 1954, the median rises by 2.58 ♩/min, equivalent to approximately 3.66% relative to the 1932 level. Between 1954 and 1961, the increase is greater: 3.75 ♩/min, or around 5.13%. Across the full period, the total rise is 6.33 ♩/min, approximately 8.97% relative to the first recording.

Unlike movements in which the three recordings alternate between positions above and below the prescription, the *Tango* preserves the same directional relationship: all three medians remain below ♩ = 80. What changes is the magnitude of that distance.

This pattern indicates a progressive quantitative approach towards the written reference, with the median in 1961 remaining approximately 3.85% below the prescription. The change primarily reflects an upward shift in the centre of the distribution, while variability remains broadly comparable.

Only in 1961 does the central distribution cross ♩ = 80. The longitudinal trajectory therefore unfolds in two phases. First, between 1932 and 1954, the performances move closer to the reference without incorporating it into their central distribution. In 1961, the written marking comes to lie within the interquartile range.

The comparative graph makes this vertical displacement clear. The 1932 curve occupies predominantly the lower region, while 1954 assumes an intermediate position across many segments. The 1961 curve tends to occupy the upper region, although frequent crossings occur among the three series.

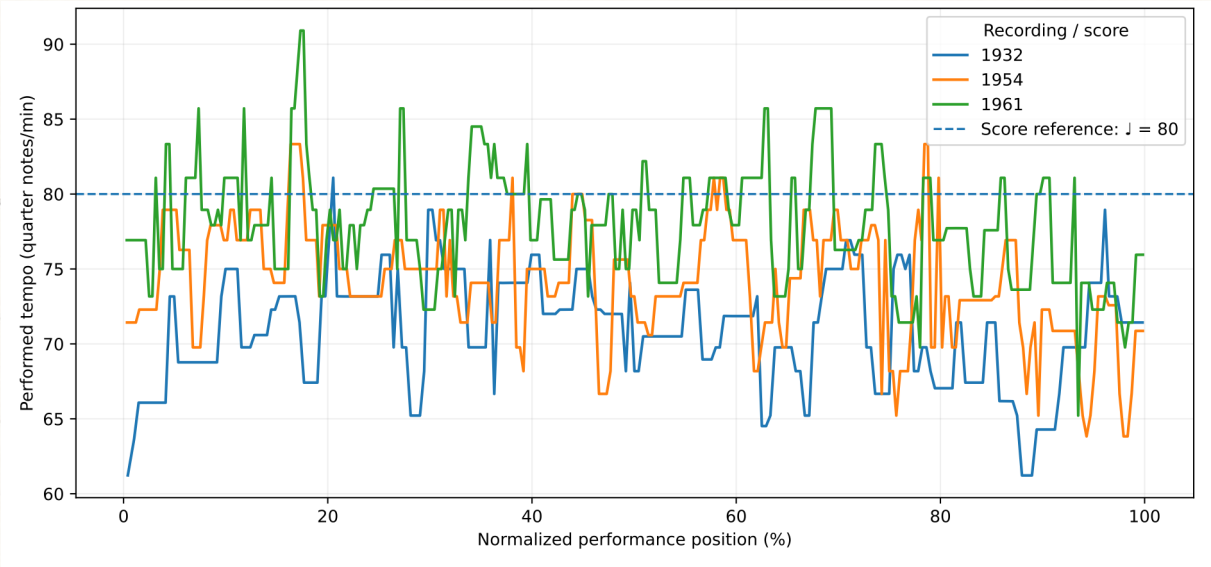
These crossings are analytically important. They show that the global ordering of the medians coexists with local reversals in the point-by-point hierarchy. There are regions in which 1932 exceeds 1954, 1954 reaches or surpasses 1961, and all three recordings temporarily converge. The longitudinal transformation should therefore be understood as a shift in the distributions and predominant regimes, rather than as an absolute separation of the trajectories.

There is no consistent longitudinal tendency towards either compression or expansion. Central and regional variability remain broadly within the same order of magnitude across the three decades.

This constancy makes it possible to identify one of the clearest characteristics of the *Tango*: the performances under Stravinsky's direction progressively alter the level of realisation without producing a comparable change in the extent of their internal temporal mobility. The movement is successively realised at higher tempo levels, while the range within which each performance is organised remains relatively similar.

There is therefore a distinction between the trajectory across recordings and the trajectories within each recording. Longitudinally, the sequence from 1932 to 1954 and 1961 constitutes an unequivocal upward progression. Internally, however, none of the three performances reproduces this direction in a simple way. The 1932 recording presents an initial rise followed by reduction and recovery. The 1954 recording begins at a relatively high level and ends lower. The 1961 recording maintains an extended central region close to 78 ♩/min, reaches a late maximum, and likewise ends below its initial level.

A longitudinal pattern can therefore emerge clearly even when the individual performances display distinct internal trajectories. The historical transformation of tempo and the temporal organisation of each realisation are related analytical scales, but they are not interchangeable.



Example 30. Comparison of the temporal profiles of the *Tango* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 80.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Tango* presents a regular longitudinal trajectory. The weighted median rises successively, and the distance from ♩ = 80 decreases with each recording. In 1932, the prescription remains clearly above the entire central region of the distribution. In 1954, this distance is reduced but still maintained. In 1961, the reference itself comes to lie within the interquartile range.

The decisive point is that this approach occurs without an equivalent transformation in internal range. Quartiles and deciles show comparable levels of dispersion across the three performances. What changes principally is the axis around which this mobility takes place. The evolution of the *Tango* can therefore be described as a progressive upward translation of the temporal regime, while broadly preserving a similar degree of internal flexibility.

This distinction is particularly relevant to the concept of temporality adopted in this study. Moving closer to a metronome marking does not necessarily mean that a performance becomes more rigid, more uniform, or less variable. In the *Tango*, proximity to the prescription and stability are independent dimensions: the former increases clearly across the three recordings, while the latter remains largely constant.

4.6.2 *Valse*

The *Valse* presents a temporal problem distinct from that of the *Tango*. The score prescribes a tempo range of ♩ = 184–192, so the relationship between performance and prescription must be assessed against this interval rather than against a single metronome value. The weighted medians of all three recordings remain below the lower boundary of the range, but the longitudinal behaviour is not progressive: 1932 and 1961 present virtually the same temporal centre, while 1954 shifts to a slower level. At the same time, internal dispersion decreases markedly after 1932. The transformation of the *Valse* therefore involves less a continuous change in tempo than an alteration in the relationship between central level and the extent of temporal mobility.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DISTANCE FROM THE LOWER BOUNDARY (♩ = 184)
1932	181.81	180.83	171.44–189.68	15.25	−2.19 (−1.19%)
1954	176.47	177.34	171.43–181.82	7.91	−7.53 (−4.09%)
1961	181.82	181.16	176.47–187.50	7.43	−2.18 (−1.19%)

Table 10. Statistical summary of the *Valse* across the three recordings.
Source: Author's own elaboration based on the results of the computational pipeline.

The decision to express the difference relative to the lower boundary of the range, rather than solely to its midpoint, is important. A performance may remain below ♩ = 184 while still partially occupying the prescribed region within its internal distribution. The midpoint of the range, ♩ = 188, will therefore be used only as an auxiliary reference, when necessary, rather than as a substitute for the interval-based tempo prescription itself.

The 1932 recording has a weighted median of 181.81 ♩/min, only 2.19 ♩/min below the lower boundary of the prescribed range, corresponding to −1.19%. The weighted mean, 180.83 ♩/min, is similarly close, though slightly lower. Considered solely in terms of its central tendency, the performance lies immediately below ♩ = 184.

The distribution is broad. The first quartile lies at 171.44 ♩/min, while the third reaches 189.68 ♩/min. The interquartile width is approximately 18.24 ♩/min, the largest of the three

recordings. The lower boundary of the prescription, ♩ = 184, lies within this interval, and part of the central region of the distribution effectively occupies the written range of 184–192.

This result prevents 1932 from being classified simply as a realisation "below the score". The median lies below the range, but the distribution crosses its lower boundary substantially. The relationship between performance and prescription is therefore heterogeneous over the course of the performance.

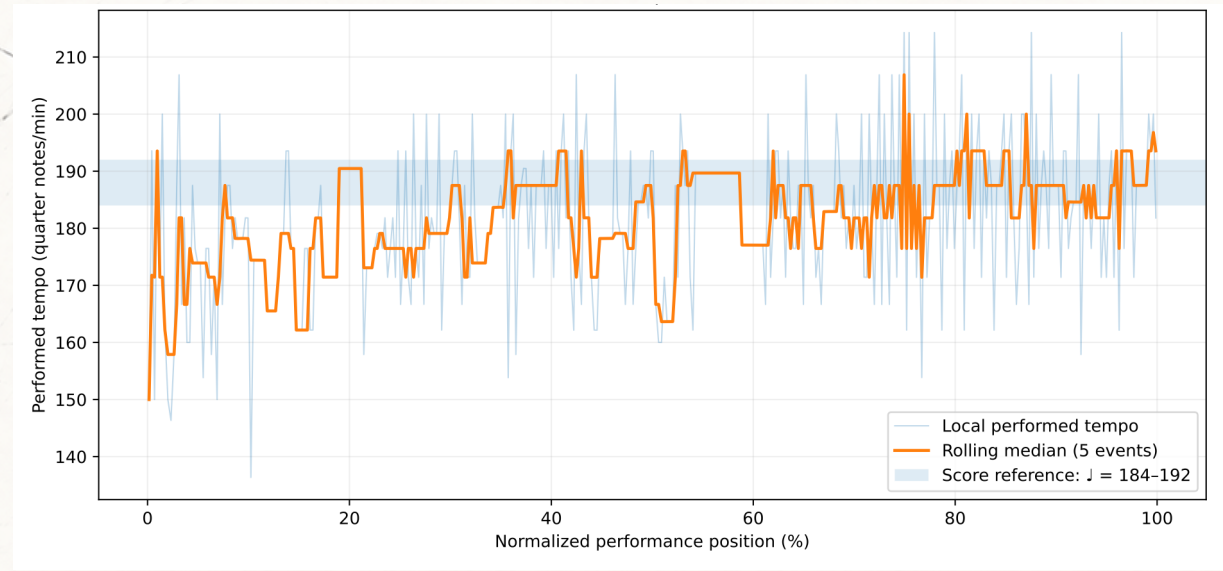
The deciles confirm this heterogeneity: 176.47, 174.42, 179.10, 183.67, 178.23, 189.68, 181.83, 181.83, 187.50, and 187.50 ♩/min. The second decile constitutes the slowest region, while the sixth reaches 189.68 ♩/min, clearly within the prescribed range. The final two deciles likewise lie at 187.50 ♩/min, that is, within the prescribed region.

The trajectory is articulated by alternating regions between approximately 174 and 184 ♩/min throughout the first half. The sixth decile marks a pronounced rise, the following two segments return to lower levels, and the final portion once again establishes values within the prescribed range.

The individual profile makes this alternation particularly evident. The moving median repeatedly crosses the lower boundary of ♩ = 184, remaining within the shaded range in some passages and retreating in others to substantially lower regions. There are also local events above 200 ♩/min and others below 150, although these extremes exert only limited influence on the weighted descriptors.

The decile median range, 15.25 ♩/min, confirms that the variability observed in 1932 is not merely localised. Relatively extended regions of the performance occupy distinct temporal levels. In this sense, it is the most regionally differentiated realisation of the *Valse*.

The central characteristic of the 1932 recording is the combination of a tempo centre slightly below the prescribed range and substantial internal mobility, allowing different regions to fall alternately below and within the written metronomic domain.



Example 31. Temporal profile of the *Valse* in the 1932 recording in relation to the reference ♩ = 184–192.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording shifts the temporal regime downwards. Its weighted median is 176.47 ♩/min, a difference of −7.53 ♩/min, or −4.09%, relative to the lower boundary of the prescribed range. Compared with 1932, the median decreases by approximately 5.34 ♩/min.

The weighted mean, 177.34 ♩/min, lies slightly above the median, but the difference of less than 1 ♩/min confirms the stability of the global characterisation. The performance is not merely marked by a few slower segments. Its temporal centre has shifted into a lower region.

The interquartile range, from 171.43 to 181.82 ♩/min, is decisive for understanding this change. Unlike 1932, the entire central range remains below ♩ = 184. The prescribed range no longer intersects the central half of the distribution.

This difference is more significant than the mere reduction of approximately 5 ♩/min in the median. In 1932, the prescription formed part of the central region of the performance. In 1954, it comes to lie entirely above it. The transformation therefore involves a repositioning of the distribution.

The decile medians are 181.82, 177.21, 179.39, 176.47, 181.82, 176.47, 176.47, 173.91, 175.18, and 176.47 ♩/min. None of the ten regional medians reaches the lower boundary of ♩ = 184.

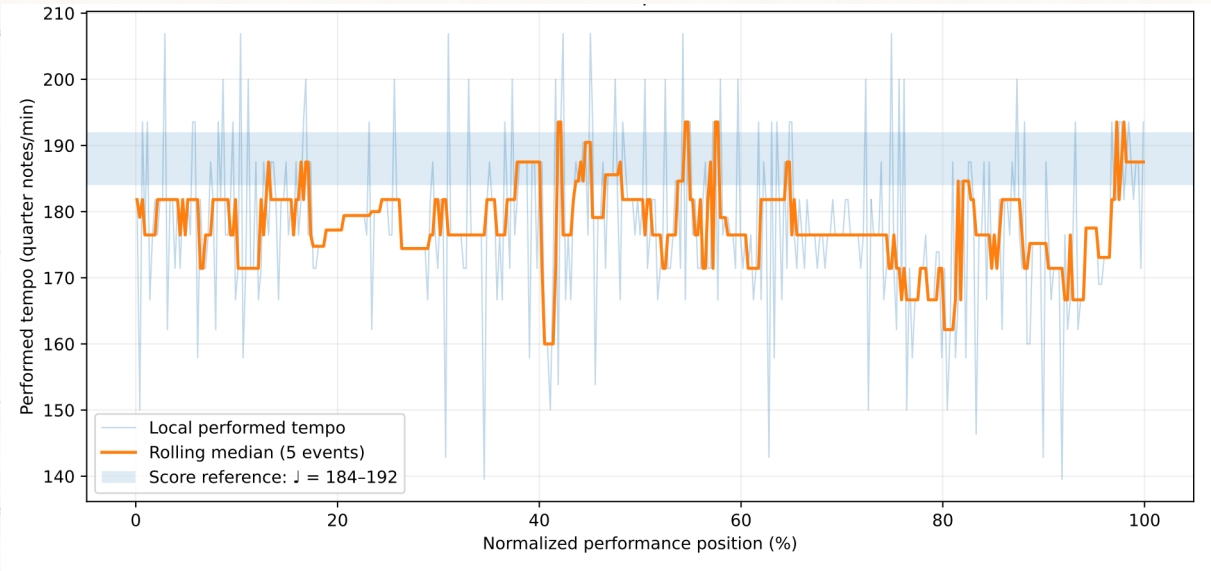
The first and fifth deciles constitute the highest points, both at 181.82 ♩/min. From the sixth segment onwards, the performance tends to occupy an even lower domain, reaching its regional minimum in the eighth decile at 173.91 ♩/min. The ending presents only a partial recovery.

The graphical profile (32) shows local approaches to and incursions into the prescribed range, particularly in the middle region and again near the end. These occurrences do not contradict the decile results. They indicate that local values reach 184–192, but do not remain there long enough to raise the median of a region representing 10% of the performance into that domain.

To say that a performance 'reaches' the written indication may mean only that certain events or brief sequences enter the prescribed range. The weighted analysis shows whether this approach is sufficiently persistent to constitute a meaningful part of the temporal regime.

The decile median range falls to 7.91 ♩/min, virtually half the value found in 1932. The interquartile width also contracts sharply, from 18.24 to approximately 10.39 ♩/min. Two independent indicators therefore point to a clear transformation: 1954 is slower, but also substantially more temporally concentrated.

This combination is conceptually important. The distance from the prescribed tempo increases, while internal stability also increases. In this case, greater distance from the written text does not correspond to greater freedom or greater variability in performance.



Example 32. Temporal profile of the *Valse* in the 1954 recording in relation to the reference ♩ = 184–192.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording returns to virtually the same temporal centre as 1932. The weighted median is 181.82 ♩/min, a difference of only 0.01 ♩/min relative to the first recording. The distance from the lower boundary of the prescribed range is −2.18 ♩/min, or −1.19%.

Despite the near identity of the medians, the 1961 distribution is considerably more concentrated. The interquartile range extends from 176.47 to 187.50 ♩/min, with a width of approximately 11.03 ♩/min, around 7.2 ♩/min narrower than in 1932.

As in the first recording, the lower boundary of ♩ = 184 lies within the interquartile range. The prescribed range therefore once again intersects the central core of the performance. There is, however, an important difference: the third quartile reaches 187.50 ♩/min, still below the midpoint of the range, ♩ = 188. The central distribution enters the lower portion of the prescribed domain, but remains strongly concentrated near its lower boundary.

The deciles reveal remarkable regional stability: 181.82, 181.82, 176.47, 181.82, 181.82, 183.90, 181.82, 181.82, 181.82, and 181.82 ♩/min. Eight of the ten segments present exactly 181.82 ♩/min or a value very close to it.

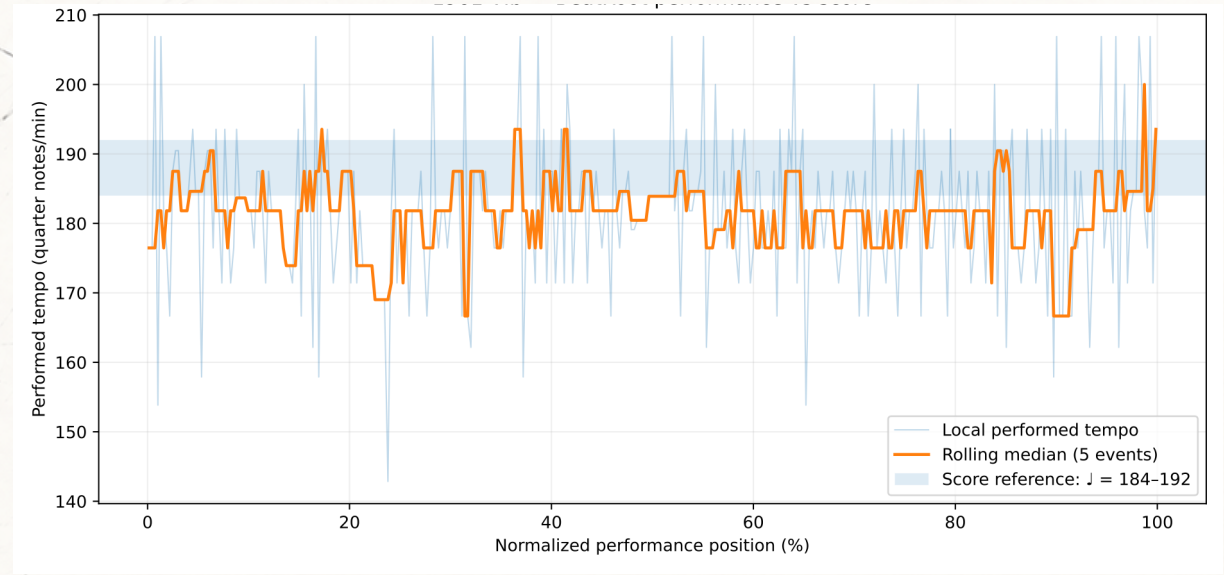
The third decile constitutes the principal depression, at 176.47 ♩/min, while the sixth reaches the regional maximum of 183.90 ♩/min, only 0.10 ♩/min below the lower boundary of the prescribed range. None of the decile medians enters the 184–192 range, although the local profile does so repeatedly.

This difference between the deciles and the individual graph is revealing. The moving median crosses the lower boundary several times, reaches regions within the prescribed range, and rises to approximately 200 ♩/min near the end. Yet when the performance is examined in broader temporal segments, these incursions do not substantially alter the predominant regional level.

The decile median range is only 7.43 ♩/min, the smallest of the three performances and virtually identical to that of 1954. Compared with the 15.25 ♩/min observed in 1932, this represents a reduction of more than 50%.

The 1961 recording constitutes a particular case: the same global centre as in 1932 is realised through a markedly different internal organisation. The median remains virtually unchanged, while both dispersion and regional differentiation decrease substantially.

This demonstrates with clarity why a single tempo value is insufficient to characterise the temporality of a performance. Two performances may share virtually the same median while nevertheless exhibiting distinct ways of organising variation around that centre.



Example 33. Temporal profile of the *Valse* in the 1961 recording in relation to the reference ♩ = 184–192.
Source: Author's own elaboration based on the results of the computational pipeline.

Between 1932 and 1954, the median decreases by 5.34 ♩/min, corresponding to approximately −2.93% relative to the initial level. Between 1954 and 1961, there is an almost symmetrical recovery of 5.35 ♩/min, or +3.03%. The total difference between 1932 and 1961 is only 0.01 ♩/min.

If the analysis were limited to the medians, one might conclude that 1961 simply restores the 1932 tempo after a slower realisation in 1954. The dispersion measures show that such an interpretation would be incomplete.

The principal longitudinal process combines a decline and subsequent recovery of the global level with a lasting contraction of the temporal range after 1932. This contraction remains evident in 1961, even as the median returns almost exactly to its initial level.

The comparative graph (34) makes this difference clear. The 1932 curve spans a broader range, alternating between regions clearly below the prescribed domain and segments situated within 184–192. The 1954 curve occupies predominantly the lower stratum. The 1961 curve moves closer to the prescribed range once again but follows a regionally more compact trajectory.

The relationship with the score follows the same non-monotonic trajectory. The medians of 1932 and 1961 lie approximately 1.19% below the lower boundary, while 1954 lies 4.09% below it. Relative to the midpoint of the range, ♩ = 188, the differences are approximately −3.29%, −6.13%, and −3.29%, respectively.

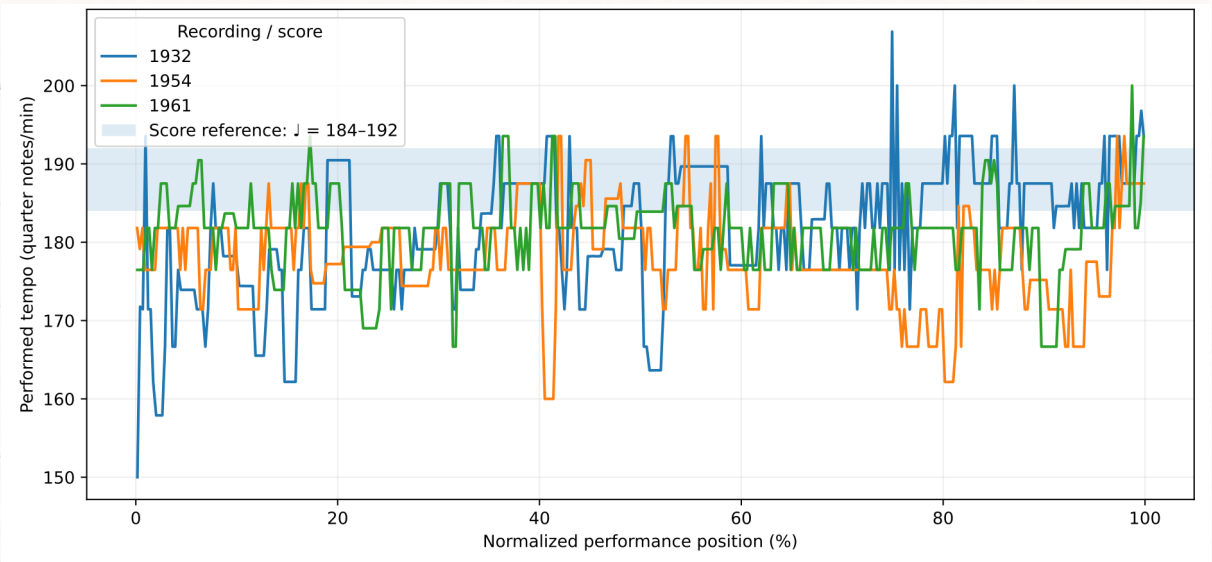
More important than these point differences is the position of the prescribed range within the distributions. In 1932, the interquartile range reaches 189.68 ♩/min and extends substantially

into the prescribed domain. In 1954, even Q3 remains below 184. In 1961, the central range once again crosses the lower boundary, although only as far as 187.50 ♩/min.

We therefore find three distinct relationships with the same prescription: broad intersection in 1932, separation in 1954, and more restricted intersection in 1961. This distinction would be invisible if we considered only the medians.

There is an important qualitative transformation between 1932 and 1961. The global level changes hardly at all, but the way in which it is sustained does. In 1932, the median of approximately 182 ♩/min emerges from a performance that moves through markedly different regions, some well below and others within the written range. In 1961, virtually the same centre results from a regionally much more homogeneous realisation.

The *Valse* thus provides an example of the independence between central position and internal temporal organisation. Temporality emerges from both the value that best summarises the distribution and the extent, persistence, and location of the variations that produce it.



Example 34. Comparison of the temporal profiles of the *Valse* in the 1932, 1954, and 1961 recordings in relation to the metronome range ♩ = 184–192.
Source: Author's own elaboration based on the results of the computational pipeline.

In summary, the *Valse* presents a longitudinal trajectory in which changes in temporal level and transformations in stability move in different directions. The 1954 recording represents the greatest downward displacement from the score, while 1961 recovers virtually the same temporal centre as 1932. This recovery, however, does not constitute a return to the same temporal conception.

The contrast between 1932 and 1961 is particularly revealing: 181.81 and 181.82 ♩/min are virtually identical values, yet they correspond to markedly different distributions. The first

performance has an interquartile width of 18.24 ♩/min and a decile median range of 15.25 ♩/min, whereas the latter reduces these measures to 11.03 and 7.43 ♩/min respectively. The central tempo remains virtually unchanged, but the way in which it is organised changes substantially.

In this sense, the most profound transformation of the *Valse* does not necessarily lie in tempo itself. Between the first and final recordings, it resides in the shift from a more expansive and regionally contrasting regime to one that is more concentrated and temporally stabilised. The 1954 recording occupies an intermediate position in this process of stabilisation, while simultaneously establishing the slowest global tempo level.

The *Valse* therefore demonstrates that persistence of tempo can coexist with transformation in temporality. The same central value may emerge from substantially different patterns of internal variation. Within the *Trois Danses*, this distinction provides one of the clearest examples of the need to consider central tendency, dispersion, and temporal trajectory together.

4.6.3 *Ragtime*

The *Ragtime* requires a specific preliminary consideration: the analysis retains the native metronomic unit of the passage, the quaver, rather than converting it into an equivalent value in crotchets. The score reference is therefore ♪ = 184–192, preceded by the metric relationship indicated at the transition. All values in this subsection are expressed in quavers per minute. Preserving the written unit is essential to ensure that the comparison between performance and prescription remains dimensionally coherent. The calibrated results also confirm that, in all three recordings, BeatRoot maintained a relationship of one detected event to one quaver.

Longitudinally, the *Ragtime* presents a two-stage transformation. Between 1932 and 1954, there is a clear rise in the temporal centre. Between 1954 and 1961, that centre remains virtually unchanged. The similar medians of the two later recordings coexist with distinct temporal behaviours. In 1961, the distribution extends further towards higher values and approaches the prescribed range more frequently. The analytical problem therefore shifts from an evident difference in temporal level between 1932 and the later recordings to a subtler difference in internal organisation between two regimes of virtually identical speed.

REC.	WEIGHTED MEDIAN (♪/MIN)	WEIGHTED MEAN (♪/MIN)	Q1–Q3 (♪/MIN)	DECILE MEDIAN RANGE	DISTANCE FROM ♪ = 184
1932	162.15	161.37	154.83–166.67	11.82	−21.85 (−11.87%)
1954	171.43	171.74	166.67–176.47	9.80	−12.57 (−6.83%)
1961	171.43	171.76	166.67–179.11	9.14	−12.57 (−6.83%)

Table 11. Statistical summary of the *Ragtime* across the three recordings.
Source: Author's own elaboration based on the results of the computational pipeline.

As in the *Valse*, the distance shown in the final column is calculated relative to the lower boundary of the prescribed range, ♪ = 184. The midpoint, ♪ = 188, produces larger deviations — approximately −13.75% in 1932 and −8.81% in both 1954 and 1961 — and serves as a supplementary measure within the interval-based reference framework.

The 1932 recording establishes the slowest temporal regime. The weighted median is 162.15 ♪/min, while the weighted mean reaches 161.37 ♪/min. The proximity between these two measures confirms that the lower tempo level characterises the distribution as a whole. Relative to the lower boundary of the score prescription, the difference is −21.85 ♪/min, or −11.87%.

The interquartile range extends from 154.83 to 166.67 ♪/min, entirely below ♪ = 184. Even its upper boundary remains more than 17 ♪/min below the prescribed range. Unlike the 1932 *Valse*, in which the central region of the distribution entered the written metronomic range, here the separation between the core of the performance and the prescription is unequivocal.

The decile trajectory adds an important layer of information: 166.67, 166.67, 157.89, 165.73, 160.00, 162.17, 163.05, 162.15, 157.39, and 154.85 ♪/min. The first two segments occupy the highest regional level. From the third decile onwards, a predominantly lower configuration is established, interrupted by partial recoveries, and the final decile presents the lowest value of the entire performance.

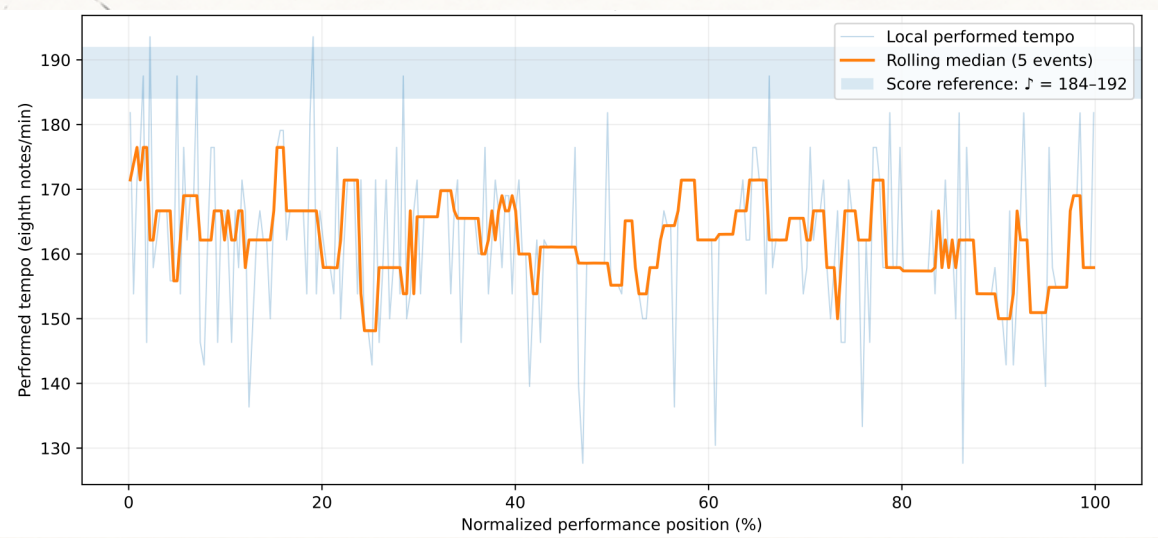
The difference between the first and final deciles is approximately −11.82 ♪/min, virtually identical to the total range between the decile medians. This distinguishes 1932 from the two later recordings: the performance presents a particularly pronounced net downward direction, even though the trajectory between its endpoints is not linear.

The individual profile confirms this organisation. In the first part, the moving median repeatedly reaches values around 165–176 ♪/min. Over the course of the performance, successive depressions emerge, some extending into the region of 150–160, while the final section contains one of the slowest concentrations of the entire trajectory. The range ♪ = 184–192 remains above the regime sustained by the smoothed curve, although isolated local events may reach or exceed it.

This distinction between local events and sustained regime is crucial. The presence of individual attacks at values close to the prescribed range does not mean that the performance is temporally organised within that domain. Neither the quartiles nor any of the ten decile medians reach ♪ = 184. The distance from the tempo prescribed in the score is therefore both global and regional.

The interquartile width, approximately 11.84 ♪/min, and the decile median range, 11.82 ♪/min, are virtually identical in magnitude. This indicates that the diversity of the global distribution

corresponds closely to differentiation among temporally extended regions of the performance. In 1932, mobility is not confined to the short scale. It participates in the macrotrajectory itself.



Example 35. Temporal profile of the *Ragtime* in the 1932 recording in relation to the reference ♪ = 184–192.
Source: Author's own elaboration based on the results of the computational pipeline.

In 1954, the temporal centre rises to 171.43 ♪/min, an increase of approximately 9.28 ♪/min relative to 1932. The weighted mean, 171.74 ♪/min, remains virtually identical to the median. The distance from the lower boundary of the prescribed range falls to −12.57 ♪/min, corresponding to −6.83%.

The transformation is visible across the entire distribution. The first quartile rises to 166.67 ♪/min and the third to 176.47 ♪/min. Despite this displacement, the central half of the performance duration remains entirely below ♪ = 184. The reference moves closer to the distribution but remains outside its core.

The decile medians — 171.43, 171.43, 169.81, 176.47, 171.43, 173.91, 176.47, 166.67, 172.66, and 171.43 ♪/min — reveal an organisation without a single longitudinal direction. The beginning and end coincide exactly at 171.43 ♪/min, while two regional maxima, in the fourth and seventh deciles, reach 176.47. The eighth decile produces the principal depression, at 166.67.

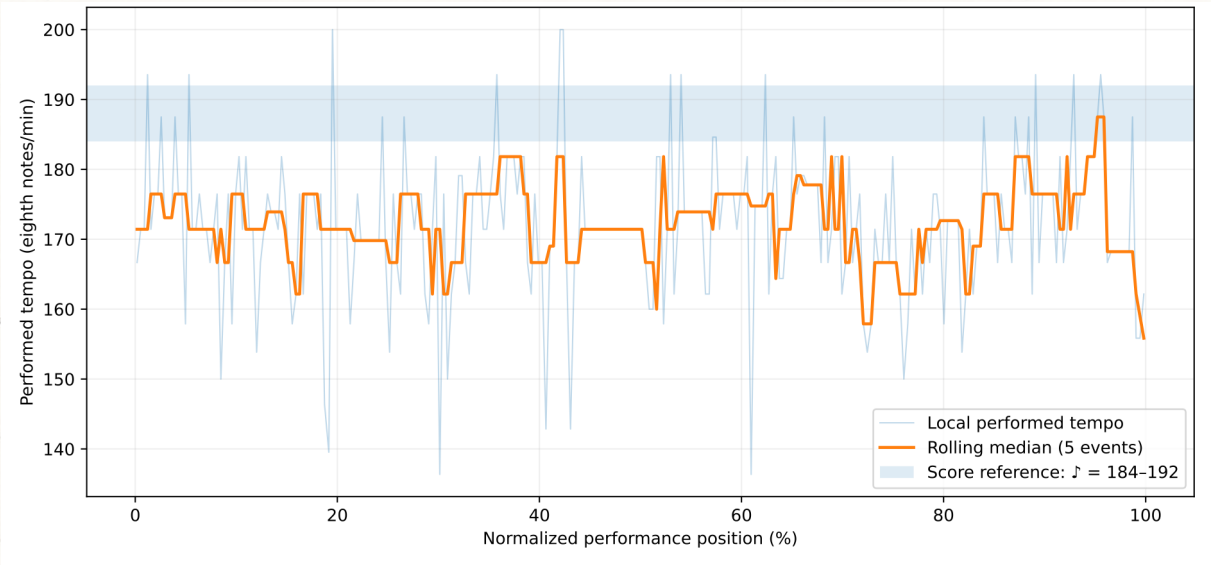
Unlike 1932, there is no net reduction between the endpoints. The performance is organised around a relatively persistent centre, interrupted by alternations between faster and slower regions. The longitudinal difference from the first recording lies primarily in the level at which this mobility occurs.

The individual graph confirms this absence of a simple direction. The moving median circulates predominantly between approximately 166 and 180 ♪/min, with localised rises that approach or enter the prescribed range and occasional depressions towards values around 160. In

the final segment, there is a marked rise into the ♪ = 184–192 domain, followed by an immediate drop at the close.

This final episode illustrates the distinction between local reach and global position. The curve reaches the score range, but the third quartile remains at 176.47 and the median at 171.43. The approach is real, but localised, and does not redefine the predominant regime.

The decile median range falls to 9.80 ♪/min, and the interquartile width is virtually identical. Compared with 1932, both contract by around 2 ♪/min. The increase in tempo is therefore accompanied by a moderate reduction in internal differentiation, although the movement remains temporally mobile.



Example 36. Temporal profile of the *Ragtime* in the 1954 recording in relation to the reference ♪ = 184–192.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording presents an interesting global result: its weighted median is again 171.43 ♪/min, identical to that of 1954. The weighted mean, 171.76 ♪/min, is likewise virtually identical to that of the previous recording. In terms of central tendency, there is no measurable longitudinal change between the two later performances.

This persistence, however, conceals a modification in the distribution. The first quartile remains exactly at 166.67 ♪/min, while the third rises from 176.47 to 179.11 ♪/min. Consequently, the interquartile range widens from approximately 9.80 to 12.44 ♪/min, principally through an expansion of the upper half of the distribution.

This difference shows that 1961 preserves the same centre while extending further into higher tempo values. The prescribed range remains above Q3, but its distance from the central region decreases. The transformation therefore takes the form of a redistribution around a

preserved centre, distinct from the broader shift in temporal level observed between 1932 and 1954.

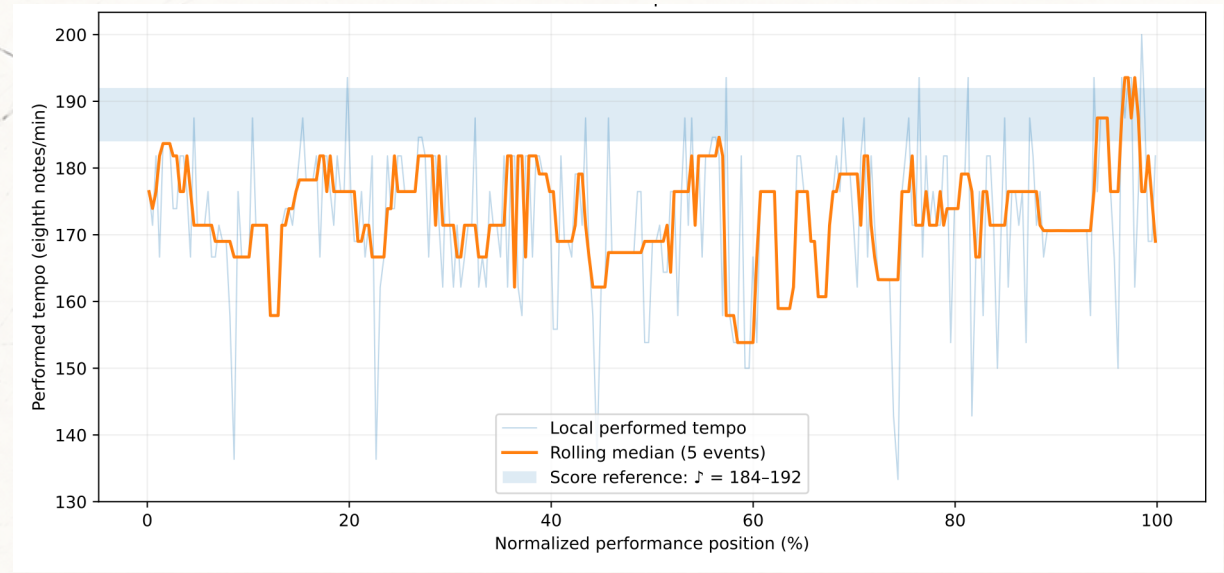
The decile medians are 171.43, 173.92, 176.47, 171.43, 167.33, 171.43, 176.47, 171.43, 171.43, and 170.62 ♪/min. The regional range is 9.14 ♪/min, the smallest of the three recordings. The trajectory presents two equivalent maxima, in the third and seventh deciles, separated by a depression in the fifth. The final segment returns to virtually the initial level.

An interesting relationship therefore emerges between two statistical scales. The decile median range decreases, while the interquartile width increases relative to 1954. This means that the broader temporal regions of the performance become slightly more similar to one another, while the global distribution of local values becomes more extended, particularly towards higher values.

These measures describe complementary aspects of the 1961 performance: greater short-scale variation alongside less persistent differentiation between broader regions. This combination would remain invisible if the analysis were restricted to the median or to a single measure of dispersion.

The individual profile supports this interpretation. The smoothed curve repeatedly traverses values between approximately 165 and 182 ♪/min, with relatively rapid alternations and several more pronounced depressions. The clearest approach to the reference occurs in the final region: the moving median enters the 184–192 range and briefly reaches values slightly above its upper boundary before returning to approximately 169 ♪/min at the close.

As in 1954, this late approach does not alter the global centre. Its significance lies in showing that, although 1954 and 1961 share the same median, the latter recording explores the upper region of the distribution more extensively and establishes more pronounced contact with the prescribed tempo.



Example 37. Temporal profile of the *Ragtime* in the 1961 recording in relation to the reference ♪ = 184–192.
Source: Author's own elaboration based on the results of the computational pipeline.

Between 1932 and 1954, the median rises by approximately 9.28 ♪/min, or around 5.72% relative to the first recording. Between 1954 and 1961, the change is statistically negligible at the adopted level of precision. The longitudinal process therefore unfolds in two stages: an initial shift in temporal level, followed by a phase of stability in the temporal centre.

The relationship with the score follows this trajectory only in part. The distance from the lower boundary decreases from −11.87% in 1932 to −6.83% in 1954, remaining at −6.83% in 1961. In none of the recordings does the median reach ♪ = 184, and in none does the interquartile range formally include the prescribed range.

In this sense, the longitudinal approach towards the prescribed tempo occurs essentially between 1932 and 1954. In 1961, the centre remains stable, while the distribution of values around it changes.

The comparative graph makes the separation of 1932 evident across much of the performance. Its curve tends to occupy the lower stratum, particularly in the second half, while 1954 and 1961 repeatedly intertwine around 170–180 ♪/min. The distinction between the two later versions is far less a matter of global level than of internal shape and the extent of their upper excursions.

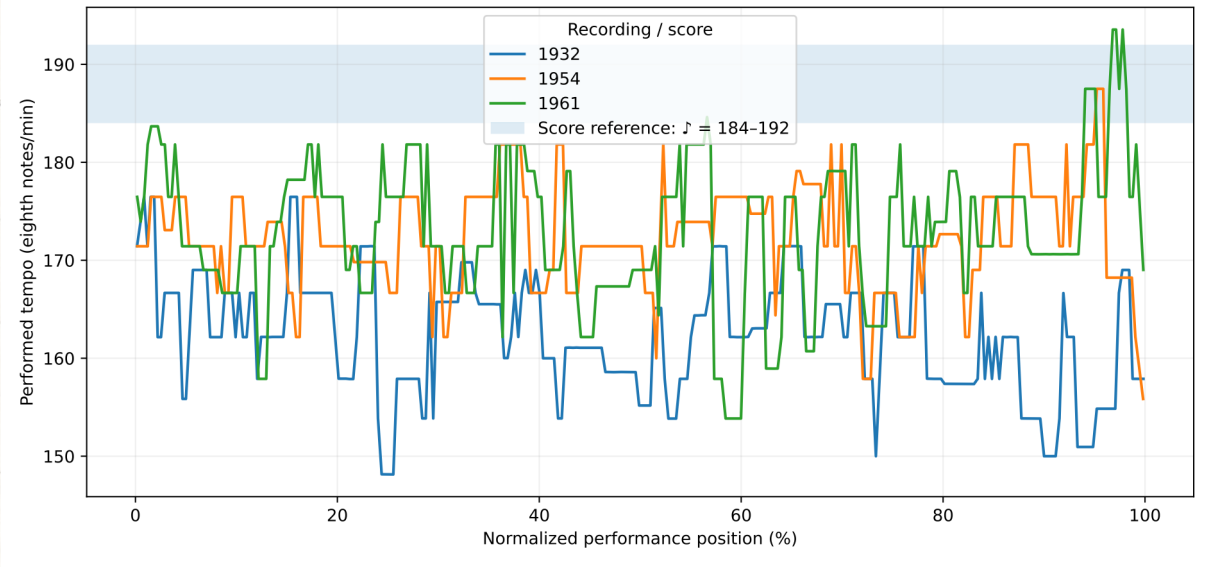
The quartiles make this difference particularly clear. Between 1954 and 1961, Q1 remains at 166.67, the median remains at 171.43, while Q3 rises from 176.47 to 179.11 ♪/min. The transformation is therefore concentrated predominantly in the upper half of the distribution.

There is a progressive, though moderate, contraction in regional differentiation. The first recording presents the greatest contrast between segments, 1954 reduces this contrast, and 1961 reduces it slightly further.

The reduction from 1932 to 1954 is followed by renewed expansion in 1961. This divergence between quartiles and deciles constitutes one of the most interesting findings of the *Ragtime*: 1961 combines greater local dispersion with greater regional uniformity.

The comparison between 1932 and the two later recordings also reveals a transformation in internal directionality. The first performance begins with two deciles at 166.67 ♪/min and ends at 154.85, producing a pronounced net decline. In 1954, the first and final deciles are identical. In 1961, they differ by less than 1 ♪/min. The longitudinal transformation therefore combines a higher temporal level with a more balanced distribution, replacing the downward asymmetry that characterised 1932.

This result makes it possible to distinguish three independent dimensions of the profile: level, dispersion, and directionality. Between 1932 and 1954, all three change. Between 1954 and 1961, the level remains stable, local dispersion increases, and regional differentiation decreases. A single tempo value could not adequately represent this transformation.



Example 38. Comparison of the temporal profiles of the *Ragtime* in the 1932, 1954, and 1961 recordings in relation to the metronome range ♪ = 184–192.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Ragtime* presents a longitudinal trajectory in which change and persistence operate at different scales. Between 1932 and 1954, the temporal centre rises from 162.15 to 171.43 ♪/min, and the distance from the prescribed range decreases significantly. Between 1954 and 1961, this centre remains virtually unchanged.

The stability of the median in the two later recordings does not correspond to temporal identity. In 1961, the upper half of the distribution expands, incursions into the ♪ = 184–192 range

become more pronounced, and, at the same time, the range between the decile medians decreases. The same centre is sustained by a different organisation of variability.

The comparison with 1932 adds a transformation in directionality. The first recording presents a net downward tendency over the course of the performance. The 1954 and 1961 recordings, although internally oscillatory, end at approximately the same level at which they began. The *Ragtime* therefore moves from a realisation that is slower, more regionally differentiated, and asymmetrical to two globally faster performances without an equivalent directional tendency.

Within the *Trois Danses*, this result complements what was observed in the *Valse*. In the *Valse*, 1932 and 1961 returned to virtually the same centre while displaying different internal organisations. In the *Ragtime*, it is 1954 and 1961 that share the same centre. In both cases, the conclusion is similar: equality of central tempo does not amount to equality of temporality. The central value identifies the performance's overall level, but does not describe how that level is constructed, tensioned, and transformed over time.

4.7 *Danse du Diable*

The *Danse du Diable* presents one of the most contrasting longitudinal configurations in the corpus. The reference adopted in the analysis is ♩ = 138, but the three recordings establish distinct relationships with this value: 1932 lies globally below it, 1954 shifts the entire temporal centre above the prescription, and 1961 returns to a lower position, although closer to the reference than the first recording. The transformation therefore follows a non-monotonic trajectory. More importantly, the three recordings organise temporal variation differently: 1932 displays broad regional differentiation and pronounced longitudinal asymmetry, 1954 combines the highest global tempo with a subsequent reduction in level, and 1961 presents the most regionally concentrated organisation.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 138
1932	127.65	126.71	120.00–131.88	19.53	−10.35 (−7.50%)
1954	146.34	145.37	139.53–150.00	11.73	+8.34 (+6.04%)
1961	132.16	132.12	130.43–136.36	5.93	−5.84 (−4.23%)

Table 12. Statistical summary of the *Danse du Diable* across the three recordings
Source: Author's own elaboration based on the results of the computational pipeline.

The 1932 recording has a weighted median of 127.65 ♩/min, approximately 10.35 ♩/min below the reference, corresponding to a difference of −7.50%. The weighted mean, 126.71 ♩/min, lies very close to the median, confirming that this lower global position characterises the distribution broadly.

The interquartile range, from 120.00 to 131.88 ♩/min, remains entirely below ♩ = 138. Even the third quartile lies more than 6 ♩/min below the written marking, placing the reference outside the central half of the distribution. The recording therefore occupies a slower temporal domain overall, with both its median and its interquartile range below the score prescription.

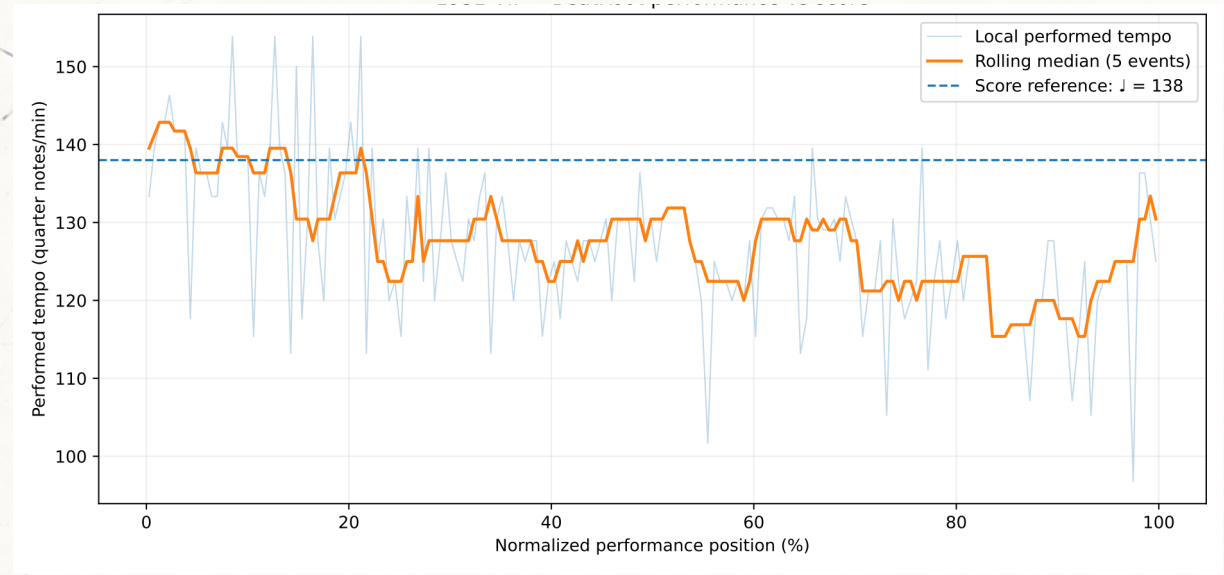
The internal structure is strongly asymmetrical. The decile medians are 139.53, 133.34, 127.67, 127.65, 127.65, 125.00, 130.43, 122.45, 120.00, and 122.44 ♩/min. The first decile is the only segment whose regional median lies slightly above the reference. From that point onwards, a marked reduction occurs. By the second decile, the level has already fallen by around 6 ♩/min, and by the third it has settled in the region of approximately 128 ♩/min.

The subsequent trajectory does not consist of a linear deceleration. There is a recovery in the seventh decile, to 130.43 ♩/min, followed by a further decline that reaches 120 ♩/min in the ninth. Even so, the difference between beginning and end is substantial, from approximately 139.53 to 122.44 ♩/min, representing a net reduction of around 17.08 ♩/min.

The total range between the decile medians reaches 19.53 ♩/min, the largest of the three recordings. This value is particularly important because it shows that the heterogeneity of 1932 is not confined to momentary fluctuations. Regions corresponding to substantial portions of the performance genuinely occupy different temporal levels.

The individual graph confirms this pattern. The moving median begins close to or above ♩ = 138, continues to approach the reference at several points during roughly the first fifth of the performance, and then settles predominantly into a lower region. In the second half, the reductions become more persistent, particularly between approximately 70% and 95% of the normalised duration, before a final recovery that nevertheless remains below the initial level.

The 1932 recording should therefore be understood as a strongly directional performance characterised by a lower overall realised tempo level. The distance from the score increases over the course of the performance. The movement begins close to the reference and ends in a clearly lower regime. The global median of 127.65 ♩/min results from the coexistence of a relatively fast opening region with a substantially slower second half.



Example 39. Temporal profile of the *Danse du Diable* in the 1932 recording in relation to the reference ♩ = 138.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording establishes the fastest global configuration. Its weighted median is 146.34 ♩/min, while the weighted mean reaches 145.37 ♩/min. Relative to ♩ = 138, the difference is +8.34 ♩/min, equivalent to +6.04%.

The interquartile range extends from 139.53 to 150 ♩/min. Unlike 1932, the entire central half of the distribution lies above the prescription. Even Q1 exceeds ♩ = 138 by approximately 1.5 ♩/min. The change between the first two recordings is therefore structural, involving a shift in the median and a complete displacement of the core of the distribution to the opposite side of the reference.

The difference between 1932 and 1954 is 18.69 ♩/min in the weighted medians, corresponding to an increase of approximately 14.64% relative to the 1932 value. This change is considerably greater than the internal fluctuations typical of either performance.

The regional organisation of 1954 reveals modest variation within the elevated tempo level. The decile medians are 146.34, 151.26, 146.34, 146.34, 150.00, 139.53, 142.86, 146.34, 140.19, and 141.17 ♩/min. The first five segments are concentrated predominantly between 146 and 151 ♩/min, while the sixth undergoes a sharp reduction to approximately 139.53 ♩/min.

From that point onwards, the performance settles into a generally lower tempo regime. The eighth decile rises again to 146.34 ♩/min, while the final two remain around 140–141 ♩/min. The difference between the first and final deciles is approximately −5.17 ♩/min.

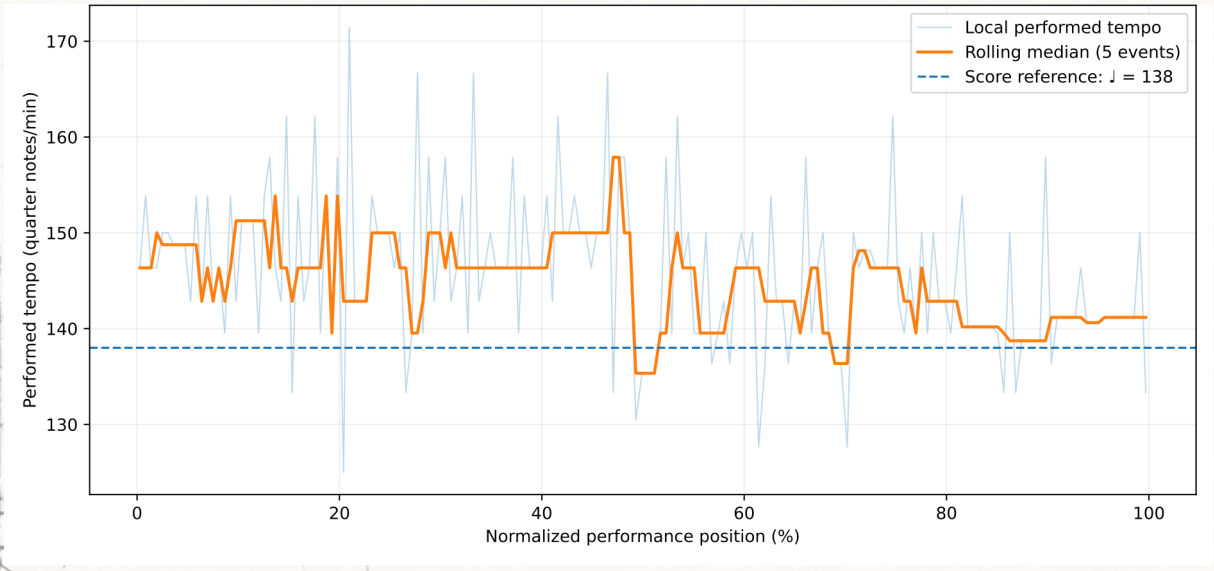
This trajectory produces an important distinction between the global centre and the internal Direction of the performance. The 1954 recording is unequivocally the fastest, yet within it there

is a reduction in temporal level between the first and second parts. Its elevated position relative to the score does not imply longitudinal constancy.

The individual profile makes this structure particularly clear. During approximately the first half, the moving median frequently remains between 145 and 150 ♩/min, at times reaching around 158. Near the midpoint of the performance, there is a marked fall into the region of 135–140 ♩/min. Recoveries follow, but the final part becomes organised around a lower level than that which predominated at the beginning.

The decile median range is 11.73 ♩/min, substantially smaller than the 19.53 observed in 1932. The interquartile width also decreases, from approximately 11.88 to 10.47 ♩/min. The 1954 recording is therefore more concentrated than that of 1932, while still preserving clear differentiation between regions.

An analytically important pattern emerges here: the fastest performance also displays a narrower regional range. The increase of approximately 19 ♩/min in the temporal centre between 1932 and 1954 coincides with a reduction in regional variability. Tempo level and variability therefore follow distinct trajectories.



Example 40. Temporal profile of the *Danse du Diable* in the 1954 recording in relation to the reference ♩ = 138.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording occupies an intermediate position in terms of global tempo but presents the most concentrated internal structure of the three. The weighted median is 132.16 ♩/min, while the weighted mean is virtually identical at 132.12 ♩/min. The difference from the score is −5.84 ♩/min, or −4.23%.

Relative to 1954, there is a reduction of approximately 14.18 ♩/min, equivalent to −9.69%. Even so, 1961 remains around 4.51 ♩/min, or 3.53%, above the level observed in 1932. The longitudinal trajectory therefore describes a pronounced rise followed by a partial retreat, without returning to the initial point.

The 1961 interquartile range extends only from 130.43 to 136.36 ♩/min. Its width, approximately 5.93 ♩/min, is virtually half that found in 1932 and significantly narrower than in 1954. In addition, the entire interval remains below the reference, although Q3 approaches ♩ = 138.

The deciles are remarkably concentrated: 133.33, 136.36, 133.33, 133.33, 133.33, 133.33, 130.43, 131.39, 130.43, and 131.58 ♩/min. Six of the ten segments lie exactly or almost exactly around 133.33 ♩/min, while the total range between the minimum and maximum is only 5.93 ♩/min.

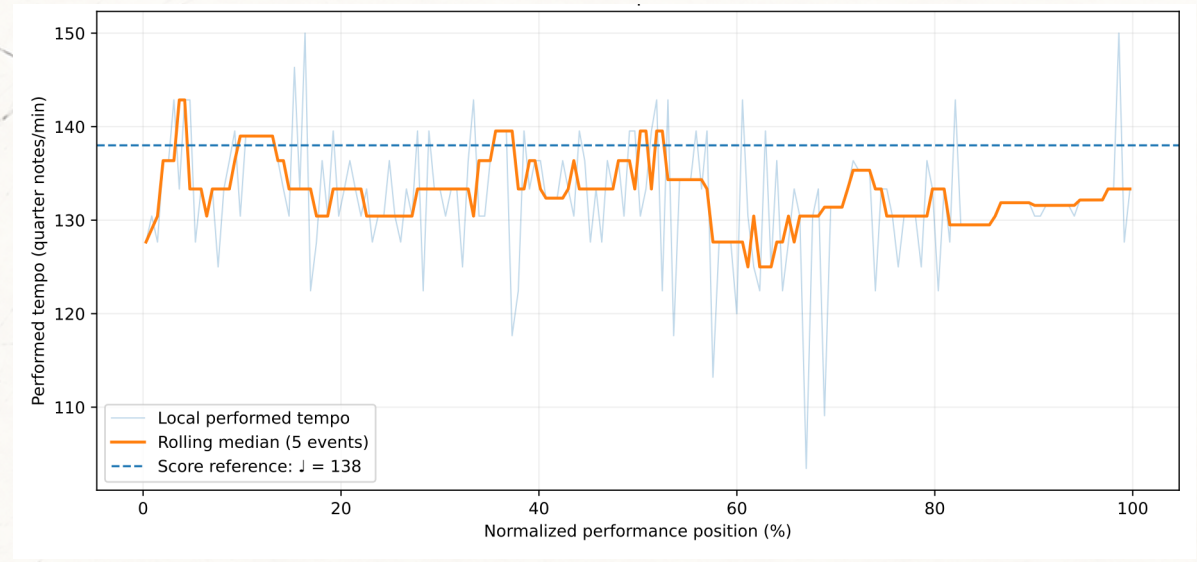
This value represents less than one third of the range observed in 1932. The transformation in stability is therefore considerably more pronounced than the difference between the medians of the two recordings.

The trajectory also reveals a gentle division between two regions. The first six deciles remain predominantly around 133–136 ♩/min. From the seventh onwards, the level falls slightly to approximately 130–132 ♩/min. The reduction is small in absolute terms, but sufficiently persistent to appear in the regional medians.

The individual graph shows that this regional stability coexists with considerably dispersed local events. There are peaks close to 150 ♩/min and isolated falls to just above 100. The moving median smooths these excursions and remains for much of the performance within a narrow band, approximately between 130 and 136 ♩/min.

This contrast is particularly significant: 1961 contains local variability without producing substantial regional differentiation. Event-by-event fluctuations do not consolidate into sufficiently distinct and sustained levels to widen the decile range. The stability that characterises the recording is mesotemporal, rather than mechanical or absolute.

The relationship with the score is also distinctive. Although the entire central region remains below ♩ = 138, some early segments come quite close to the reference, and the smoothed curve occasionally exceeds it. Even so, none of these local approaches alters the global position of the distribution.



Example 41. Temporal profile of the *Danse du Diable* in the 1961 recording in relation to the reference ♩ = 138.
Source: Author's own elaboration based on the results of the computational pipeline.

Between 1932 and 1954, the median rises by 18.69 ♩/min. Between 1954 and 1961, it falls by 14.18 ♩/min. By the end of the period, 1961 remains only 4.51 ♩/min above 1932. The longitudinal movement therefore consists of a very pronounced temporary expansion in 1954, followed by a partial return.

The 1932 recording lies below the prescription, 1954 crosses it and establishes its central core entirely above it, and 1961 returns to a lower position. There is no evidence of linear convergence towards the metronome marking across the three decades.

The interquartile ranges make this contrast even clearer. In 1932, the core of the distribution is 120–131.88 ♩/min. In 1954, it shifts to 139.53–150.00, and in 1961 it returns to 130.43–136.36. The 1932 and 1954 intervals do not overlap, while 1961 occupies an intermediate region, still separate from the 1954 core and only partially close to the upper boundary of the 1932 distribution.

The 1954 curve occupies the upper domain for almost the entire performance, while 1932 tends to remain in the lower region, particularly during the second half. The 1961 recording establishes a relatively compact intermediate trajectory. Taken together, the curves reveal distinct temporal shapes across the three recordings, combining differences in overall level with changes in internal organisation.

There is a continuous and very pronounced reduction in regional differentiation. From 1932 to 1961, the range falls by approximately 69.6%. This transformation is independent of the non-monotonic trajectory of the global medians.

Across two distinct measures, 1961 emerges as the most concentrated realisation. Their convergence is significant: the quartiles describe the distribution independently of temporal order,

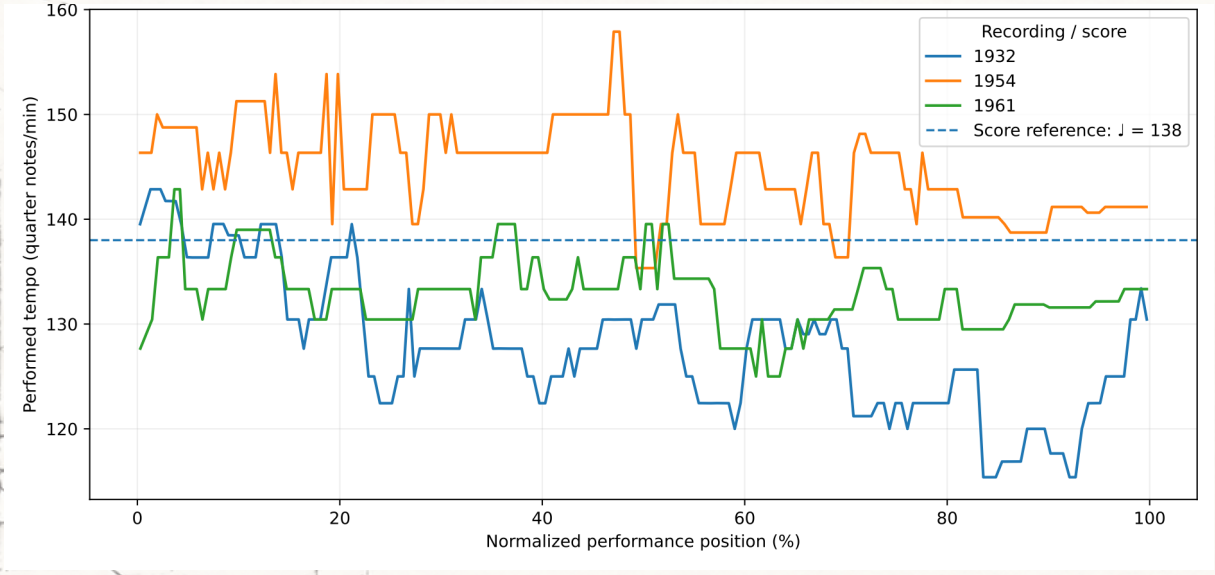
whereas the deciles preserve its longitudinal organisation. Both point to a progressive contraction of sustained variability.

There is also a clear transformation in directionality. In 1932, the difference between the first and final deciles is approximately −17.08 ♩/min. In 1954, it falls to around −5.17 ♩/min. In 1961, it is only −1.75 ♩/min. The downward tendency remains perceptible but progressively loses magnitude.

This sequence provides a particularly strong result: pronounced internal decline, moderate decline, and near stability. In other words, alongside the contraction of regional ranges, there is also a reduction in the asymmetry between beginning and end.

This evidence changes how the transformation of the *Danse du Diable* should be understood. The most consistent longitudinal feature is not the global tempo — which rises and then falls — but the progressive stabilisation of its internal temporal organisation. The variable showing the greatest historical continuity across 1932, 1954, and 1961 is the reduction in differentiation between regions of the performance.

This also highlights the distinctiveness of the 1961 recording. Its temporal centre occupies an intermediate position, while its internal organisation is qualitatively different, displaying a degree of regional concentration unmatched by either of the two earlier recordings.



Example 42. Comparison of the temporal profiles of the *Danse du Diable* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 138.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Danse du Diable* reveals a particularly clear dissociation between the trajectory of tempo and the trajectory of stability. The global level follows a non-monotonic path: relatively slow in 1932, highest in 1954, and intermediate in 1961. The internal organisation, by contrast, changes in

only one direction, with a continuous reduction in both the range between regions and the difference between the beginning and the end.

In 1932, the profile is broad and strongly asymmetrical: the performance begins close to the prescription and moves towards a much lower regime. In 1954, the movement is performed globally above ♩ = 138 but still displays a perceptible difference between a faster first half and a lower second region. In 1961, the temporal centre returns below the reference, but the performance is sustained within a much narrower regional band.

The most significant result cannot be reduced to an opposition between "Faster" and "slower". The longitudinal transformation involves a shift from a strongly differentiated and directional realisation to one that is progressively more concentrated and less asymmetrical, independently of the non-linear movement of global tempo. In this sense, the *Danse du Diable* provides an especially clear example of how the temporal identity of a performance emerges from the relationship between its overall tempo level and the way that level is organised over time.

4.8 *Grand Choral*

The *Grand Choral* presents a longitudinal configuration that combines a non-monotonic change in global tempo level with a feature that persists across all three recordings: a tendency for the tempo to occupy higher values at the beginning and lower ones in the later regions. The score reference is ♩ = 54. In 1932, the core of the performance lies entirely above this value. In 1954, it shifts markedly downwards. In 1961, there is a partial recovery, although the central tendency remains below the prescription. At the same time, differentiation between temporal regions increases from 1932 to 1961, indicating that the transformation encompasses changes in both overall tempo level and its distribution over the course of the performance.

Table 13 brings together the principal descriptors of this transformation. The data show that the movement across the three performances cannot be represented as a linear trajectory either towards or away from the score prescription.

REC.	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 54
1932	59.40	59.70	57.15–62.50	5.19	+5.40 (+10.00%)
1954	44.44	44.19	40.82–47.62	7.38	−9.56 (−17.70%)
1961	50.00	50.58	47.62–54.05	9.90	−4.00 (−7.41%)

Table 13. Statistical summary of the *Grand Choral* across the three recordings.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1932 recording establishes the only global regime above the metronome marking. Its weighted median is 59.40 ♩/min, corresponding to +5.40 ♩/min, or approximately +10.00%,

relative to ♩ = 54. The weighted mean, 59.70 ♩/min, lies only 0.29 ♩/min above the median, indicating that the global characterisation is only minimally affected by extreme values.

The position of the reference relative to the quartiles is even more revealing. The interquartile range extends from 57.15 to 62.50 ♩/min. Thus, ♩ = 54 lies below Q1. Not only the median, but the entire central half of the distribution is above the prescription. The 1932 realisation should therefore be characterised as structurally faster, rather than as a performance close to the written marking but disturbed by a few accelerated segments.

This global position coexists with a directional trajectory. The decile medians are 63.16, 58.82, 62.50, 59.70, 61.73, 60.60, 59.40, 58.40, 58.26, and 57.97 ♩/min. The first decile contains the highest regional value and the last the lowest. Reductions and recoveries occur between them, but the overall pattern is downward.

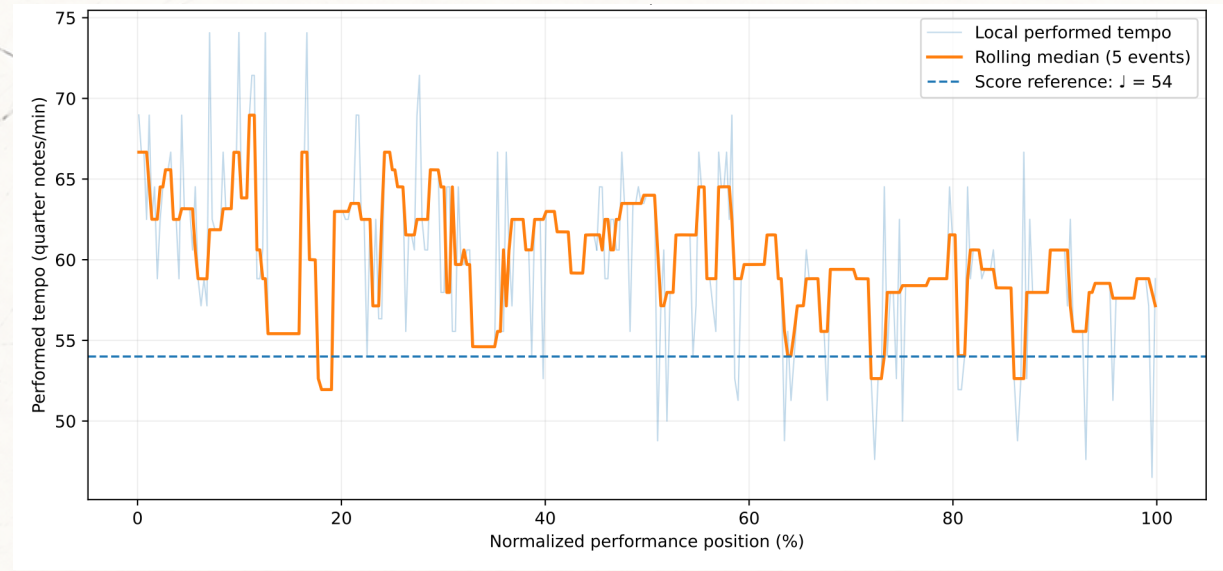
The decline between the first and final deciles is approximately 5.19 ♩/min, precisely the total range between the decile medians. This means that the regional extremes also correspond to the chronological extremes of the performance: the highest level occurs at the beginning and the lowest at the end.

The trajectory is not linear. The fall from the first to the second decile is followed by a recovery in the third. A further reduction occurs in the fourth, again offset by an increase in the fifth. From that point onwards, however, a more consistent decline emerges: 60.60, 59.40, 58.40, 58.26, and 57.97 ♩/min. The downward character becomes progressively clearer during the second half.

The opening region contains sustained values in the approximate range of 62–67 ♩/min, with still higher local peaks. As the performance unfolds, the moving median gradually occupies lower levels, particularly in the second half, although it remains above ♩ = 54 for most of the trajectory. Approaches to, or excursions below, the reference are localised and do not alter the central regime of the recording.

The regional range of 5.19 ♩/min is the smallest of the three realisations. The interquartile width, approximately 5.35 ♩/min, is likewise the smallest. The two measures are almost identical, suggesting that the global distribution and the differentiation between successive regions operate on similar scales of variation.

The 1932 realisation combines two distinct properties: a global regime clearly above the score prescription and a gradual reduction of that regime over the course of the performance. The elevated tempo forms the starting point of a downward trajectory.



Example 43. Temporal profile of the *Grand Choral* in the 1932 recording in relation to the reference ♩ = 54.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording produces a radical transformation in temporal level. Its weighted median is only 44.44 ♩/min, placing it 9.56 ♩/min below the score indication, a difference equivalent to −17.70%. The weighted mean, 44.19 ♩/min, virtually coincides with this centre.

The change relative to 1932 is substantial. The median falls from 59.40 to 44.44 ♩/min, a difference of approximately 14.96 ♩/min, or −25.18% relative to the value of the first recording. This reduction relocates the movement within an entirely different temporal regime.

The interquartile range confirms the magnitude of this displacement. Q1 lies at 40.82 ♩/min and Q3 at 47.62 ♩/min. The reference ♩ = 54 itself remains more than 6 ♩/min above the third quartile. The entire central region of the distribution is therefore separated from the prescription.

The organisation of the deciles shows that the downward direction already observed in 1932 persists despite the global reduction. The values are 48.19, 47.62, 47.62, 43.48, 44.44, 43.01, 41.96, 43.96, 43.39, and 40.82 ♩/min. Once again, the first decile constitutes the maximum and the last the minimum.

The difference between them is 7.38 ♩/min, greater than that observed in 1932. The first three segments remain close to 48 ♩/min. From the fourth onwards, there is a transition to a level predominantly situated between approximately 41 and 44 ♩/min. A partial recovery occurs in the eighth decile within an otherwise persistent downward tendency.

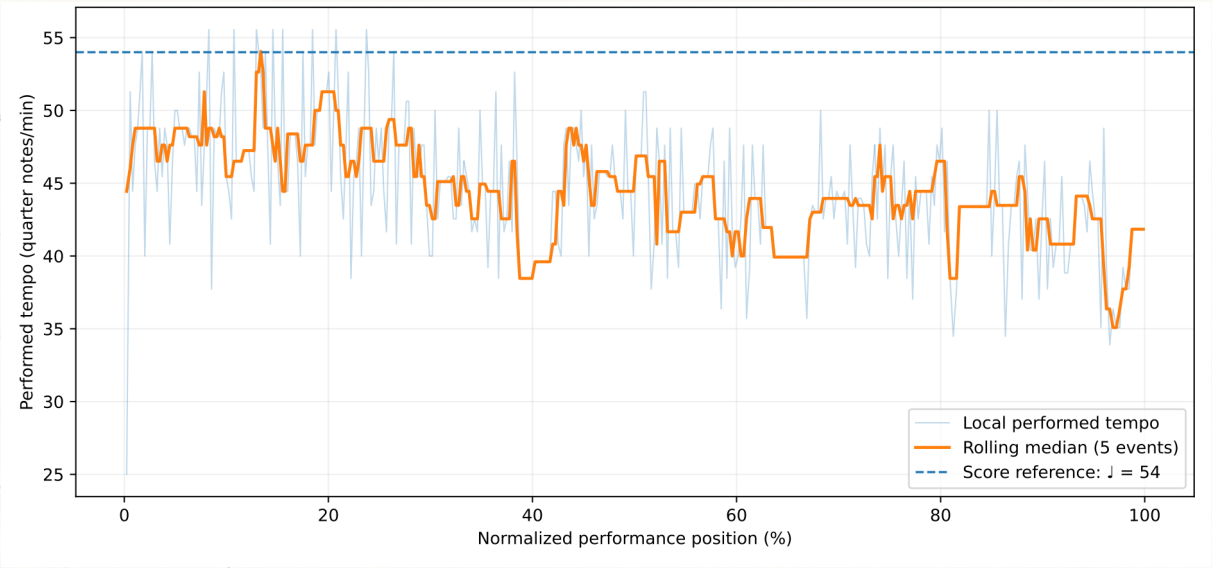
The first third contains numerous segments between approximately 46 and 50 ♩/min, with some isolated rises approaching ♩ = 54. From around 35–40% of the normalised duration onwards,

the profile occupies lower regions more persistently, frequently around 40–45 ♩/min. Near the end, there is a further pronounced depression followed by a partial recovery.

The prescription remains essentially external to the realised regime. Even the fastest passages of the moving median rarely reach ♩ = 54, and none of the decile medians attains this reference. The distance from the score is simultaneously global, distributional, and regional.

The decile median range rises from 5.19 to 7.38 ♩/min, while the interquartile width increases from approximately 5.35 to 6.80 ♩/min. The drastic slowing in 1954 is therefore accompanied by greater differentiation between regions of the performance.

This result shows that the transformation between 1932 and 1954 occurs along two dimensions. The movement becomes substantially slower and, at the same time, more contrasted over the course of its duration. The resulting profile therefore combines a lower global tempo level with greater internal differentiation.



Example 44. Temporal profile of the *Grand Choral* in the 1954 recording in relation to the reference ♩ = 54.
Source: Author's own elaboration based on the results of the computational pipeline.

In 1961, the temporal centre rises again. The weighted median reaches exactly 50.00 ♩/min, while the weighted mean is 50.58 ♩/min. The distance from the score is reduced to −4.00 ♩/min, corresponding to −7.41%. The recording recovers a substantial part of the level lost in 1954 but returns neither to the reference nor to the 1932 regime.

Between 1954 and 1961, the median increases by 5.56 ♩/min, equivalent to +12.50% relative to the 1954 value. Even so, 1961 remains approximately 9.40 ♩/min, or 15.83%, below the 1932 recording. The recovery is therefore only partial.

The interquartile range extends from 47.62 to 54.05 ♩/min. This substantially changes the statistical relationship with the score: ♩ = 54 now lies virtually at the upper boundary of the central region of the distribution. In 1954, it lay entirely above Q3. In 1961, it once again touches the central domain, although it remains far from the median.

This configuration shows why the simple difference between the median and the score is insufficient. The median still lies 7.41% below the reference, but the upper half of the distribution approaches it much more closely. The 1961 regime is internally more heterogeneous in its relationship with the prescription.

The deciles make this heterogeneity particularly clear: 57.14, 52.63, 54.05, 51.95, 50.56, 50.00, 47.24, 48.39, 48.42, and 49.59 ♩/min. The first segment is performed clearly above the score marking, the third virtually coincides with it, and all the remaining segments lie below it.

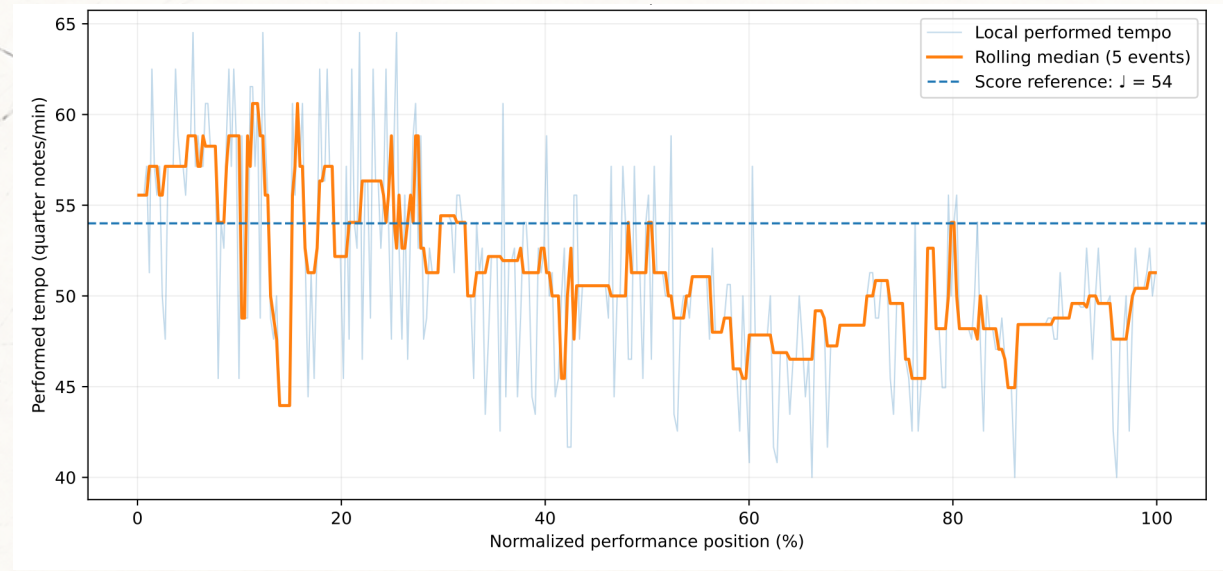
The trajectory can be divided into two broad regions. The opening portion occupies comparatively high levels, with repeated approaches to or crossings of ♩ = 54. From the middle region onwards, a progressive reduction occurs, reaching the regional minimum in the seventh decile at 47.24 ♩/min. The final three segments show a slight recovery, but remain close to 48–50 ♩/min.

The first part is highly mobile, with the moving median frequently between approximately 54 and 59 ♩/min and with several more extreme excursions. From around the midpoint of the normalised duration onwards, the profile becomes concentrated predominantly below ♩ = 54, particularly between 46 and 51 ♩/min, with localised recoveries.

The range between the decile medians reaches 9.90 ♩/min, the largest value among the three recordings. Curiously, the interquartile width, approximately 6.44 ♩/min, is slightly narrower than that of 1954.

The comparatively stable interquartile range indicates that the larger decile range reflects temporal organisation across specific regions rather than a general increase in dispersion. In 1961, this differentiation is particularly evident in the contrast between a faster opening and a slower second half.

In other words, 1961 combines broadly comparable overall dispersion with greater regional differentiation. The temporal ordering of the values therefore becomes especially important for understanding its profile.



Example 45. Temporal profile of the *Grand Choral* in the 1961 recording in relation to the reference ♩ = 54.
Source: Author's own elaboration based on the results of the computational pipeline.

The trajectory of the weighted medians is strongly non-monotonic: 59.40, 44.44, and 50.00 ♩/min. Between 1932 and 1954, there is a reduction of 14.96 ♩/min, equivalent to approximately −25.18%. Between 1954 and 1961, there is a recovery of 5.56 ♩/min, or +12.50%. Even after this recovery, the final level remains approximately 15.83% lower than that of 1932.

The relationship with the prescription also changes radically: +10.00%, −17.70%, and −7.41%. Thus, 1932 establishes a regime unequivocally above ♩ = 54. The 1954 recording shifts into a substantially lower domain, while 1961 moves back towards the reference without reaching it in terms of central tendency.

The position of the reference itself within the distributions is even more informative. In 1932, ♩ = 54 lies below Q1. In 1954, it lies above Q3. In 1961, it virtually coincides with Q3. The written marking therefore occupies three different statistical positions: below the core of the performance, above it, and finally at its upper boundary.

The 1932 curve predominantly occupies the upper domain, while that of 1954 remains in the lower one. The 1961 recording establishes an intermediate region, approaching 1932 only at the beginning and 1954 in several later regions.

There is a feature shared by all three realisations that the global values do not reveal: all display a negative difference between the beginning and the end. The first and final deciles move from 63.16 to 57.97 ♩/min in 1932, from 48.19 to 40.82 in 1954, and from 57.14 to 49.59 in 1961. In absolute terms, these reductions correspond approximately to −5.19, −7.38, and −7.56 ♩/min.

There is an important longitudinal persistence here. Despite the substantial changes in global level, all three recordings share a downward orientation between their opening and closing regions.

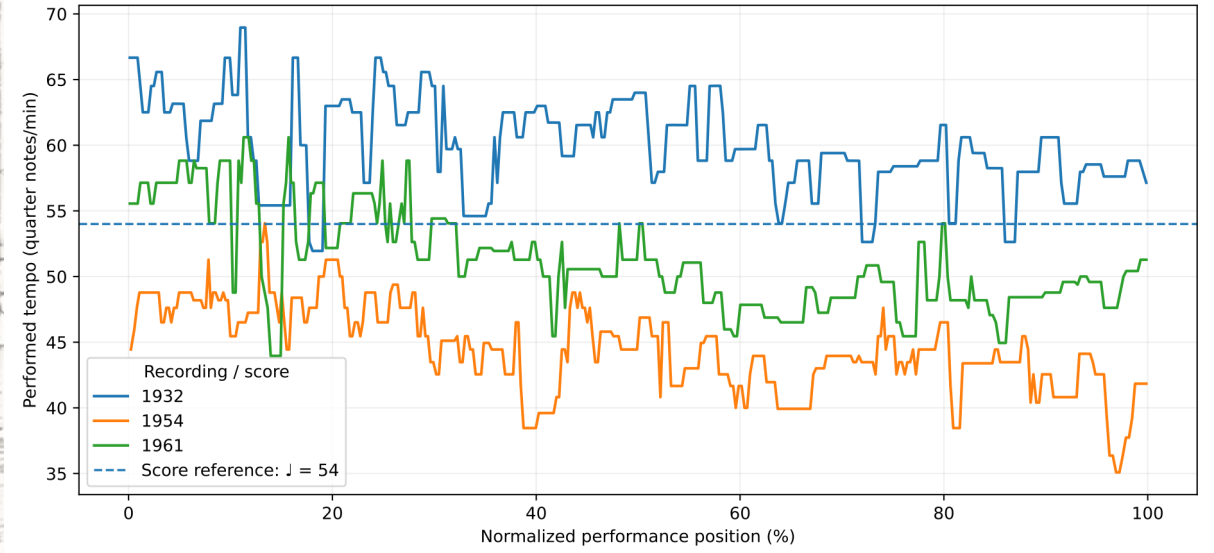
The intensity and organisation of this process nevertheless change. In 1932, the decline occurs within a regime that remains above the score prescription. In 1954, it unfolds entirely below it. In 1961, the trajectory itself crosses the reference: it begins above ♩ = 54 and subsequently moves into a lower regime.

This difference makes 1961 particularly significant. The relationship between performance and score cannot be characterised by a single sign throughout the entire performance. The global value is lower, but the opening is not. The position of the performance relative to the prescription therefore depends on where in the trajectory it is observed. The evolution of the decile median range introduces a second tendency, this time monotonic: 5.19, 7.38, and 9.90 ♩/min.

Unlike movements in which the later recordings became more regionally concentrated, the *Grand Choral* displays a progressive increase in differentiation between temporal regions.

The interquartile widths do not follow the same progression: 5.35, 6.80, and 6.44 ♩/min. Central dispersion increases from 1932 to 1954 but then falls slightly in 1961. The divergence between quartiles and deciles is fundamental: the greater regional differentiation of 1961 reflects the temporal ordering of distinct levels over the course of the performance rather than a general expansion of the distribution.

This makes it possible to distinguish two properties. The first is the overall amount of variability. The second is the way in which that variability is organised in time. The *Grand Choral* shows that a performance may display a central distribution relatively comparable to that of another while nevertheless possessing a much more differentiated longitudinal structure.



Example 46. Comparison of the temporal profiles of the *Grand Choral* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 54.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Grand Choral* presents a clear dissociation between temporal level, dispersion, and directionality. The global level follows the trajectory 59.40, 44.44, and 50.00 ♩/min, without a single longitudinal direction. Regional differentiation, by contrast, increases successively. At the same time, all three recordings preserve a common asymmetry: the opening occupies a higher regime than the ending.

In 1932, the performance under Stravinsky's direction establishes a relatively fast and still comparatively concentrated musical realisation. In 1954, the temporal centre shifts into a much slower domain and the differentiation between regions increases. In 1961, part of the speed is recovered, but the regional organisation of the trajectory becomes even more pronounced, particularly through the opposition between an opening close to or above the prescription and a second half predominantly below it.

The longitudinal transformation cannot be understood as a mere change of tempo. The central value fluctuates, but one formal characteristic persists and becomes increasingly pronounced: the differentiation between a faster opening and slower later regions. At the same time, the increasing decile median range shows that this asymmetry becomes more structurally marked across the three recordings.

The *Grand Choral* therefore provides a case that clearly distinguishes between what is the tempo of the performance? and how is that tempo organised over the course of the performance? The first question produces three very different global values. The second reveals a directional continuity extending across the three decades, together with an increasingly articulated internal organisation of that direction. It is precisely in this difference between value and trajectory that its interpretative temporality emerges.

4.9 *Marche triomphale du Diable*

The *Marche triomphale du Diable* closes the corpus with a temporal configuration that is particularly useful for distinguishing metronomic proximity, global displacement, and regional stability. The score establishes ♩ = 112. In 1932, the weighted median virtually coincides with this reference. In 1954, the realisation shifts markedly into a higher regime. In 1961, there is a reduction relative to 1954, but the temporal centre remains clearly above both the prescription and the first recording. The longitudinal trajectory is therefore non-monotonic at the global level, while still preserving an unequivocal separation between 1932 and the two later realisations.

More importantly, comparison of the descriptors reveals distinct relationships between tempo level and stability across the three recordings. The 1954 recording presents both the highest tempo and the largest range between decile medians, whereas 1961, although still substantially

faster than 1932, establishes the most regionally concentrated profile. Table 14 summarises these relationships.

RECORDING	WEIGHTED MEDIAN (♩/MIN)	WEIGHTED MEAN (♩/MIN)	Q1–Q3 (♩/MIN)	DECILE MEDIAN RANGE	DIFFERENCE FROM ♩ = 112
1932	111.11	110.80	107.14–114.29	6.88	−0.89 (−0.79%)
1954	130.43	130.39	127.66–133.33	8.33	+18.43 (+16.46%)
1961	120.00	120.58	117.65–125.00	5.00	+8.00 (+7.14%)

Table 14. Statistical summary of the *Marche triomphale du Diable* across the three recordings.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1932 recording presents the closest relationship to the metronome marking among the three performances. Its weighted median is 111.11 ♩/min, only 0.89 ♩/min below ♩ = 112, a difference of approximately −0.79%. The weighted mean, 110.80 ♩/min, is similarly close to the written reference. The agreement between the two measures indicates that this central tendency is broadly representative of the distribution.

This proximity becomes even clearer when the interquartile range, from 107.14 to 114.29 ♩/min, is considered. The reference ♩ = 112 itself lies within this region. In this case, the written value falls genuinely within the central half of the realised *tempi*, rather than merely lying close to a distribution concentrated on one side of the reference.

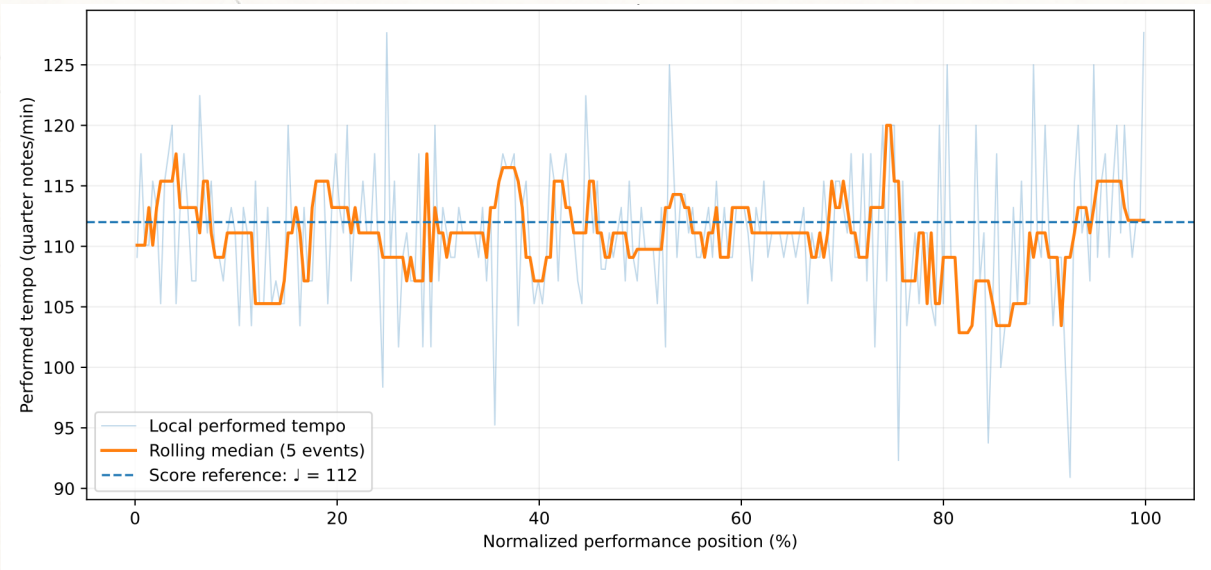
The performance nevertheless retains local variation around this central level (♩ = 112). The decile medians are 111.11, 107.14, 111.11, 111.11, 111.11, 111.11, 111.11, 111.11, 105.27, and 112.15 ♩/min. The sequence reveals an exceptional concentration around 111 ♩/min, interrupted primarily by two slower regions: the second decile and, more markedly, the ninth.

The regional range of 6.88 ♩/min results essentially from this late depression. Outside it, much of the performance remains gathered within a relatively narrow domain immediately adjacent to the reference. The first and final deciles differ by only about 1.04 ♩/min, which rules out any strong longitudinal tendency between the two extremities.

The moving median repeatedly oscillates around ♩ = 112 through much of the performance, with brief rises to approximately 115–120 ♩/min and reductions to around 105–110. The slowest region is concentrated mainly between approximately 80% and 90% of the normalised duration. After this point, the profile recovers and ends once again close to the reference.

The value of 111.11 ♩/min accurately represents the tempo level that dominates much of the performance. Local variations remain limited in persistence and leave the temporal centre largely unchanged.

In 1932, the proximity of the performance to the written indication operates on two simultaneous scales: in the central tendency and in the position of the reference within the distribution. Among the movements examined, this is one of the clearest cases in which the metronome marking closely corresponds to the regime realised.



Example 47. Temporal profile of the *Marche triomphale du Diable* in the 1932 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1954 recording breaks unequivocally with the configuration of the previous recording. Its weighted median rises to 130.43 ♩/min, while the weighted mean is virtually identical at 130.39 ♩/min. The difference from the score reaches +18.43 ♩/min, equivalent to +16.46%.

Relative to 1932, the change is 19.32 ♩/min, corresponding to approximately +17.39% in relation to the level of the first recording. The magnitude of this difference greatly exceeds the regional dispersion of either performance or indicates a genuine change of regime rather than a merely localised alteration.

The interquartile range of 127.66 to 133.33 ♩/min lies entirely above the score indication. Q1 alone already exceeds ♩ = 112 by more than 15 ♩/min. The written reference therefore lies well below the central region of the distribution and the predominant tempo level.

The deciles are 133.33, 130.43, 130.43, 133.33, 130.43, 127.66, 130.43, 127.66, 125.00, and 133.33 ♩/min. The performance begins at a high level, alternates mainly between approximately 128 and 133 ♩/min and reaches its slowest region in the ninth decile. The tenth fully recovers the opening value.

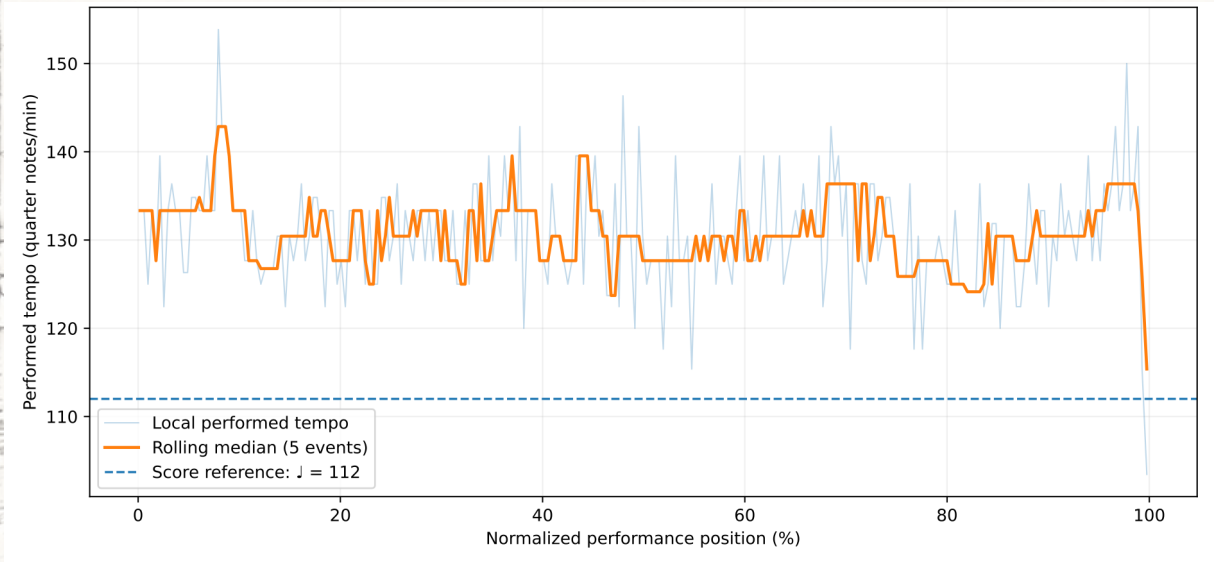
This sequence produces a structure different from that observed in 1932. It establishes a relatively persistent higher tempo regime, characterised by limited proximity to the written reference, a late reduction, and subsequent recovery.

For much of the performance, the moving median remains approximately between 127 and 136 ♩/min, with some still higher peaks. The region between about 75% and 90% of the normalised duration contains comparatively lower values, close to 124–128 ♩/min, before the rise that characterises most of the final decile.

Very close to the end of the performance, the graph shows an abrupt fall in the moving median, reflecting the final detected intervals. This behaviour should be distinguished from the organisation of the tenth decile, whose median remains at 133.33 ♩/min. It is a highly localised terminal event, insufficient to justify characterising the entire final region as decelerated. Without specific alignment to the score, it would not be methodologically appropriate to assign it greater formal significance.

The range between the decile medians is 8.33 ♩/min, the largest of the three recordings. The interquartile width, however, is only 5.67 ♩/min, narrower than in 1932. This combination is particularly informative: the central distribution is relatively concentrated, yet certain chronologically defined regions — especially the ninth decile — depart sufficiently from the predominant regime to increase regional differentiation.

There is therefore a dissociation between global dispersion and longitudinal differentiation. The 1954 recording combines a relatively concentrated global distribution with specific regions organised at distinct levels within an elevated tempo regime.



Example 48. Temporal profile of the *Marche triomphale du Diable* in the 1954 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The 1961 recording establishes a third regime. Its weighted median is 120.00 ♩/min, while the weighted mean reaches 120.58 ♩/min. The global level falls substantially relative to 1954, but remains 8 ♩/min above the score, corresponding to a difference of +7.14%.

Between 1954 and 1961, the median decreases by approximately 10.43 ♩/min, or 8.00% relative to the 1954 value. Compared with 1932, however, 1961 remains 8.89 ♩/min faster, an increase likewise close to 8.00%. The final musical performance therefore lies quantitatively between the two earlier recordings, although not exactly halfway between them.

The interquartile range, from 117.65 to 125.00 ♩/min, remains entirely above ♩ = 112. In this respect, its statistical relationship with the score is more similar to 1954 than to 1932: in both later recordings, the reference lies outside the central half of the distribution.

The fundamental difference lies in regional stability. The deciles are 120, 120, 122.45, 122.45, 120, 120, 122.45, 120, 120, and 125.00 ♩/min. The entire trajectory is contained within a range of only 5 ♩/min, the smallest of the three recordings.

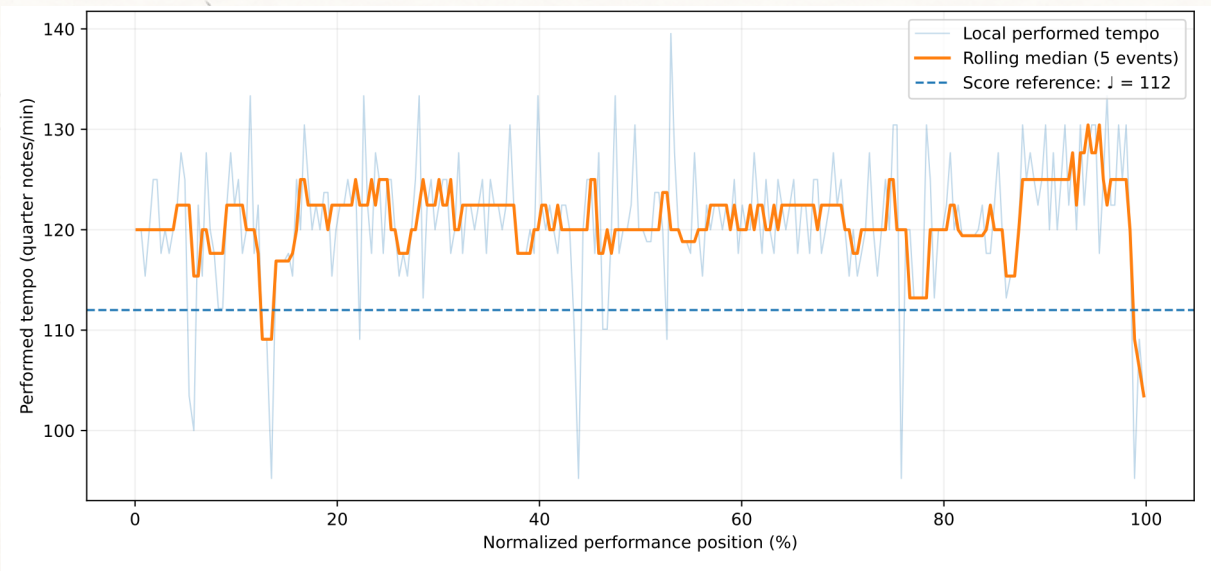
The concentration is striking. Nine of the ten deciles lie between 120 and approximately 122.45 ♩/min, with only the final decile reaching 125. The performance contains no extended region approaching ♩ = 112. Its positive displacement from the score is therefore sustained with a high degree of continuity.

The individual graph shows this regional stability alongside considerable local mobility. The moving median oscillates mainly between approximately 118 and 125 ♩/min, with brief depressions — one of them close to or slightly below the reference — and more pronounced rises towards the end, reaching approximately 128–130 ♩/min.

As in 1954, there is a very abrupt decline in the final moments of the curve. The regional data show, however, that the tenth decile has precisely the highest median of the recording, 125 ♩/min. The extreme reduction is confined to a very small portion of the ending, while the final segment as a whole follows a different pattern. This distinction is essential for separating a local edge effect from a structural characteristic of the performance.

The interquartile width is approximately 7.35 ♩/min, slightly greater than in 1954, while the decile median range falls to only 5 ♩/min. Once again, the two scales diverge: local values display considerable dispersion, whereas temporally extended regions remain highly similar to one another.

The 1961 recording therefore establishes the most regionally stable regime of the three performances. This stability is sustained around a tempo level approximately 7% above the prescription.



Example 49. Temporal profile of the *Marche triomphale du Diable* in the 1961 recording in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The trajectory of the weighted medians is clearly non-monotonic: 111.11, 130.43, and 120.00 ♩/min. Between 1932 and 1954, there is an increase of approximately 19.32 ♩/min, equivalent to 17.39%. Between 1954 and 1961, the value falls by 10.43 ♩/min, or 8.00%. Considering the chronological extremes of the corpus, 1961 remains 8.89 ♩/min, also approximately 8.00%, above 1932.

The relationship with the score changes from −0.79% to +16.46% and then to +7.14%. The shift between 1932 and 1954 is qualitatively more significant than a change of only a few percentage points might suggest. The reference moves from being inside the interquartile range to lying entirely below it. This condition persists in 1961.

The central intervals express this transformation clearly: 107.14–114.29 ♩/min in 1932, 127.66–133.33 ♩/min in 1954, and 117.65–125.00 ♩/min in 1961. There is no overlap between the interquartile ranges of 1932 and 1954. The 1961 recording establishes a third region, lower than that of 1954 but still largely separated from the central core of 1932.

The 1932 curve remains predominantly close to the reference of ♩ = 112. The 1954 recording occupies the upper stratum for almost the entire performance, frequently between 125 and 136

♩/min, while 1961 establishes an intermediate domain centred approximately around 120–125 ♩/min.

This organisation remains remarkably persistent across much of the normalised duration. Unlike cases in which the curves repeatedly crossed one another, here there is a relatively clear separation between the three regimes. The 1954 profile remains above that of 1961 for almost the entire trajectory, while 1961 in turn remains above 1932 for much of it.

The longitudinal transformation involves changes in both tempo level and regional differentiation. The decile median ranges are 6.88, 8.33, and 5 ♩/min.

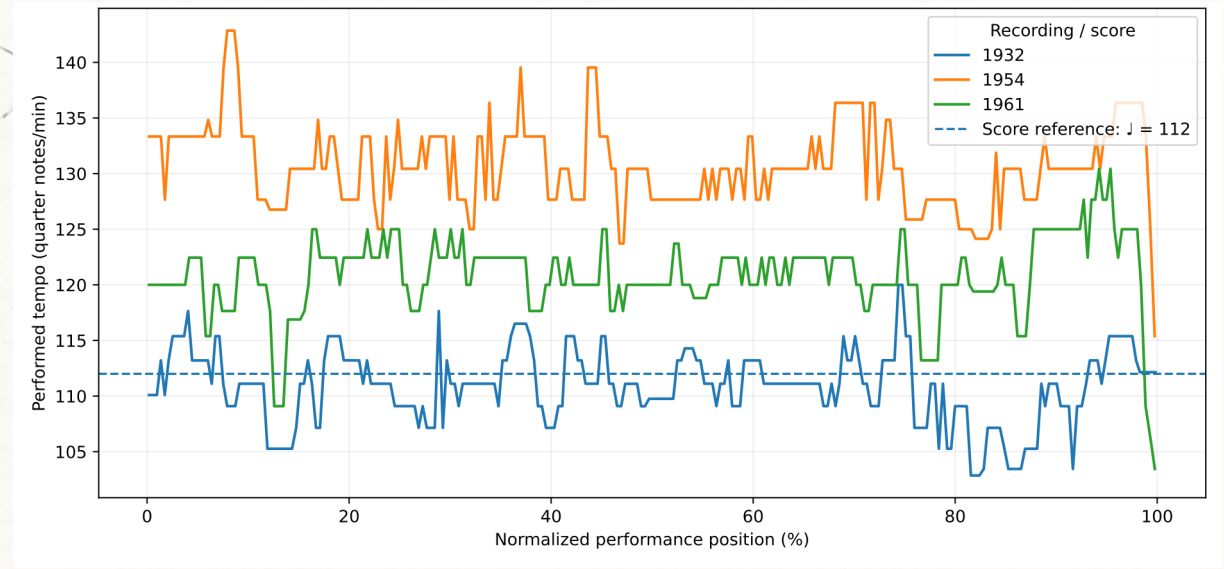
The 1954 recording displays the greatest regional differentiation, whereas 1961 establishes the smallest. Global tempo level and internal stability therefore follow distinct trajectories: speed reaches its maximum in 1954 and then falls in 1961. Regional differentiation also increases in 1954, but subsequently contracts to a level below that of 1932.

The interquartile widths present a different configuration: 7.15, 5.67, and 7.35 ♩/min. The 1954 recording has the narrowest central distribution despite exhibiting the largest decile median range. In 1961, the relative pattern is reversed: local dispersion is somewhat greater, while successive regions are more similar to one another.

The divergence between these two indicators again demonstrates that dispersion and temporal differentiation are not synonymous. The interquartile range indicates how widely the values are spread, regardless of when they occur. The decile median range indicates the extent to which different portions of the performance establish distinct temporal levels. In the *Marche triomphale du Diable*, these two dimensions follow partially independent trajectories.

There is also a difference in directionality. In 1932, the first and final deciles are virtually equivalent, with a slight rise at the end. In 1954, they likewise coincide at 133.33 ♩/min, despite the late depression. In 1961, the final decile rises to 125 ♩/min, five units above the first. None of the three recordings therefore displays a sustained overall downward tendency between the two extremities.

This characteristic distinguishes the *Marche triomphale du Diable* from the *Grand Choral*, in which the opposition between a faster opening and a slower ending persisted across all three recordings. The principal differentiating factor lies in the tempo level around which each performance organises its oscillations.



Example 50. Comparison of the temporal profiles of the *Marche triomphale du Diable* in the 1932, 1954, and 1961 recordings in relation to the reference ♩ = 112.
Source: Author's own elaboration based on the results of the computational pipeline.

The *Marche triomphale du Diable* brings the movement-by-movement analysis to a close with three clearly differentiated temporal conceptions. In 1932, the performance under Stravinsky's direction remains very close to the written indication and organises much of the performance around that value. In 1954, the movement shifts to a regime approximately 16% above the prescription, retaining a relatively concentrated centre but with more pronounced differentiation between certain regions. In 1961, this level is substantially reduced without returning to the 1932 conception, while establishing the greatest regional stability of the three recordings.

The longitudinal relationship cannot be described as a progressive convergence towards the score. The earliest recording is precisely the one that lies closest to the metronome marking. The two later recordings establish their own regimes above it. Nor can the trajectory be reduced to a simple historical acceleration: the maximum occurs in 1954 and is partially reversed in 1961.

The central result lies in the independence between proximity to the prescription, global level, and internal stability. These dimensions combine differently across the three recordings: the performance closest to the score differs from the most regionally stable, while the fastest recording presents a comparatively concentrated central distribution. The 1961 performance, which displays the greatest regional stability, remains clearly above the written marking. The *Marche triomphale du Diable* thus reinforces a conclusion that emerges progressively throughout the chapter: metronomic tempo is only one dimension of realised temporality. The interpretative profile results from the interaction among the position of the temporal centre, the dispersion of values, and the way different regions organise that variation over time.



5 Stravinsky's Tempo: Persistence and Transformation



The preceding analyses have shown that the relationship between score and performance encompasses more than the proximity between a measured value and a metronome marking. In each movement, the 1932, 1954, and 1961 recordings reveal distinct ways of distributing tempo, stabilising regions, producing inflections, and organising internal differences. These processes produce distinct temporal configurations that can be compared historically across the three recordings.

This shift of scale is decisive. Each performance has been examined in terms of its internal organisation, preserving the particularities of each movement and preventing a global value from standing in for the trajectory realised. From this point onwards, the question is what happens when those trajectories are brought into relation with one another. The analysis therefore turns to the nature of these differences: where they are concentrated, which behaviours recur, and which relationships are reorganised across the twenty-nine years separating the first recording from the last.

This comparison also makes it possible to return to the problem that has underpinned the argument developed thus far. The precision advocated by Stravinsky established a horizon of determination for performance, yet his own performances demonstrate that sonic realisation can acquire different temporal forms in sound. The authority of the score remains intact, while divergence becomes analytically significant as a historically situated form of temporal production whose interpretative implications must be established in each case. The persistence of a musical conception can therefore coexist with different ways of producing it in time. Metronomic proximity, internal stability, and historical continuity must accordingly be examined as related but distinct dimensions.

Longitudinal comparison also requires the avoidance of a teleological reading. The sequence 1932–1954–1961 does not constitute a trajectory of improvement, increasing distance from the score, or progressive convergence towards it. A later configuration may recover relationships present earlier, abandon others, or produce new forms of balance. Transformation can be recognised only when difference ceases to be episodic and begins to reveal a consistent reconfiguration of temporal relationships.

The movement-by-movement results now acquire a collective significance. What, ultimately, persists and what is transformed in the time realised by Stravinsky between 1932 and 1961?

5.1 Persistence and Difference

A cross-sectional reading of the eleven segments offers a first answer to the problem posed at the beginning of this chapter: the three recordings follow multiple temporal trajectories. These

trajectories combine continuities in certain patterns of organisation with substantial changes in tempo level, dispersion, and the internal distribution of *tempi*. Continuity emerges through recurring relationships and patterns as well as through values, while difference encompasses both shifts in central tendency and changes in temporal organisation.

Table 15 condenses the most relevant results of Chapter 4 by making visible, at a cross-sectional scale, both the recurring relationships and the features that distinguish the three moments.

MOVEMENT	PRESCRIBED REFERENCE	WEIGHTED MEDIAN 1932 - 1954 - 1961	PERSISTENCE OR RECURRENCE	PRINCIPAL DIFFERENCE
MARCHE DU SOLDAT	♩ = 112	108.11 → 122.45 → 117.65	Organisation into temporally recognisable regions	1954 establishes the highest level; 1961 occupies an intermediate position, with a central reduction followed by recovery
LE VIOLON DU SOLDAT	♩ = 100	88.24 → 92.30 → 101.69	Relatively concentrated centre in each recording	Continuous longitudinal increase; only 1961 fully incorporates the prescribed reference
PASTORALE	♩ = 48	60.00 → 100.00 → 71.72	All three recordings remain above the prescription	1954 establishes an exceptionally high regime; 1961 reduces this level without returning to that of 1932
MARCHE ROYALE	♩ = 112	109.09 → 115.95 → 117.65	Regional organisation becomes progressively more concentrated	Increase in global level; 1932 displays greater differentiation and a downward tendency
PETIT CONCERT	♩ = 120	113.20 → 133.33 → 117.65	Central depression followed by recovery	1954 shifts the entire movement into a much higher regime; regional differentiation subsequently decreases
TANGO	♩ = 80	70.59 → 73.17 → 76.92	All three recordings remain below the prescription, with similar internal ranges	Progressive convergence towards the metronome marking
VALSE	♩ = 184–192	181.81 → 176.47 → 181.82	1932 and 1961 have virtually the same global centre	1954 is slower; 1961 recovers the 1932 level with substantially less dispersion
RAGTIME	♪ = 184–192	162.15 → 171.43 → 171.43	1954 and 1961 share virtually the same centre	1932 is slower and downward-directed; 1961 preserves the 1954 centre but reorganises the internal distribution
DANSE DU DIABLE	♩ = 138	127.65 → 146.34 → 132.16	Final regions remain lower than the opening ones, although this difference decreases	1954 reaches the highest level; regional stability progressively increases
GRAND CHORAL	♩ = 54	59.40 → 44.44 → 50.00	In all three recordings, the opening region is faster than the later ones	The relationship to the score reverses: 1932 lies above it, 1954 below it, and 1961 shows a partial recovery
MARCHE TRIOMPHALE DU DIABLE	♩ = 112	111.11 → 130.43 → 120.00	Each recording establishes a relatively well-defined global regime	1954 reaches the maximum; 1961 reduces the level and displays the greatest regional stability

Table 15. Summary of temporal persistence and differences across the 1932, 1954, and 1961 recordings.
Source: Author's own elaboration based on the results and temporal profiles presented in Chapter 4.

The heterogeneity of these relationships becomes even more apparent when the realised values are converted from absolute BPM to relative distances from their corresponding metronome markings. This normalisation makes it possible to compare, on a common scale, movements whose prescribed values differ substantially in magnitude.



Example 51. Relative deviation of the weighted median realised tempo from the prescribed reference in the 1932, 1954, and 1961 recordings of *L'Histoire du Soldat*.
Source: Author's own elaboration based on the weighted median tempi calculated from the performance data and the metronome markings in Stravinsky and Ramuz (1987), Chester edition.

The distribution reveals a heterogeneous historical trajectory marked by areas of persistence, reversals, and movement-specific shifts. The relationship between prescription and realisation therefore develops differently in each movement.

The first point made clear by this synthesis is that persistence can reside in temporal relationships even when absolute tempo changes. In the *Petit concert*, for example, the central depression followed by recovery remains recognisable even when the 1954 recording shifts the entire movement to a considerably higher level. Something similar occurs, in different forms, in the *Danse du Diable* and the *Grand Choral*: certain relationships between regions persist while the global tempo changes. Temporal identity may therefore be grounded in the relationships between parts and their organisation over time.

This finding returns to the distinction established in the first chapter. For Kramer (1988), musical time emerges from the relationships produced as the music itself unfolds. Hasty (1997) takes this condition further by understanding temporal organisation as a process, something

constituted as it happens and whose nature is partly lost when reduced to a static result. The evidence produced by the temporal analysis gives empirical expression to this distinction. A movement may change its overall level without losing its internal relationships, just as it may preserve virtually the same level while reorganising the way in which that time is distributed.

The *Valse* and *Ragtime* make this perspective particularly clear. In the former, 1932 and 1961 have virtually identical medians, yet the later recording concentrates its realisation within a much narrower range. *Ragtime* presents another form of equivalence: 1954 and 1961 share the same global centre, while 1961 reorganises the longitudinal distribution, intensifying certain higher regions and reducing the decile median range. Equivalent central values can coexist with distinct temporal identities. The median indicates where a performance tends to organise itself, while its internal trajectory reveals how that temporal space is traversed.

This is precisely why the normalisation procedures and measures adopted in Chapter 3 were retained at complementary analytical levels. The computational procedure made it possible to compare corresponding positions across the three recordings without requiring them to have the same duration. Sonic Visualiser, designed for audio visualisation, analysis, and annotation (Cannam et al., 2010), provided the infrastructure for data extraction, but the comparison does not end with the production of numerical series. The profiles recover position and direction, while medians, quartiles, and deciles make it possible to assess whether a localised difference corresponds to a broader transformation. In this sense, Rink's (2024) warning remains central: measurement acquires analytical meaning when it is returned to the musical process that made it measurable.

Comparison across the three years also rules out any simple narrative of historical acceleration. 1954 frequently occupies extreme positions, but not always in the same direction. It is the fastest recording in the *Marche du Soldat*, *Pastorale*, *Petit concert*, *Danse du Diable*, and *Marche triomphale du Diable*, whereas in the *Valse* and *Grand Choral* it establishes the lowest level. In *Le Violon du Soldat*, *Marche royale*, and *Tango*, by contrast, the upward shift continues into 1961. The 1954 recording therefore represents a phase of intensified differentiation among movements, producing temporal regimes that are more widely separated from one another.

Nor can 1961 be interpreted as a return to the initial conception. In several segments — *Marche du Soldat*, *Pastorale*, *Danse du Diable*, and *Marche triomphale du Diable* — it occupies a global position intermediate between 1932 and 1954. This intermediate position is frequently accompanied by a different internal organisation. In the *Marche triomphale*, for example, the reduction relative to 1954 coincides with the greatest degree of regional stability among the three recordings. In the *Valse*, the global value virtually returns to that of 1932, while the dispersion

remains distinct. The recovery of an earlier tempo therefore coexists with a different pattern of temporal organisation.

Across the three recordings, movement-specific relationships to the score persist over time. The *Pastorale* remains above the reference in all three recordings, while the *Tango* remains below it. In other movements, the relative position changes. *Le Violon du Soldat* gradually approaches the prescription until reaching it in 1961, whereas the *Grand Choral* crosses the reference in the opposite direction: it begins above it in 1932, shifts below it in 1954, and recovers only part of that distance in 1961. Metronomic proximity and historical continuity are different analytical problems.

This result complicates the familiar tension between Stravinsky's discourse on performance and his own practice. Cook (2003) has already shown, in *Le Sacre du printemps*, that performances conducted by the composer introduce changes of tempo, pauses absent from the notation, and reorganisations that extend beyond literal reproduction of the score. The present analysis confirms this distance while revealing a more complex relationship between Stravinsky's stated principles and his practice as a conductor. The recurrence of contours, the preservation of relationships between regions, and the existence of different degrees of stability indicate that divergence from prescription can coexist with consistent forms of temporal organisation.

At this point, Cook's (2013) understanding of performance as a form of musical production becomes particularly clear. The three recordings give distinct temporal form to relationships delimited by the score. Stravinsky's prescriptions remain central to this process: the metronome marking provides a reference, while performance determines how that reference participates in a concrete temporal organisation.

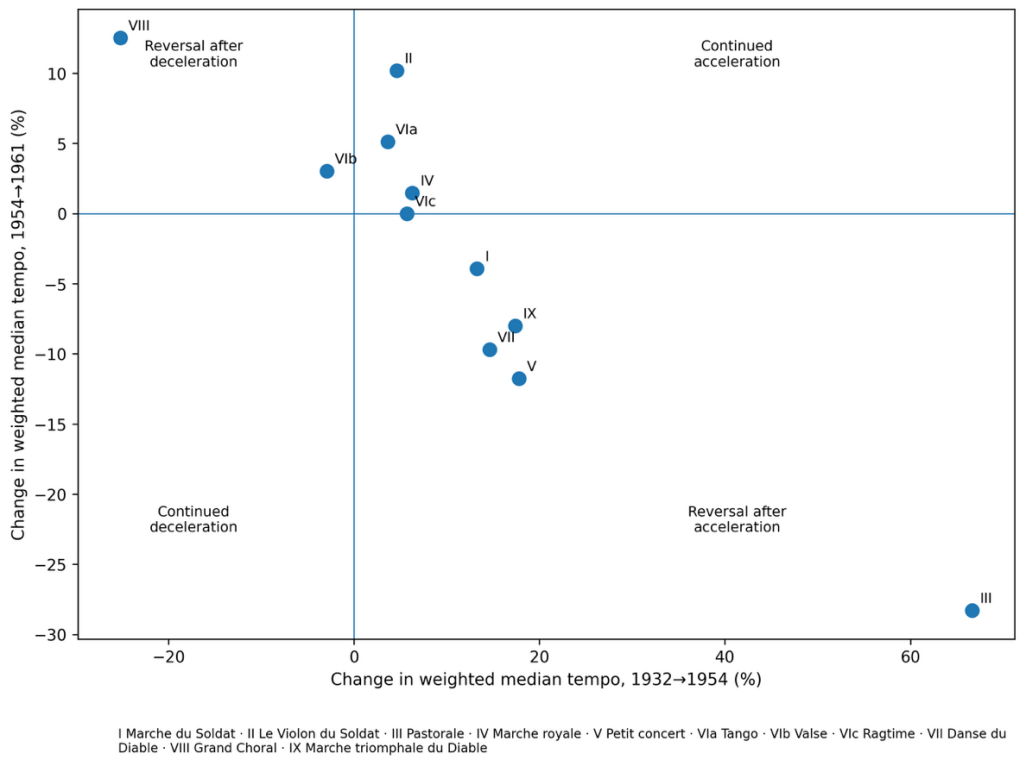
Taken together, the results lead to a decisive distinction. Across 1932, 1954, and 1961, persistence is expressed through continuities of direction, proportion, and regional organisation, while transformation appears in global tempo shifts, changes in dispersion, and internal redistributions. It is within this coexistence that difference ceases to be merely variation between recordings and gives rise to the next question: under what conditions can these changes be understood as temporal transformation?

5.2 Trajectories of Transformation

If the previous section made it possible to distinguish what persists from what differs, the historical question requires a further step: examining the direction taken by the differences from one recording to the next. A transformation becomes historically significant through the sequence of relationships linking the three recordings: what 1954 changes relative to 1932 and how 1961 subsequently reshapes the configuration established in 1954. Interpretative history thus ceases to

be a measure of distance between two endpoints and becomes a sequence of shifts, continuities, and reversals.

To make this direction immediately visible, Example 52 deliberately sets aside the score's metronome marking and instead takes each preceding recording as the point of comparison for the next. The horizontal axis represents the percentage change in the weighted median between 1932 and 1954, while the vertical axis represents the change between 1954 and 1961. The origin indicates no change in median tempo. Matching signs on the two axes indicate directional continuity, whereas opposite signs indicate reversal. Because the chronological intervals are unequal — twenty-two years between the first two recordings and seven between the latter two — the values represent relative changes between recordings, not annual rates of transformation.



Example 52. Historical direction of change in weighted median tempo across the 1932, 1954, and 1961 recordings of *L'Histoire du Soldat*.
Source: Author's own elaboration based on the weighted median tempi calculated from the performance data.

The distribution shown in Example 52 is particularly revealing. Seven of the eleven movements change direction between the two historical intervals. Five occupy the quadrant corresponding to acceleration between 1932 and 1954 followed by deceleration between 1954 and 1961, while two follow the opposite path. Only three maintain an upward direction across both intervals, whereas *Ragtime* accelerates in the first and preserves virtually the same centre in 1961. Sustained directionality is therefore limited to these upward trajectories; across the remaining movements, inflection predominates over continuation.

This result changes the very notion of transformation employed here. Reversal and restoration are distinct processes. A later recording may recover a tempo level close to that of an earlier one while organising that tempo differently over the course of the performance. Conversely, two performances may have widely separated centres while preserving similar internal relationships. It is therefore necessary to distinguish between a shift in tempo level and a reconfiguration of temporal organisation.

Example 52 intentionally represents only the first of these dimensions. This limitation functions as a control on the reading of the profiles developed in the previous chapter. When a difference between two recordings can be explained primarily by the displacement of their medians, we are dealing predominantly with a change of level. When similar central values coexist with distinct contours, dispersions, or internal directions, the transformation lies in the temporal distribution itself. Historical change can therefore occur without any pronounced global acceleration or deceleration.

This distinction is supported by the relational conception of temporal experience discussed by Rodemeyer (2006). An event acquires temporal meaning through its present magnitude, its relationship with what precedes it, and the conditions it creates for what follows. An event acquires temporal meaning through its present magnitude, its relationship with what precedes it, and the conditions it creates for what follows. London (2004), in understanding metrical attention as a process of synchronisation and anticipation, leads to the same consequence by another route: temporally similar positions may fulfil different functions when they emerge from different trajectories. In this sense, a value of 120 beats per minute acquires a different temporal significance depending on whether it occurs within a stable region, an acceleration, or a recovery following deceleration.

It is also at this point that Adorno's (1974) critique acquires a use distinct from that of a simple judgement on Stravinsky. His opposition between modes of temporal organisation draws attention to the distinction between controlling temporal units and shaping the experience of succession as a whole. The present results render this problem empirically visible without serving as a direct confirmation of his aesthetic interpretation: precision and transformation can coexist within the same temporal organisation. A performance may retain a high degree of metrical definition while still reorganising direction, stability, and proportion between regions.

This conclusion is also relevant in relation to Stravinsky's own conception of time. Stravinsky associates tempo with the unit of pulse and with the character of the material, refusing to treat it as something wholly external to musical conception. From this perspective, altering tempo may change the way in which internal relationships become audible. The three recordings show,

however, that the constitutive importance of temporal prescription is compatible with multiple legitimate forms of performance. The force of temporal prescription in the score may persist even as its historical concretisation changes.

An essential interpretative limit must nevertheless be maintained. These trajectories belong to the configurations preserved in the recordings and do not, in themselves, justify a psychological narrative about changes in Stravinsky's intentions. Johnson (2002) reminds us that a recording documents a specific realisation without being identical with the work or constituting a definitive version of it. Studio conditions, editing, and production also form part of the preserved object. To speak of transformation, therefore, is to state that the recorded temporal relationships change historically in observable ways, not to attribute every difference to a conscious and isolated decision by the composer.

Taken together, the evidence points towards an interpretative history shaped less by progression than by reorganisation. Between 1932, 1954, and 1961, the trajectories follow multiple directions: some continue, others reverse, compensate for earlier displacements, or stabilise at new levels. Historical change encompasses both the tempo at which Stravinsky performs *L'Histoire du Soldat* and the function that tempo assumes within each temporal trajectory.

5.3 Between Prescription and Realisation

The comparison between score and performance now makes it possible to define more precisely the status of metronome markings within the problem under investigation. The results confirm their prescriptive function while showing that the temporal event emerges through the interaction between prescription and the conditions of performance. The metronome marking fixes a reference relationship. Performance produces the concrete conditions under which that relationship comes to operate. The decisive point lies in distinguishing prescriptive authority from prescriptive sufficiency: notation may exert substantial authority while still leaving aspects of temporal organisation to be determined in performance.

This distinction changes the analytical meaning of agreement with the metronome. Numerical proximity to the indicated value and fidelity of temporal organisation are distinct dimensions, just as greater numerical distance may coexist with a highly structured interpretative approach. The 1932 *Marche du Soldat*, for example, lies globally very close to the prescribed reference, whereas the 1954 *Pastorale* displays an exceptionally large departure from it. The analytical interest of these cases lies in how each performance organises its relationship to the prescription. In both, the central value indicates only where the realisation is positioned in relation to the prescription. On its own, the central value locates the performance relative to the prescribed tempo.

A fuller account requires attention to how that tempo is distributed, where it changes, and what relationships emerge between different regions. Metronomic correspondence therefore constitutes one dimension of temporal organisation within performance.

This conclusion is important because the *corpus* consists of performances conducted by the composer himself. In other circumstances, differences between prescription and realisation might be attributed to the distance between authorial intention and interpretative decision. Here, that explanation loses some of its force: the agent who established the written reference also participates in producing the configurations that diverge from it. The most consequential empirical finding, therefore, is that Stravinsky's continuing authorial authority coexists with distinct temporal identities across his performances.

This finding prevents the composer's performance from being elevated, without critical mediation, to the status of a sounding score. Joseph (2001) has demonstrated the importance Stravinsky attached to his own recordings as references for other performers, even directing them to specific recordings when he wished to indicate how particular tempi should be realised. The corpus examined here introduces a difficulty into that normative gesture: when several authorial recordings exist and they do not coincide temporally, which of them could function as the definitive realisation of intention? The very plurality of the documentary record makes the idea of a single sonic equivalent of the prescription untenable.

This perspective still permits distinctions among performances and preserves the analytical relevance of the composer's intention. What changes is the kind of authority that can be attributed to that intention. Kivy (1995), in questioning the possibility of a comprehensive and unitary musical authenticity, offers a productive parallel for this problem. In the present *corpus*, authorial authority is distributed across distinct but related sources: the score, metronome markings, and recorded performances. Each contributes differently to the construction of Stravinsky's temporal authority, and their relationships remain productive precisely because they embody different temporal solutions.

It is at this point that Lawrence Kramer's (2011) distinction between performance as the realisation of something and performance as event becomes especially productive. The authority of the score persists as performance gives a recognisable work concrete temporal form within a singular situation. Each performance therefore combines the structural identity of the work with determinations specific to its historically situated temporal configuration. What the data from *L'Histoire du Soldat* make it possible to observe quantitatively is precisely this difference: a prescribed structure sufficiently stable to render the performances comparable coexists with temporally non-identical results.

This relationship also prevents the variations identified from being interpreted simply as failures of precision. Such a reading would assume that the metronome marking anticipated both the tempo level and the entire temporal organisation of the performance. The profiles analysed here point to a different perspective. The temporal prescription of the score may remain recognisable while performance produces different degrees of concentration, different inflections, and different ways of traversing the same movement. The differences between the recordings emerge within the work through the possibilities opened by performance.

Taruskin's (1995) critique of the idea that music could simply "speak for itself" helps to situate this consequence. No degree of adherence to the text eliminates the act through which the text is converted into sonic behaviour. In Stravinsky's case, this principle acquires force precisely because his aesthetic sought to reduce the space accorded to interpretative intervention. The results allow this aesthetic to retain its explanatory force while clarifying its operative limit: restricting the performer's latitude still leaves the prescribed material to acquire concrete temporal form in performance.

This distinction between determination and realisation finally offers a more rigorous way of understanding Stravinskian precision. Precision may be understood as the preservation of relationships sufficiently defined for the work to retain its identity, articulation, and direction across performances, even when their measured tempi differ from the metronome marking. From this perspective, precision ceases to be the opposite of variability. The question becomes which variations are compatible with musical organisation and how they participate in its production.

The results therefore lead to a more restricted, but also more consequential, formulation: prescription delimits the field of realisation without exhausting it. The score retains authority because it makes certain relationships necessary and comparable. Performance remains productive because it must determine how those relationships will exist in time. When composer and performer are the same person, this difference becomes especially visible. The three recordings of *L'Histoire du Soldat* show that authorial authority can remain recognisable across non-identical realisations. It is precisely in this coexistence of determination and difference that the metronome ceases to constitute the limit of analysis and becomes only its point of departure.

5.4 Beyond the Metronome

The question that guided this study can now be answered with precision. Between 1932 and 1961, Stravinsky's performances preserve continuity through selected relationships between regions, internal directions, proportions, and patterns of temporal organisation, while transformations occur in both tempo level and the configuration of the temporal trajectory.

Transformation occurs when those relationships change in position, range, stability, or direction from one recording to another. The time realised by Stravinsky thus becomes historically variable without being temporally indeterminate.

This answer derives from a cross-sectional result of the musical *corpus* examined. No single trajectory describes all eleven analysed segments. Some movements accelerate between two recordings and decelerate in the next, others maintain the same direction, and still others recover levels close to those previously realised without restoring the preceding configuration. Across the intervals 1932–1954 and 1954–1961, seven of the eleven movements change direction, while the sustained trajectories are exclusively upward. The frequently extreme position of 1954 also assumes different meanings across movements, corresponding in some cases to the highest tempo levels and in others to the lowest. Chronological succession orders the documents, whereas their temporal logic emerges from the movement-specific relationships constructed across the three recordings.

The most important result lies in the relative independence of tempo level, dispersion, and trajectory. Tempo level and temporal organisation may follow distinct trajectories, just as a stable central value may coexist with changes in the temporal profile. Central tendency indicates where a realisation is situated, dispersion describes the concentration or spread of its values, and trajectory reveals how these values are organised and articulated over time. Considered together, these dimensions reveal differences that a single summary measure would obscure.

It is in this articulation that the distinction between tempo and temporality receives empirical confirmation. Tempo provides a measure of time. Temporality concerns the organisation of the relationships that this time establishes as the music unfolds. A tempo curve, therefore, provides a measurable representation of one dimension of temporality and makes it possible to observe how particular relationships are constructed, maintained, or transformed. The results show that the same level may form part of different configurations, just as different levels may participate in internally similar organisations. Difference in tempo and difference in temporal organisation are not equivalent.

This distinction also clarifies the scope of the concept of realised time. It refers to the concrete configuration assumed by the temporal conditions of the work in a specific performance, encompassing both the value reached and the way that value is organised over time. The analyses now make it possible to add a further consequence to this definition. Temporality in performance possesses both an internal organisation and a history. When a work is performed again, certain relationships may persist, others may be displaced, and others may acquire a different configuration.

The history of performance cannot be reduced to a succession of adopted values. It is constituted through the relationships that cut across, connect, and differentiate its realisations.

This perspective has made it possible to distinguish two levels that must remain separate. Intraperformative variation describes the temporal behaviour produced within a single performance. Interperformative transformation emerges when comparison between realisations reveals a consistent reorganisation of those relationships. Not every internal fluctuation constitutes historical transformation. Likewise, not every difference between two medians implies a substantive alteration of temporal organisation. Transformation may involve the global centre, internal distribution, regional stability, the direction of the trajectory, or different combinations of these elements. Its identification depends on the relationship between these dimensions.

The principal methodological contribution of this study has been to make this historicity comparable without turning performance into a sequence of decontextualised numbers. The treatment of temporal events, metrical calibration, and the construction of weighted measures and normalised profiles made it possible to work simultaneously with position, distribution, and trajectory. The value of this analytical architecture lies in enabling different questions to be addressed at each scale. Where a performance is situated, how its values are distributed, and how that configuration develops over time are not interchangeable questions. Keeping them distinct was a necessary condition for interpreting the data without reducing the temporal complexity that the study set out to investigate.

The results also alter the status of prescription. The score remains indispensable because it establishes the units and relationships that make comparison between performances possible. The metronome markings retain their authority, while the observed differences clarify its scope: they prescribe tempo, whereas the full temporality of performance emerges through a broader set of temporal relationships. Prescription provides conditions and references. Realisation produces the concrete form through which those conditions come to exist in time. The relationship between the two is one of partial determination: prescription establishes temporal conditions that performance gives concrete form without being fully determined by them.

The fact that the *corpus* consists of performances conducted by Stravinsky himself makes this conclusion significant. The identity of composer and performer coexists with distinct temporal configurations across recordings. Difference therefore emerges within the composer's own performance history, while each recording represents one historically situated sonic configuration of his temporal conception. If the same authority produces different configurations at different moments, authorial practice must itself be understood historically. It retains sufficient continuity to remain recognisable while assuming different temporal configurations across performances.

In this context, recording acquires a particular epistemological function. It preserves a realisation that, as an event, cannot be repeated identically. When distinct recordings are compared, what initially constituted a localised temporal decision becomes historical evidence. The recordings of 1932, 1954, and 1961 do not merely document three versions of the same work. Taken together, they make the transformation of Stravinsky's own performance practice observable. Their value lies less in offering a definitive model of execution than in making it possible to follow how the same work was temporally produced at different moments.

This conclusion also redefines the relationship between persistence and transformation. A work may preserve its identity across changing temporal configurations, while transformation can emerge through the reorganisation of relationships that remain historically connected to what precedes them. Comparison is possible only because something remains sufficiently recognisable for difference to acquire meaning. Persistence and transformation belong to the same process. The former provides continuity to the relationship. The latter reveals that such continuity is sustained through transformation.

Musical temporality emerges in a space that belongs neither exclusively to the score nor exclusively to performance. Notation projects relationships before they occur. Performance gives them actual duration, direction, and position. Recording preserves one such configuration and makes it possible to place it in relation to others. What becomes historically observable is therefore the passage between successive temporal configurations and the different ways in which a prescribed organisation acquires sonic form.

To go beyond the metronome is to retain the number while recognising both its analytical value and its limits. The metronome marking makes it possible to locate a tempo relationship. Performance data make it possible to follow the behaviour of that relationship once it becomes part of a trajectory. Temporality begins to become intelligible when position, direction, distribution, and history are considered together. Across the three recordings of *L'Histoire du Soldat*, Stravinsky's time emerges as a recognisable temporal organisation whose identity persists through transformation. It is through this coexistence of persistence and change that, beyond the metronome, the temporal history of a performance becomes intelligible.

Appendix A: Computational Pipeline for the Analysis of Realised Tempo

A.1 Scope

The following source code reproduces *version 6.1* of the computational pipeline used to generate the final analytical data and figures discussed in Chapters 3–5. The code is presented here as part of the study's reproducibility record. Its purpose is to make explicit the computational operations applied after the temporal events had been detected and exported from BeatRoot. No analytical decision is inferred autonomously by the program. Metrical calibration, the analytical unit assigned to each recording and movement, and the metronomic references derived from the score are supplied as external parameters. The score reference enters the procedure only after realised tempo has been calculated independently from the detected events. The pipeline processes the complete corpus of 33 cases, corresponding to eleven analytical units across the recordings of 1932, 1954, and 1961. Raw BeatRoot timestamp files are preserved unchanged throughout the procedure.

A.2 Inputs, environment, and execution

The pipeline requires three classes of input:

1. BeatRoot CSV files containing one numerical timestamp per row
2. `beatroot_calibration_v6.csv`, containing the metrical calibration parameters for each recording and movement
3. `score_tempi.csv`, containing the metronomic references and their corresponding notated units

The final analysis was executed in Python 3.13.5 with NumPy 2.3.5, pandas 2.2.3, and Matplotlib 3.10.8. Temporal events were previously inspected and exported using Sonic Visualiser 5.2.1 and the BeatRoot Beat Tracker distributed with Vamp Plugin Pack 2.0.

With the default directory structure, the pipeline is executed from the command line as follows:

```
python stravinsky_tempo_pipeline_v6_1.py
```

Alternative paths may be supplied through the --input, --output, --calibration, and --score arguments.

A.3 Complete source code

For readability, the source code is divided below into functional sections. The order is identical to that of the executable file. When concatenated in sequence, the listings constitute the complete version 6.1 pipeline used in the study.

A.3.1 Dependencies, constants, and filename parsing

```
from __future__ import annotations

import argparse
import hashlib
import re
from pathlib import Path

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt


SMOOTHING_WINDOW = 5

UNIT_LABEL = {
    "quarter_note": "quarter notes/min",
    "eighth_note": "eighth notes/min",
}

SCORE_UNIT_MAP = {
    "semínima": "quarter_note",
    "seminima": "quarter_note",
    "quarter": "quarter_note",
    "quarter_note": "quarter_note",
    "colcheia": "eighth_note",
    "eighth": "eighth_note",
    "eighth_note": "eighth_note",
}


def duplicate_rank(path: Path) -> int:
    m = re.search(r"\((\d+)\)$", path.stem)
    return int(m.group(1)) if m else 0


def strip_duplicate_suffix(stem: str) -> str:
    return re.sub(r"\(\d+\)$", "", stem)


def normalize_text(s: str) -> str:
    return s.lower().replace("_", "-").replace(" ", "-")
```

```
def parse_beatroot_name(path: Path) -> dict:
    stem = strip_duplicate_suffix(path.stem)

    if "_BeatRoot_beats" not in stem and "_beatroot_beats" not in stem.lower():
        raise ValueError("not a BeatRoot beats filename")

    base = re.sub(r"_BeatRoot_beats$", "", stem, flags=re.IGNORECASE)

    m = re.match(r"^(?P<year>\d{4})_(?P<body>.+)$", base)
    if not m:
        raise ValueError("cannot parse year/movement from filename")

    year = int(m.group("year"))
    body = m.group("body")

    code_match       =       re.match(r"^(VIa|VIb|VIc|VIII|VII|VI|IV|IX|III|II|I|V)(?:-|$)",       body,
flags=re.IGNORECASE)
    if not code_match:
        raise ValueError("cannot parse movement code from filename")

    raw_code = code_match.group(1)
    code_norm = {
        "i": "I", "ii": "II", "iii": "III", "iv": "IV", "v": "V",
        "via": "VIa", "vib": "VIb", "vic": "VIc",
        "vii": "VII", "viii": "VIII", "ix": "IX",
    }[raw_code.lower()]

    return {
        "year": year,
        "movement_code": code_norm,
        "body": body,
    }
```

A.3.2 Input validation and duplicate protection

```
def load_timestamps(path: Path) -> np.ndarray:
    """
    Accept only a one-column numeric timestamp export.

    This explicitly rejects accidental waveform/audio exports such as the
    earlier malformed 1954 Ragtime CSV with multiple columns.
    """
    # Cheap line-format check before loading the whole file.
    checked = 0
    with path.open("r", encoding="utf-8-sig", errors="replace") as f:
        for line in f:
            line = line.strip()
```

```
            if not line:
                continue
            checked += 1

            if any(sep in line for sep in [",", ";", "\t"]):
                raise ValueError("multi-column file; expected one timestamp per row")

            try:
                float(line)
            except ValueError:
                raise ValueError("non-numeric timestamp row")

            if checked >= 12:
                break

    if checked == 0:
        raise ValueError("empty file")

    s = pd.read_csv(path, header=None, names=["timestamp_s"], dtype=float)["timestamp_s"]
    t = s.to_numpy(dtype=float)
    t = t[np.isfinite(t)]

    if len(t) < 3:
        raise ValueError("fewer than 3 timestamps")
    if np.any(np.diff(t) <= 0):
        raise ValueError("timestamps are not strictly increasing")

    return t


def file_digest(path: Path) -> str:
    h = hashlib.sha256()
    with path.open("rb") as f:
        while True:
            block = f.read(1024 * 1024)
            if not block:
                break
            h.update(block)
    return h.hexdigest()


def choose_beatroot_files(input_dir: Path):
    """
    Select exactly one valid BeatRoot CSV per year × movement.

    Preference order:
      1. valid one-column timestamp file
      2. among valid duplicates, highest '(n)' suffix
      3. if no suffix difference, newest modification time
```

```
If several valid duplicates are byte-identical, that is recorded as benign.
If valid duplicates differ, v6 records a warning in duplicate_report_v6_1.csv.
"""
groups = {}
rejected = []

for path in sorted(input_dir.glob("*BeatRoot_beats*.csv")):
    try:
        info = parse_beatroot_name(path)
        t = load_timestamps(path)
        key = (info["year"], info["movement_code"])
        groups.setdefault(key, []).append({
            "path": path,
            "info": info,
            "n": len(t),
            "digest": file_digest(path),
        })
    except Exception as exc:
        rejected.append({
            "file": path.name,
            "reason": str(exc),
        })

chosen = []
duplicate_report = []

for key, candidates in groups.items():
    candidates = sorted(
        candidates,
        key=lambda x: (
            duplicate_rank(x["path"]),
            x["path"].stat().st_mtime,
        ),
    )

    selected = candidates[-1]
    chosen.append(selected["path"])

    digests = {c["digest"] for c in candidates}
    duplicate_report.append({
        "year": key[0],
        "movement_code": key[1],
        "candidate_count": len(candidates),
        "valid_duplicates_identical": len(digests) == 1,
        "selected_file": selected["path"].name,
        "other_valid_candidates": " | ".join(
            c["path"].name for c in candidates[:-1]
        ),
    })
```

```
    return chosen, pd.DataFrame(duplicate_report), pd.DataFrame(rejected)
```

A.3.3 Metrical calibration and score metadata

```
def load_calibration(path: Path) -> pd.DataFrame:
    cal = pd.read_csv(path, encoding="utf-8-sig")

    required = {
        "year",
        "movement_code",
        "movement_name",
        "native_unit",
        "metrical_factor",
        "beatroot_relation",
        "calibration_status",
        "evidence",
    }
    missing = required - set(cal.columns)
    if missing:
        raise ValueError(f"Calibration file missing columns: {sorted(missing)}")

    cal["year"] = pd.to_numeric(cal["year"], errors="raise").astype(int)
    cal["movement_code"] = cal["movement_code"].astype(str).str.strip()
    cal["metrical_factor"] = pd.to_numeric(cal["metrical_factor"], errors="raise")

    return cal


def get_calibration_row(year: int, movement_code: str, cal: pd.DataFrame):
    rows = cal[
        (cal["year"] == year)
        & (cal["movement_code"] == movement_code)
    ]
    if len(rows) != 1:
        raise ValueError(
            f"Expected one calibration row for {year} {movement_code}, found {len(rows)}"
        )
    return rows.iloc[0]


def load_score_tempi(path: Path) -> pd.DataFrame:
    score = pd.read_csv(path, encoding="utf-8-sig")

    required = {
        "movement_code",
        "movement_name",
        "score_marking_raw",
        "reference_unit",
        "tempo_min",
```

```
        "tempo_max",
    }
    missing = required - set(score.columns)
    if missing:
        raise ValueError(f"Score file missing columns: {sorted(missing)}")

    score = score.copy()
    score["movement_code"] = score["movement_code"].astype(str).str.strip()
    score["tempo_min"] = pd.to_numeric(score["tempo_min"], errors="coerce")
    score["tempo_max"] = pd.to_numeric(score["tempo_max"], errors="coerce")
    score["native_unit_internal"] = (
        score["reference_unit"]
        .astype(str)
        .str.strip()
        .str.lower()
        .map(SCORE_UNIT_MAP)
    )
    return score


def get_score_row(movement_code: str, score: pd.DataFrame):
    rows = score[score["movement_code"] == movement_code]
    return None if rows.empty else rows.iloc[0]
```

A.3.4 Duration-weighted statistics and temporal segmentation

```
def weighted_mean(values, weights):
    v = np.asarray(values, dtype=float)
    w = np.asarray(weights, dtype=float)

    valid = np.isfinite(v) & np.isfinite(w) & (w > 0)
    if not np.any(valid):
        return np.nan

    return float(np.sum(v[valid] * w[valid]) / np.sum(w[valid]))


def weighted_quantile(values, weights, q):
    v = np.asarray(values, dtype=float)
    w = np.asarray(weights, dtype=float)

    valid = np.isfinite(v) & np.isfinite(w) & (w > 0)
    if not np.any(valid):
        return np.nan

    v = v[valid]
    w = w[valid]

    order = np.argsort(v, kind="stable")
```

```
    v = v[order]
    w = w[order]

    cumulative = np.cumsum(w)
    cutoff = q * cumulative[-1]
    idx = int(np.searchsorted(cumulative, cutoff, side="left"))
    idx = min(idx, len(v) - 1)
    return float(v[idx])


def score_relation(performance, ref_min, ref_max):
    if not all(np.isfinite(x) for x in [performance, ref_min, ref_max]):
        return "comparison_not_available", np.nan, np.nan

    if performance < ref_min:
        delta = performance - ref_min
        return "below_score_reference", float(delta), float(delta / ref_min * 100)

    if performance > ref_max:
        delta = performance - ref_max
        return "above_score_reference", float(delta), float(delta / ref_max * 100)

    return "within_score_reference", 0.0, 0.0


def decile_summary(midpoint, tempo, weights, start, end):
    if end <= start:
        return [], np.nan, np.nan, np.nan

    norm = (midpoint - start) / (end - start)
    vals = []

    for i in range(10):
        lo = i / 10
        hi = (i + 1) / 10
        if i < 9:
            mask = (norm >= lo) & (norm < hi)
        else:
            mask = (norm >= lo) & (norm <= hi)

        vals.append(
            weighted_quantile(
                tempo[mask],
                weights[mask],
                0.50,
            ) if np.any(mask) else np.nan
        )

    finite = np.array([x for x in vals if np.isfinite(x)], dtype=float)
    if len(finite):
```

```
        dmin = float(np.min(finite))
        dmax = float(np.max(finite))
        drange = dmax - dmin
    else:
        dmin = dmax = drange = np.nan

    return vals, dmin, dmax, drange
```

A.3.5 Score-reference handling and processing of individual performances

```
def score_unit_symbol(native_unit: str) -> str:
    """
    Return a compact musical-note symbol for the score-reference legend.

    quarter_note -> ♩
    eighth_note  -> ♪
    """
    return {
        "quarter_note": "♩",
        "eighth_note": "♪",
    }.get(native_unit, "")


def make_score_reference_label(score_row) -> str:
    """
    Build labels such as:
        Score reference: ♩ = 112
        Score reference: ♪ = 184–192
    """
    native_unit = str(score_row["native_unit_internal"])
    symbol = score_unit_symbol(native_unit)

    ref_min = float(score_row["tempo_min"])
    ref_max = float(score_row["tempo_max"])

    if np.isclose(ref_min, ref_max):
        value = f"{ref_min:g}"
    else:
        value = f"{ref_min:g}–{ref_max:g}"

    if symbol:
        return f"Score reference: {symbol} = {value}"

    return f"Score reference: {value}"


def add_score_reference(ax, score_row):
    if score_row is None:
        return
```

```
    ref_min = score_row["tempo_min"]
    ref_max = score_row["tempo_max"]

    if not (np.isfinite(ref_min) and np.isfinite(ref_max)):
        return

    label = make_score_reference_label(score_row)

    if np.isclose(ref_min, ref_max):
        ax.axhline(
            ref_min,
            linestyle="--",
            linewidth=1.3,
            label=label,
        )
    else:
        ax.axhspan(
            ref_min,
            ref_max,
            alpha=0.15,
            label=label,
        )


def process_one(path, cal, score, processed_dir, raw_fig_dir, perf_fig_dir):
    info = parse_beatroot_name(path)
    year = info["year"]
    code = info["movement_code"]

    c = get_calibration_row(year, code, cal)
    factor = float(c["metrical_factor"])
    native_unit = str(c["native_unit"])

    score_row = get_score_row(code, score)
    if score_row is None:
        raise ValueError(f"No score metadata for movement {code}")

    score_native_unit = score_row["native_unit_internal"]
    if score_native_unit != native_unit:
        raise ValueError(
            f"Native-unit mismatch for {year} {code}: "
            f"calibration={native_unit}, score={score_native_unit}"
        )

    t = load_timestamps(path)
    ibi = np.diff(t)
    midpoint = (t[:-1] + t[1:]) / 2
    raw_epm = 60.0 / ibi
    performed = raw_epm * factor
```

```
duration = float(t[-1] - t[0])
norm_pos = (
    (midpoint - t[0]) / duration * 100
    if duration > 0
    else np.zeros_like(midpoint)
)

raw_smooth = (
    pd.Series(raw_epm)
    .rolling(SMOOTHING_WINDOW, center=True, min_periods=1)
    .median()
    .to_numpy()
)
perf_smooth = (
    pd.Series(performed)
    .rolling(SMOOTHING_WINDOW, center=True, min_periods=1)
    .median()
    .to_numpy()
)

# Primary, duration-weighted summary.
tw_median = weighted_quantile(performed, ibi, 0.50)
tw_mean = weighted_mean(performed, ibi)
tw_q1 = weighted_quantile(performed, ibi, 0.25)
tw_q3 = weighted_quantile(performed, ibi, 0.75)

# Diagnostics.
event_median = float(np.nanmedian(performed))
event_mean = float(np.nanmean(performed))

deciles, decile_min, decile_max, decile_range = decile_summary(
    midpoint, performed, ibi, t[0], t[-1]
)

score_min = float(score_row["tempo_min"])
score_max = float(score_row["tempo_max"])
score_mid = (score_min + score_max) / 2

relation, delta_range, delta_range_pct = score_relation(
    tw_median, score_min, score_max
)
delta_mid = tw_median - score_mid
delta_mid_pct = delta_mid / score_mid * 100 if score_mid else np.nan

unit_label = UNIT_LABEL[native_unit]

df = pd.DataFrame({
    "interval_index": np.arange(1, len(ibi) + 1),
    "timestamp_start_s": t[:-1],
```

```
    "timestamp_end_s": t[1:],
    "midpoint_s": midpoint,
    "normalized_position_pct": norm_pos,
    "inter_event_interval_s": ibi,
    "time_weight_s": ibi,
    "beatroot_rate_raw_epm": raw_epm,
    "beatroot_rate_smoothed_epm": raw_smooth,
    "metrical_factor": factor,
    "native_analysis_unit": native_unit,
    "performed_tempo_native_per_min": performed,
    "performed_tempo_smoothed_native_per_min": perf_smooth,
    "calibration_status": str(c["calibration_status"]),
    "beatroot_relation": str(c["beatroot_relation"]),
    "calibration_evidence": str(c["evidence"]),
    "score_marking_raw": str(score_row["score_marking_raw"]),
    "score_native_tempo_min": score_min,
    "score_native_tempo_max": score_max,
})

canonical_stem = f"{year}_{code}-{c['movement_name'].replace(' ', '-')}"
processed_path = processed_dir / f"{canonical_stem}_BeatRoot_processed_v6_1.csv"
df.to_csv(processed_path, index=False, encoding="utf-8-sig")

# Raw BeatRoot diagnostic.
fig, ax = plt.subplots(figsize=(10, 5))
ax.plot(norm_pos, raw_epm, linewidth=0.8, alpha=0.35, label="Raw BeatRoot rate")
ax.plot(norm_pos, raw_smooth, linewidth=1.8, label="Rolling median (5 events)")
ax.set_xlabel("Normalized performance position (%)")
ax.set_ylabel("BeatRoot event rate (events/min)")
ax.set_title(f"{year} {code} — raw BeatRoot profile")
ax.legend()
ax.grid(True, alpha=0.2)
fig.tight_layout()
fig.savefig(raw_fig_dir / f"{canonical_stem}_raw_BeatRoot_v6_1.png", dpi=300)
fig.savefig(raw_fig_dir / f"{canonical_stem}_raw_BeatRoot_v6_1.pdf")
plt.close(fig)

# Calibrated performance vs score.
fig, ax = plt.subplots(figsize=(10, 5))
ax.plot(
    norm_pos,
    performed,
    linewidth=0.8,
    alpha=0.28,
    label="Local performed tempo",
)
ax.plot(
    norm_pos,
    perf_smooth,
    linewidth=1.8,
```

```
    label="Rolling median (5 events)",
)
add_score_reference(ax, score_row)
ax.set_xlabel("Normalized performance position (%)")
ax.set_ylabel(f"Performed tempo ({unit_label})")
ax.set_title(f"{year} {code} — BeatRoot performance vs score")
ax.legend()
ax.grid(True, alpha=0.2)
fig.tight_layout()
fig.savefig(perf_fig_dir / f"{canonical_stem}_performance_vs_score_v6_1.png", dpi=300)
fig.savefig(perf_fig_dir / f"{canonical_stem}_performance_vs_score_v6_1.pdf")
plt.close(fig)

row = {
    "source_file": path.name,
    "year": year,
    "movement_code": code,
    "movement_name": c["movement_name"],
    "native_analysis_unit": native_unit,
    "native_unit_label": unit_label,
    "metrical_factor": factor,
    "beatroot_relation": c["beatroot_relation"],
    "calibration_status": c["calibration_status"],
    "calibration_evidence": c["evidence"],
    "duration_s": duration,
    "n_timestamps": len(t),
    "n_intervals": len(ibi),
    "raw_beatroot_time_weighted_median_epm": weighted_quantile(raw_epm, ibi, 0.50),
    "time_weighted_median_performed_tempo_native_per_min": tw_median,
    "time_weighted_mean_performed_tempo_native_per_min": tw_mean,
    "time_weighted_q1_performed_tempo_native_per_min": tw_q1,
    "time_weighted_q3_performed_tempo_native_per_min": tw_q3,
    "event_median_performed_tempo_native_per_min": event_median,
    "event_mean_performed_tempo_native_per_min": event_mean,
    "decile_1_median": deciles[0],
    "decile_2_median": deciles[1],
    "decile_3_median": deciles[2],
    "decile_4_median": deciles[3],
    "decile_5_median": deciles[4],
    "decile_6_median": deciles[5],
    "decile_7_median": deciles[6],
    "decile_8_median": deciles[7],
    "decile_9_median": deciles[8],
    "decile_10_median": deciles[9],
    "decile_median_min": decile_min,
    "decile_median_max": decile_max,
    "decile_median_range": decile_range,
    "score_marking_raw": score_row["score_marking_raw"],
    "score_native_tempo_min": score_min,
    "score_native_tempo_max": score_max,
```

```
        "relation_to_score_reference": relation,
        "delta_to_score_range_native": delta_range,
        "delta_to_score_range_pct": delta_range_pct,
        "delta_vs_score_midpoint_native": delta_mid,
        "delta_vs_score_midpoint_pct": delta_mid_pct,
        "processed_file": processed_path.name,
    }

    return row, df
```

A.3.6 Cross-recording comparisons

```
def make_movement_comparisons(data_by_key, cal, score, out_dir):
    for code in cal["movement_code"].drop_duplicates():
        items = []
        for year in [1932, 1954, 1961]:
            key = (year, code)
            if key in data_by_key:
                items.append((year, data_by_key[key]))

        if len(items) < 2:
            continue

        c = get_calibration_row(items[0][0], code, cal)
        unit_label = UNIT_LABEL[str(c["native_unit"])]
        score_row = get_score_row(code, score)

        fig, ax = plt.subplots(figsize=(10, 5))
        for year, df in items:
            ax.plot(
                df["normalized_position_pct"],
                df["performed_tempo_smoothed_native_per_min"],
                linewidth=1.6,
                label=str(year),
            )

        add_score_reference(ax, score_row)
        ax.set_xlabel("Normalized performance position (%)")
        ax.set_ylabel(f"Performed tempo ({unit_label})")
        ax.set_title(f"{code} — BeatRoot 1932 × 1954 × 1961 vs score")
        ax.legend(title="Recording / score")
        ax.grid(True, alpha=0.2)
        fig.tight_layout()
        fig.savefig(out_dir / f"{code}_BeatRoot_1932_1954_1961_vs_score_v6_1.png", dpi=300)
        fig.savefig(out_dir / f"{code}_BeatRoot_1932_1954_1961_vs_score_v6_1.pdf")
        plt.close(fig)


def make_global_deviation_plot(summary, output_dir):
```

```
    df = summary.sort_values(["movement_code", "year"], kind="stable").copy()
    df["label"] = df["movement_code"].astype(str) + " " + df["year"].astype(str)

    x = np.arange(len(df))

    fig, ax = plt.subplots(figsize=(14, 6))
    ax.axhline(0, linestyle="--", linewidth=1.0, label="Score reference midpoint")
    ax.plot(
        x,
        df["delta_vs_score_midpoint_pct"],
        marker="o",
        linewidth=1.2,
        label="Time-weighted median deviation",
    )
    ax.set_xticks(x)
    ax.set_xticklabels(df["label"], rotation=90)
    ax.set_ylabel("Deviation from score reference midpoint (%)")
    ax.set_xlabel("Movement and recording")
    ax.set_title("BeatRoot performed tempo relative to score prescription")
    ax.legend()
    ax.grid(True, alpha=0.2)
    fig.tight_layout()
    fig.savefig(output_dir / "all_recordings_percent_deviation_v6_1.png", dpi=300)
    fig.savefig(output_dir / "all_recordings_percent_deviation_v6_1.pdf")
    plt.close(fig)
```

A.3.7 Method notes and pipeline execution

```
def write_method_notes(output_dir):
    text = """STRAVINSKY TEMPO PIPELINE v6.1 — BEATROOT METHOD NOTES

1. Corpus
   11 analytical units × 3 Stravinsky recordings (1932, 1954, 1961) = 33 cases.

2. Primary detector
   BeatRoot Beat Tracker is used as the primary beat-event detector.

3. Algorithm benchmark
   BeatRoot was selected after comparison with the earlier QM Tempo and Beat Tracker
   workflow on the Three Dances. QM repeatedly changed metrical detection level within
   individual recordings, whereas BeatRoot maintained a substantially more stable event
   level in the benchmark cases.

4. Raw data
   Raw BeatRoot timestamp exports are never modified.

5. Raw event rate
   BeatRoot rate = 60 / inter-event interval in seconds.
```

6. Metrical calibration

Each recording/movement receives one stable factor:

performed native tempo = BeatRoot event rate × metrical factor.

The factor represents the relationship between BeatRoot lines and the written metric unit. It is not chosen by proximity to the score's metronome marking.

7. Explicit visual counts

Movement II:

1932 ×0.5; 1954 ×0.5; 1961 ×1.

Movement III:

1932 ×0.5; 1954 ×1; 1961 ×0.5.

Movement VIII:

1932 ×1/3; 1954 ×1/3; 1961 ×1/3.

8. Three Dances

Tango: 2 BeatRoot events = 1 quarter note, factor ×0.5.

Valse: 1 BeatRoot event = 1 quarter note, factor ×1.

Ragtime: 1 BeatRoot event = 1 eighth note, factor ×1.

9. Native score units

All quarter-note movements remain in quarter notes/min.

Ragtime remains in eighth notes/min, matching its native score metronomic unit.

10. Direct mappings

Movements I, IV, V, VII and IX use one BeatRoot event = one quarter note.

These stable direct mappings are retained independently of the score tempo value and may be cross-checked against earlier manual performance estimates.

11. Duration-weighted statistics

Whole-performance mean, median, Q1 and Q3 are weighted by the actual duration of each inter-event interval. Event-count summaries are retained as diagnostics.

12. Stability diagnostics

Each recording is divided into ten equal temporal regions. A duration-weighted median is calculated for each decile to reveal gradual tempo evolution or anomalous changes.

13. Score comparison

Score tempo enters only after performed tempo has been calculated. The pipeline reports whether the time-weighted median lies below, within or above the score reference and calculates deviation from the score-reference midpoint.

14. No local correction

v6 contains no local 1:1 / 1:2 / 2:3 level-switch corrections. A single stable BeatRoot metrical relation is used for each recording/movement.

15. Duplicate protection

v6.1 accepts only one-column numeric timestamp exports and rejects accidental multi-column waveform/audio exports. It also reports duplicate BeatRoot files and selects one valid candidate per year × movement.

```
16. Score-reference legend
    Figure legends display the score reference with musical-note symbols:
        quarter note -> ♩
        eighth note  -> ♪
    Example: "Score reference: ♩ = 112" or "Score reference: ♪ = 184–192".
"""
    (output_dir / "METHOD_NOTES_v6_1.txt").write_text(text, encoding="utf-8")


def main():
    parser = argparse.ArgumentParser(
        description="Stravinsky tempo pipeline v6.1 — BeatRoot-native analysis."
    )
    parser.add_argument("--input", default="data")
    parser.add_argument("--output", default="results_v6_1")
    parser.add_argument("--calibration", default="beatroot_calibration_v6.csv")
    parser.add_argument("--score", default="score_tempi.csv")
    args = parser.parse_args()

    input_dir = Path(args.input)
    output_dir = Path(args.output)
    calibration_path = Path(args.calibration)
    score_path = Path(args.score)

    if not input_dir.exists():
        raise SystemExit(f"Input folder not found: {input_dir.resolve()}")
    if not calibration_path.exists():
        raise SystemExit(f"Calibration file not found: {calibration_path.resolve()}")
    if not score_path.exists():
        raise SystemExit(f"Score file not found: {score_path.resolve()}")

    cal = load_calibration(calibration_path)
    score = load_score_tempi(score_path)

    processed_dir = output_dir / "processed"
    raw_fig_dir = output_dir / "raw_beatroot_figures"
    perf_fig_dir = output_dir / "performance_vs_score_figures"
    comparison_dir = output_dir / "comparisons_1932_1954_1961"

    for d in [
        processed_dir,
        raw_fig_dir,
        perf_fig_dir,
        comparison_dir,
    ]:
        d.mkdir(parents=True, exist_ok=True)

    files, duplicate_report, rejected = choose_beatroot_files(input_dir)
```

```
duplicate_report.to_csv(
    output_dir / "duplicate_report_v6_1.csv",
    index=False,
    encoding="utf-8-sig",
)
if not rejected.empty:
    rejected.to_csv(
        output_dir / "rejected_beatroot_files_v6_1.csv",
        index=False,
        encoding="utf-8-sig",
    )

print("\nSTRAVINSKY TEMPO PIPELINE v6.1 — BEATROOT")
print("=" * 80)
print(f"Valid year × movement cases selected: {len(files)}\n")

if len(files) != 33:
    print(
        f"WARNING: expected 33 cases, found {len(files)}. "
        "The pipeline will continue and report the available cases.\n"
    )

rows = []
data_by_key = {}
failures = []

for path in sorted(
    files,
    key=lambda p: (
        parse_beatroot_name(p)["movement_code"],
        parse_beatroot_name(p)["year"],
    ),
):
    try:
        row, df = process_one(
            path,
            cal,
            score,
            processed_dir,
            raw_fig_dir,
            perf_fig_dir,
        )
        rows.append(row)
        data_by_key[(row["year"], row["movement_code"])] = df

        print(
            f"OK  {row['year']} {row['movement_code']:<4} "
            f"{row['time_weighted_median_performed_tempo_native_per_min']:8.2f} "
            f"{row['native_unit_label']}"
        )
```

```
        except Exception as exc:
            failures.append({"file": path.name, "reason": str(exc)})
            print(f"FAIL {path.name}: {exc}")

    summary = pd.DataFrame(rows)

    if not summary.empty:
        summary = summary.sort_values(
            ["movement_code", "year"],
            kind="stable",
        )

        summary.to_csv(
            output_dir / "calibrated_summary_v6_1.csv",
            index=False,
            encoding="utf-8-sig",
        )

        comparison_cols = [
            "year",
            "movement_code",
            "movement_name",
            "native_analysis_unit",
            "native_unit_label",
            "metrical_factor",
            "beatroot_relation",
            "calibration_status",
            "time_weighted_median_performed_tempo_native_per_min",
            "time_weighted_mean_performed_tempo_native_per_min",
            "time_weighted_q1_performed_tempo_native_per_min",
            "time_weighted_q3_performed_tempo_native_per_min",
            "decile_median_min",
            "decile_median_max",
            "decile_median_range",
            "score_marking_raw",
            "score_native_tempo_min",
            "score_native_tempo_max",
            "relation_to_score_reference",
            "delta_to_score_range_native",
            "delta_to_score_range_pct",
            "delta_vs_score_midpoint_native",
            "delta_vs_score_midpoint_pct",
            "source_file",
        ]

        summary[comparison_cols].to_csv(
            output_dir / "score_performance_comparison_v6_1.csv",
            index=False,
            encoding="utf-8-sig",
```

```
            )

            make_movement_comparisons(
                data_by_key,
                cal,
                score,
                comparison_dir,
            )
            make_global_deviation_plot(summary, output_dir)

        if failures:
            pd.DataFrame(failures).to_csv(
                output_dir / "processing_failures_v6_1.csv",
                index=False,
                encoding="utf-8-sig",
            )

        write_method_notes(output_dir)

        print("\n" + "=" * 80)
        print(f"Processed successfully: {len(rows)}")
        print(f"Processing failures: {len(failures)}")
        print(f"Output folder: {output_dir.resolve()}")
        print("Raw BeatRoot CSVs were not modified.")


if __name__ == "__main__":
    main()
```

A.4 Generated outputs and reproducibility boundary

For each valid recording–movement combination, the pipeline preserves the intermediate values required to reconstruct the calculation of realised tempo from the original timestamps. These include the beginning and end of each inter-event interval, its midpoint, duration, temporal weight, raw BeatRoot event rate, metrical factor, native analytical unit, realised tempo, smoothed tempo, and normalised position within the performance.

At corpus level, the program generates processed interval-level CSV files, duration-weighted summary statistics, decile medians, score–performance comparisons, individual performance figures, cross-recording comparative figures, duplicate-file reports, rejected-file reports, processing-failure reports, and methodological notes. The program also checks the expected corpus size of 33 cases and reports any discrepancy rather than silently normalising the dataset. The reproducibility boundary should be stated explicitly.

The pipeline begins with the timestamp files already exported by BeatRoot. It therefore reproduces the complete computational path from detected temporal events to the analytical outputs used in this study. Reproducing the earlier event-detection stage from the audio additionally requires access to the original recordings, the corresponding version of Sonic Visualiser, the BeatRoot plugin, and the execution conditions under which the timestamps were generated.

The code should therefore be understood as the formal computational implementation of the methodological procedure described in Chapter 3. It standardises calculation and documentation, while the musical validity of the results remains dependent on the analytical decisions encoded in the calibration and score-reference tables.



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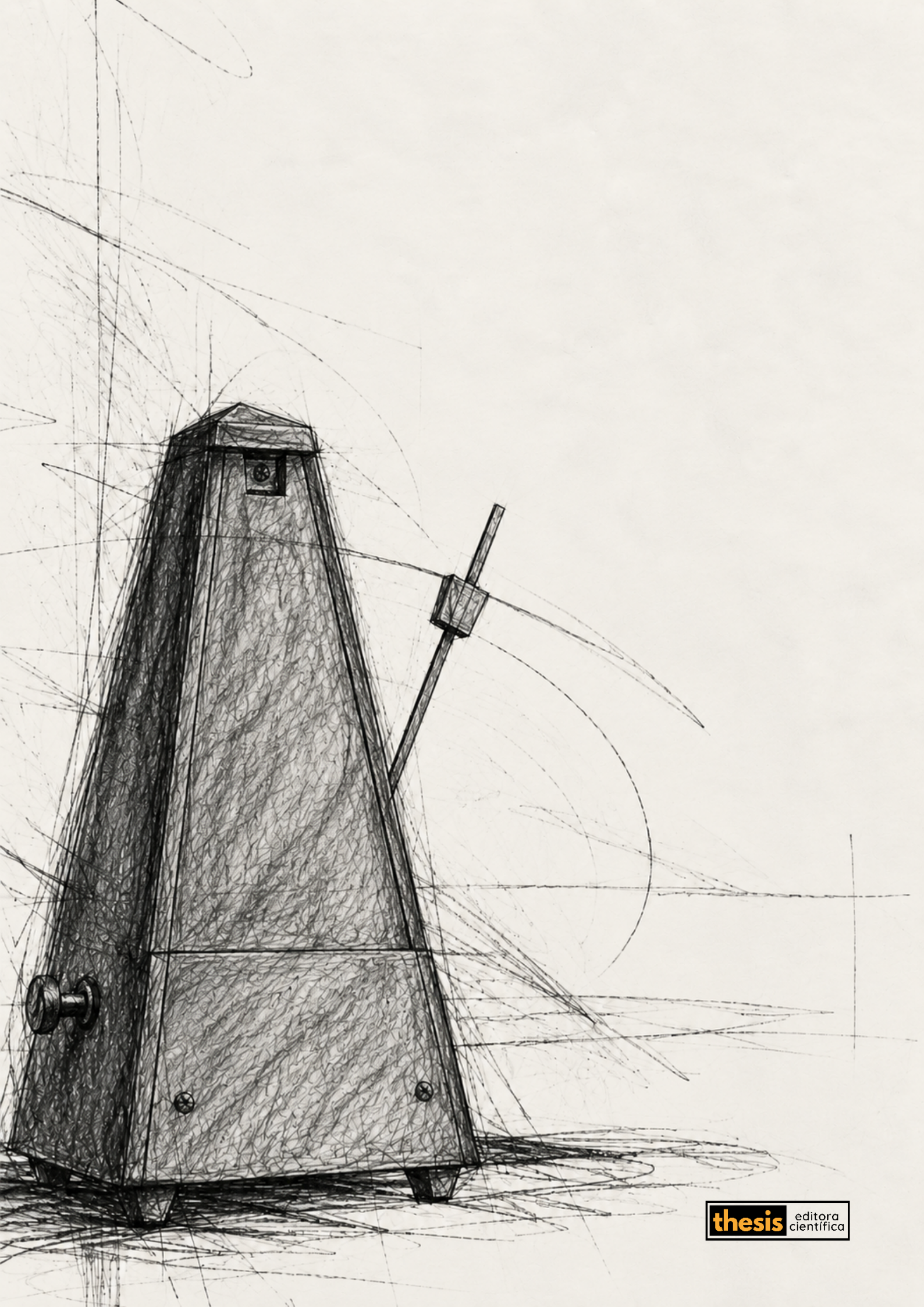
A Note on the Author

Erickinson Lima is a conductor, professor, and researcher whose interdisciplinary work spans music, education, technology, and artificial intelligence. He holds a PhD and a Master's degree in Music (Conducting) from the University of Aveiro. His research focuses on technological innovation applied to teaching, learning, and musical practice, with particular interests in artificial intelligence, digital technologies, accessibility, and inclusion.

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