A Digital Approach to Proportions

Analysing Common Practice Period Forms with music21

Joshua Ballance

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Abstract

Proportions in eighteenth-century and later forms have been variously alluded to by authors such as Hepokoski & Darcy (2006), Rosen (1988), and Caplin (1998), but never grappled with on a comprehensive scale. This is in part due to the nature of the undertaking: counting bars is a thankless task. This dissertation instead uses data generated by computer analysis of a large selection of works, both canonical and otherwise: music21 enables us to 'ask' a computer to identify particular features, and in doing so provide information about them. I am particularly interested in sonata forms, and the relative durations of the exposition to the development & recapitulation, though further questions could include binary & ternary forms, the division of the development-recapitulation, or the placement of the medial caesura.

This will be carried out in the context of those formal theories put forward by the authors mentioned above. Indeed, by applying their models through the 'objective' vehicle of a computer analysis, much will be learnt about how well the criteria identified by the authors are able to operate without external contextual knowledge. Perhaps most significantly, we will have a statistical, rather than largely unsystematic, basis on which to discuss proportional formal matters.

The author would like to thank several private individuals for providing scores for this project, including Pierre Gouin & Michel Leménager.

Introduction

"How sour sweet music is when time is broke and no proportion kept." (Richard II: Act V, Scene 5)

Opening Remarks

Proportions in sonata forms have, at times, been the subject of analytical and theoretical scrutiny; however, analysts have tended to focus on other matters, and questions of proportions have been dealt with only incidentally. Indeed, a cursory glance through the nine-page bibliography at the back of Hepokoski & Darcy's immense *Elements of Sonata Theory* reveals no titles with 'proportions' in it; likewise, James Webster's Grove Dictionary entry contains only passing references to the comparative lengths of sections.[1]

On a superficial level, it may seem that the relationships between the lengths of sections are obvious: it might be expected that the development is shorter than the exposition; that the exposition and the recapitulation are roughly the same length; that the second group of the exposition tends to be longer than the first. If we think we know all this, can we prove it? If so, what other patterns might there be? And, how can we do so?

In reality, this question has never been subjected to rigorous statistical scrutiny. Some analysts have quoted statistics, such as Webster's claim that "Mozart's developments are fairly short, perhaps 50-60% of the length of the exposition. […] Haydn's typical developments are perhaps 75% of the length of the exposition, Beethoven's perhaps 90%; occasionally, they wrote developments longer than the exposition".[2] Likewise, Hepokoski & Darcy's entire book is built upon the conception of an ideal type from which composers deviate, and thus an implicit statistical basis. In neither case are data given to justify these assertions. Instead, it is assumed that the authority for these authors to pontificate upon these matters comes from extensive knowledge of the repertoire, and an intuitive sense of the situation. Indeed, William Caplin's only comment to approach the discussion is to suggest that any identification of groups according to length has "limited value, since they say nothing about the content of the groups or how they relate to one another (except in regard to duration)."[3] Meanwhile, in discussing the rather different repertoire of Stravinsky's music, Jonathan Kramer has gone as far as to question the value of comparing 'clock-time' in tonal music.[4] Evidently, this topic has been dealt with superficially at best, and typically based on the intuition of particular authors.

It is worth responding to Kramer to justify the use of clock-time, as, although calculations are made with bar numbers, these represent time, assuming the regular pulse of performance. Though various authors have discussed the disparity between the listener's perception of time in performance, it remains the case that we experience music within the framework of clock-time.[5] What is more, different listeners have different perceptions, and so without developing a methodology to measure and compare 'experienced time', and conducting a large-scale survey to find the relevant data, clock-time remains the most objective frame of comparison.

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[1] James Hepokoski & Warren Darcy, *Elements of Sonata Theory: Norms, Types, and Deformations in the Late-Eighteenth-Century Sonata* (Oxford: OUP, 2006); James Webster, 'Sonata Form' in *Grove Music Online* (published online 2001)

[2] Webster, 'Sonata Form'

[3] William E. Caplin, *Classical Form: A Theory of Formal Functions for the Instrumental Music of Haydn, Mozart, and Beethoven* (Oxford: OUP, 1998), p. 9

[4] Jonathan Kramer, 'Discontinuity and Proportion in the Music of Stravinsky' in *Confronting Stravinsky* (University of California Press, 1986), ed. Jann Pasler, p. 175

[5] See for example Gérard Grisey, 'Tempus ex Machina: A composer's reflections on musical time', *Contemporary Music Review*, 2:1 (2009), pp. 239-275

What Are We Proving?

This work does not aim to attack the aforementioned authors' work, so much as to examine, and, where necessary, to refine it. Intuition may be sufficient for superficial commentary, but this can be complemented with a data-driven approach. This project will seek to assess several questions. Primarily: in considering the sonata forms of late-eighteenth-century and early-nineteenth-century composers, were there general trends surrounding the comparative lengths of different sections? More specifically, were there particular trends in the works of different composers, or, alternatively, different genres? For example, was the structure of Mozart's music more similar to the structure of chamber music generally, or to the works of Haydn?

In seeking to answer these questions, this study will consider three main structural features: the positions of the end of the exposition, the start of the recapitulation, and the exposition's medial caesura. In addition, the duration of the movements themselves will also be noted, to allow for comparison by composer and genre. From these data points, the lengths of the exposition, development, and recapitulation can be calculated, as well as the first group and transition compared with the second group, and possible codetta, in the exposition. These will also be considered proportionally as well as in absolute terms.

These structural features will largely be considered against Hepokoski & Darcy's definitions of sonata theory, partly because their work represents the most recent significant entry into the pantheon of scholarship about sonata forms, but also because their entire approach relies on a sense of normative practice from which music can deviate. Their fastidious desire to define and categorise everything they discuss also arguably lends itself to this style of digital and statistical interrogation.

If this subject is as important as has been suggested, it seems peculiar that it has not yet been explored. The likely reason is rather trivial: manually counting bars is time-consuming. One of the few corpus studies to engage with this area is Steven Cannon's study of nineteenth-century-symphonic-sonata movements. Though he does not specifically outline his procedure, it seems plausible that it was carried out manually, and, though his zeal is commendable, it is an inefficient way to carry out this sort of process. Indeed, this is exactly the sort of study that benefits from digital tools. In this case, the Python-based toolkit for automated music analysis: music21.

Cannon draws attention to one of the inevitable traits of this sort of study: that "while this method gives a rather incomplete picture of an individual movement, it allows the study to cover a very large number of pieces."[6] This is an inevitable problems that would plague any such approach; however, if the focus of the study, as here, is on particular structural phenomena in the pieces, it is intended less as a set of analyses of a selection of works, and more as a summary of common practice regarding a particular phenomenon.

Without wishing to stray into the labyrinth of debate surrounding the definition of style in relation to 'general' practice, or the work of particular canonic figures, it is perhaps worth a brief riposte to Rosen, whose shadow lurks around every corner when considering this question. The introduction to *Sonata Forms* outlines his thoughts well, where he argues forcibly against both of these approaches.[7]

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[6] Steven Craig Cannon, 'Sonata Form in the Nineteenth-Century Symphony', *Empirical Musicology Review*, Vol. 11, No. 2 (2016), p. 205

[7] Charles Rosen, *Sonata Forms* (New York: Norton & Company, 1988), pp. 3-7

In terms of defining style according to the works of certain composers who have, thanks to a positive afterlife, come to be adopted into the canon (in this case, Mozart, Haydn, and Beethoven), it is clearly fraudulent to posit that they necessarily define general practice. Questions of influence are something altogether different, and so, although it can now be asserted that they do not represent a given period for modern scholars, that is not to say that, for earlier musicians, this was not the case; Reicha, Marx and Czerny's definitions of sonata form as predicated on Beethoven are historically significant precisely *because* they saw him as the ideal model.[8] Thus, the conclusions reached below about the situation for these three composers who constitute the First Viennese School is certainly of interest in considering their respective impact on later composers, and whether they did begin trends that were adopted by their disciples.

As regards a statistical approach to common practice, Rosen's argument relies on three assumptions. Firstly, that the only value of this is to build up a sense of general practice, against which other composers can be measured. Secondly, that listeners had no conception of such a general practice, and instead listened to composers on individualistic terms. Thirdly, that, in fact, the "stylistic unity of the late eighteenth century is often overstated", and "statistically defined, "General practice" is pure fiction."[9] Working in reverse order, stylistic unity in the late eighteenth century may well be overstated, but that is not to say that there was no coherence in the treatment of particular approaches: quite how integrated the period was is indeed a subject of this essay. As for the second assumption identified above, Rosen appears supremely confident in his knowledge of late eighteenth-century listening experiences. His comparison to a twentieth-century listener experiencing Britten or Stravinsky is a false equivalent perhaps primarily because the advent of recording technology transformed listeners' abilities to engage with later composers' works. More generally, humans naturally make connections, and so listeners would have sought to understand new works in a context, much as audiences do today. Finally, his initial assumption is easily refuted: certainly it is interesting to compare individual figures to the normative situation, but this general practice is also interesting in and of itself.

The following essay outlines the methodology used, followed by an exposition and discussion of the results, and a summary of conclusions, with suggestions for further study. The methodology is discussed below, with the relevant code attached with annotations in Appendix 1. The results are presented graphically and diagrammatically, with the data in Appendix 2, along with various comments as to what can be learned from this. Indeed, this study is hardly intended to present conclusive answers to these major questions; rather, to prompt further enquiry into this and other topics utilising this approach.

The code is included in part for this very purpose, in the hope that others will use, and improve it in an Open Source manner.[10] By opening these tools up to a greater number of scholars, the communal understanding of these matters can be democratised, no longer relying on the intuition of particular authors, but rather grounding this understanding in a more objectively defensible manner.

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[8] Antonin Reicha, *Traité de haute composition musicale* (Paris: A. Farrenc, 1826); Adolf Bernhard Marx, *Die Lehre von der musikalischen Komposition* (Leipzig: Breitkopf & Härtel, 1841); Carl Czerny, *Die Schule der Praktischen Tonsetz Kunst,* (London: Robert Cocks & Co., 1848), trans. John Bishop

[9] Rosen, *Sonata Forms*, p. 6

[10] See Andrew Butterfield & Gerard Ekembe Ngondi, 'Open-source' in *Oxford Dictionary of Computer Science* (7 ed.) (2016)

Methodology

Corpus

As large a corpus of movements as was practicable has been compiled this study. For pieces to be available for this sort of work, and for this project, useable by music21, they need to be publicly accessible and readable by computer.[11] As a result, the corpus largely has been constructed by using files already engraved and hosted on various websites, although some have been received via private correspondence. In doing this, most major online sheet-music sharing sites have been consulted, including MuseData, IMSLP, and MuseScore, as well as some less well-known and more specialist sites, like *Tobi's Notenarchiv*.[12] Scores have also been received from some private individuals who do not wish to share publicly their engraving files. As OMR ('optical music recognition') software (for automatically engraving music) is still in its infancy, this was the only possible way. To engrave even a few works not only requires expensive OMR software, but is extremely time-consuming. Hopefully, in some years, OMR technology will be sufficient to require little in terms of human correction, and so could be used reliably for amassing a corpus like this without requiring extensive checking, but for now this is little more than a utopian dream.

The majority of the movements included in the corpus are those which unequivocally would be understood as being 'in sonata form', and are concentrated around the time period spanning the late eighteenth century, and the start of the nineteenth century. The corpus also includes some examples of earlier and later work, primarily for comparison, hence the inclusion of the keyboard sonatas by W. F. Bach, and various works by Brahms. Nonetheless, the focus of this study is on those sonata form movements by the First Viennese School and its contemporaries. This period is appropriate for a number of reasons. Firstly, because these works, much like sonata form itself, have such a significant place in the Western canon, and as a result have been intensely studied. This has the related effect of having prompted the re-engraving of many of these files in a format suitable for use here. On a more intellectual level, however, these pieces are interesting because scholars claim to have such an apparently clear sense of expectation. There is also little of the structural flexibility that would take place later, which, from the perspective of coding, eases the task, as it presents a fairly regular set of features to be considered. Other forms, for example mid-eighteenth-century dance forms, are probably as regularly codified in their practice, but these are of less canonic value.

Inevitably, there are some issues that arise from this: in particular, the choice of repertoire that others have chosen to publish, and the variable quality of these transcriptions. As these works have been engraved and published by others, they are only those works which others deem valuable. Unsurprisingly, this therefore lends the corpus a canonical focus, though there are some exceptions (e.g. W. F. Bach). Indeed, it is interesting to note the comparative disparity between the number of works available by a figure even as famous as Schubert (5 in the corpus), and those of his contemporary, Beethoven (almost 50).

Considering questions of quality: with this many files, it is impractical to ascertain the quality of each individually, and so the accuracy of the various engravers has to be trusted. Though there will certainly be some errors, of greater or lesser gravity, in some of the files, these are unlikely to have a significant impact on

[11] For a full list of readable filetypes, see http://web.mit.edu/music21/doc/usersGuide/usersGuide_08_installingMusicXML.html

[12] See bibliography for a full list and URLs.

the present study. In general terms, these will be subsumed into the greater dataset as anomalous, if not 'filtered out' by the code altogether.

These can take the form of literal 'mistakes' (an incorrect pitch or duration), or more structural issues with the engraving. An incorrect pitch, for example, would be unlikely to have any impact on this sort of study as there is little of the methodology predicated on detailed pitch and rhythm identification. Even if that were to happen, the piece would be disregarded rather than creating a false positive. The copy of Haydn's Op. 1, No. 1 that used to be included in the music21 core corpus provides a good example of a structural issue, as it had some rests missing in some parts, resulting in their being omitted by music21, and the parts getting 'out-of-sync' with each other. This sort of structural issue is rare, as it is easily identifiable, and indeed in this case has since been updated. Though this sort of structural issue has the potential to be more significant, it will tend to mean a piece is disregarded rather than creating false positives. The methodology below relies upon finding structural points by finding particular sets of events, and if there is some structural issue with the file, it is unlikely that these specific events will have been replicated elsewhere.

On occasion, where movements open with an anacrusis, bar numbers can be 'out' by 1, depending on the editor. For example, the Haydn 'London' Trio No. 1 has the anacrustic bar labelled as bar 0, whereas Dussek's Sonata Op. 46, No. 4, has its anacrustic bar labelled as bar 0. Though this is somewhat frustrating, it creates no problems beyond occasional works being measured as having an extra bar, which is of little significance in the context of the size of the works as a whole.

In devising a method for finding these structural moments automatically, various ways have had to be found for a computer to find different parts of a sonata form, often using proxies. Though 'traditional' formal analysis often draws on a number of parameters of varying 'objectivity', when working with a computer, everything must be established as a series of operations. Though this is initially daunting, it encourages consideration of how these sorts of analytical decisions are made: what are our criteria? Of course, in undertaking this sort of project, simplicity is always desirable, and so if there is an easy way to establish something, it has been used, even if it is not the most conventional analytical method.

The Exposition: In Search of Barlines

This is precisely the case with the end of the exposition. According to Hepokoski & Darcy, the exposition concludes with 'essential expositional closure' which is articulated by "the first satisfactory perfect authentic cadence within the secondary key that goes on to differing material".[13] This may then be followed by what they term the 'closing zone', which is typically structured around further cadences in this key. Indeed, according to Webster, "Most large-scale expositions include a cadential closing group or 'codetta'."[14] For Rosen, "The final cadence is almost always marked […] by a series of conventional flourishes, which repeat and embellish a V-I cadence. At the end of the exposition, in order to confirm the new harmonic center, a considerable amount of insistence upon the now-tonicized dominant is called for."[15]

These sophisticated analytical methods make use of a variety of parameters and approaches for deciding where the exposition ends. In this study, however, an approach has been taken that is almost too obvious for scholars to admit. An absolute staple of the late eighteenth-century exposition is the exposition repeat. As Hepokoski & Darcy posit, repeats of the recapitulation had largely been jettisoned by c.1790; but it was several decades later that nineteenth-century aesthetics began to critique exposition repeats too.[16] This trope has been exploited in order to find an easy way for the location of the end of the exposition: in brief, it finds a repeat barline near the middle of the piece, and then measures the number of bars preceding this. Evidently, this counts any material within the closing zone as part of the exposition, making no distinction as to where the exposition truly 'closes', in Hepokoski & Darcy's sense.

Obvious problems occur when there is no such repeat barline, either in the original piece, or in the encoded version of it (as is the case with some of the MuseData and KernScores files). Nevertheless, using barlines is a reliable and successful method for those works where there is such a barline encoded.

An annotated version of the code is given as Appendix 1: lines 119-157 concern finding this barline. A few further comments are appropriate. 'Final' and 'repeat' barlines have been used to identify those possible barlines that engravers may have used at this midpoint. However, 'double' barlines have been excluded as these tend to accompany any change of key or time signature, so may give false positives. It is also important to take account of those pieces in which there are more than, or less than, two of these types of barlines. If there is only one of these types of barlines in the piece, and thus no central barline (Ex. 1a), this method is unable to locate the end of the exposition and this is noted in the resulting spreadsheet (Appendix 2). Where there are three of these barlines in place, this can happen for a variety of reasons; often, it is either because there is a repeat barline near the start of the piece that prevents the exposition repeat from returning to the very start (Ex. 1c) (e.g. Beethoven, Cello Sonata, Op. 102, Movt. 1), or, otherwise, because there is a recapitulation repeat as well (the end repeat and start repeat count as two different barlines, although intuitively they would seem to be in the same position) (Ex. 1d) (e.g. Haydn, London Trio No. 1, H. IV: I, Movt. 1). In either of these cases, it is the penultimate barline in the list that is desired. There are a few cases, however, in which the penultimate barline comes close to the end: this is often because there are a first and second ending at the end of the recapitulation, sometimes leading into a coda or codetta. In order to try and avoid being derailed by these, if the offset difference between the final and penultimate barlines is less than 16

[13] Hepokoski & Darcy, *Elements of Sonata Theory*, p. 18
[14] Webster, 'Sonata Form'
[15] Rosen, *Sonata Forms*, p. 242
[16] Hepokoski & Darcy, *Elements of Sonata Theory*, pp. 20-22

Ex. 1: Barline Structures

a	Exposition	Development	Recapitulation	‖				
b	Exposition	:‖	Development	Recapitulation	‖			
c	Exposition	‖:	Exposition	:‖	Development	Recapitulation	‖	
d	Exposition	:‖	‖:	Development	Recapitulation	:‖		
e	Exposition	:‖	‖:	Development	Recapitulation	:‖	Coda	‖
f	Introduction/Exposition	‖:	Exposition	:‖	‖:	Development	Recapitulation	:‖

(i.e. four bars in 4/4), the code switches to using the antepenultimate barline. Where there are four of these barlines, the model is that there is a start repeat near the beginning of the exposition and the development, and an end repeat at the end of the exposition and the end of the recapitulation (Ex. 1f) (this would be a common pattern for a symphony with a slow introduction). Thus, the penultimate barline is used, with the same caution surrounding the final and penultimate barlines not being too close (Ex. 1e). These various caveats will catch the majority of cases which are not as simple as the default.

Slow introductions are not dealt with here. Though Hepokoski & Darcy label them, along with codas, 'parageneric spaces', here they are grouped into the overall tripartite sonata structure, and thus slow introductions are included with the exposition, and codas with the recapitulation.[17] Likewise, the extra bars that might be prompted by repeats are not measured here. Though Hepokoski & Darcy draw attention to the potential structural significance of repeats, by removing them it is possible to remove this difference between pieces, which, in any case, is often altered in editing and performance, and compare them solely in terms of how long individual sections of original music last unrepeated.[18]

[17] Ibid., p. 281ff.
[18] Ibid., pp. 20-22

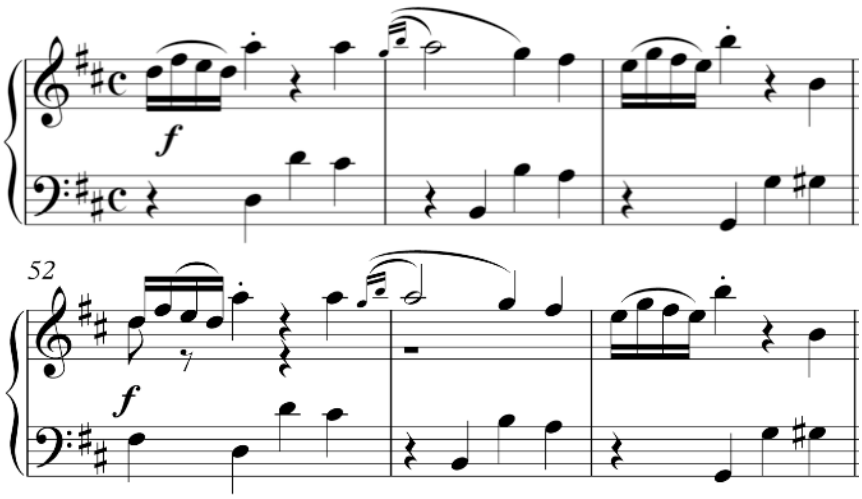
The Recapitulation: In Search of New Beginnings

Conceptually, finding the recapitulation is a two-part process: it is typically understood as the moment when the first theme group reappears, in the tonic key. As Hepokoski & Darcy put it, "the initiatory P^1 module of the recapitulation replicates the exposition's opening key, mood, and sound."[19] As a result, it is primarily a thematic-harmonic operation, though is often supported by textural and rhetorical means as a moment of arrival. Fundamentally, a passage that is identical to the beginning of the movement needs to be identified. This is precisely the approach that has been taken for finding the recapitulation with music21 (see Appendix 1; lines 234-284). By using the 'chordify' function (explained below), music21 reduces the music to a single harmonic line, and thus does away with potential changes of orchestration. Though alterations in harmonic voicing would render this method unsuccessful (e.g. Ex. 2: W. F. Bach, Sonata in D Major, F. 4, Movt. I, where an F# in the left hand at the start of the recapitulation prevents recognition of this moment), this is rare enough not to cause significant issues.

The main methodological question that arises is how long the passage should be for which music21 searches. If it is too short (e.g. 1 bar), it may well recur at other points in the piece other than the beginning of the recapitulation, and so there will be various false positives; if it is too long (e.g. 16 bars), the music may well have been altered in the recapitulation to avoid modulating to the dominant, and so no results will be returned. As it is difficult to know in advance what the most useful passage-duration is, various lengths were trialled in the process of writing this code, and two bars were chosen as the optimum amount.

Some further qualifications are in order. The first is to explain the 'chordify' function. According to the creators of music21, this functions by "reducing a complex score with multiple parts to a succession of chords in one part that represent everything that is happening in the score", colloquially termed 'salami-slicing'.[20] (Ex. 3 shows Beethoven, Op. 18, No. 1, Movt. 1, bb.1-8 chordified.) Of course, in the process, a clear sense of the individual voice-leading is lost, as everything is compiled into a series of chords, but when looking for overall textural features like silences, this is not problematic.

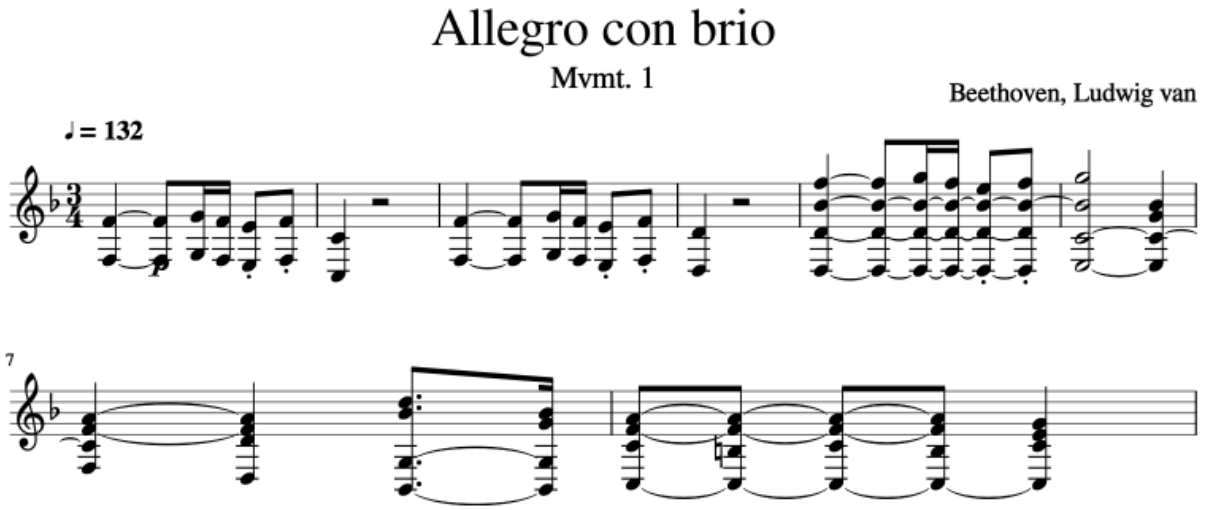
Ex. 2: W. F. Bach, Sonata in D Major, F. 4, Movt. I, Bb. 1-3 of Exposition & Recapitulation



[19] Ibid., p. 231

[20] music21 user guide http://web.mit.edu/music21/doc/usersGuide/usersGuide_09_chordify.html

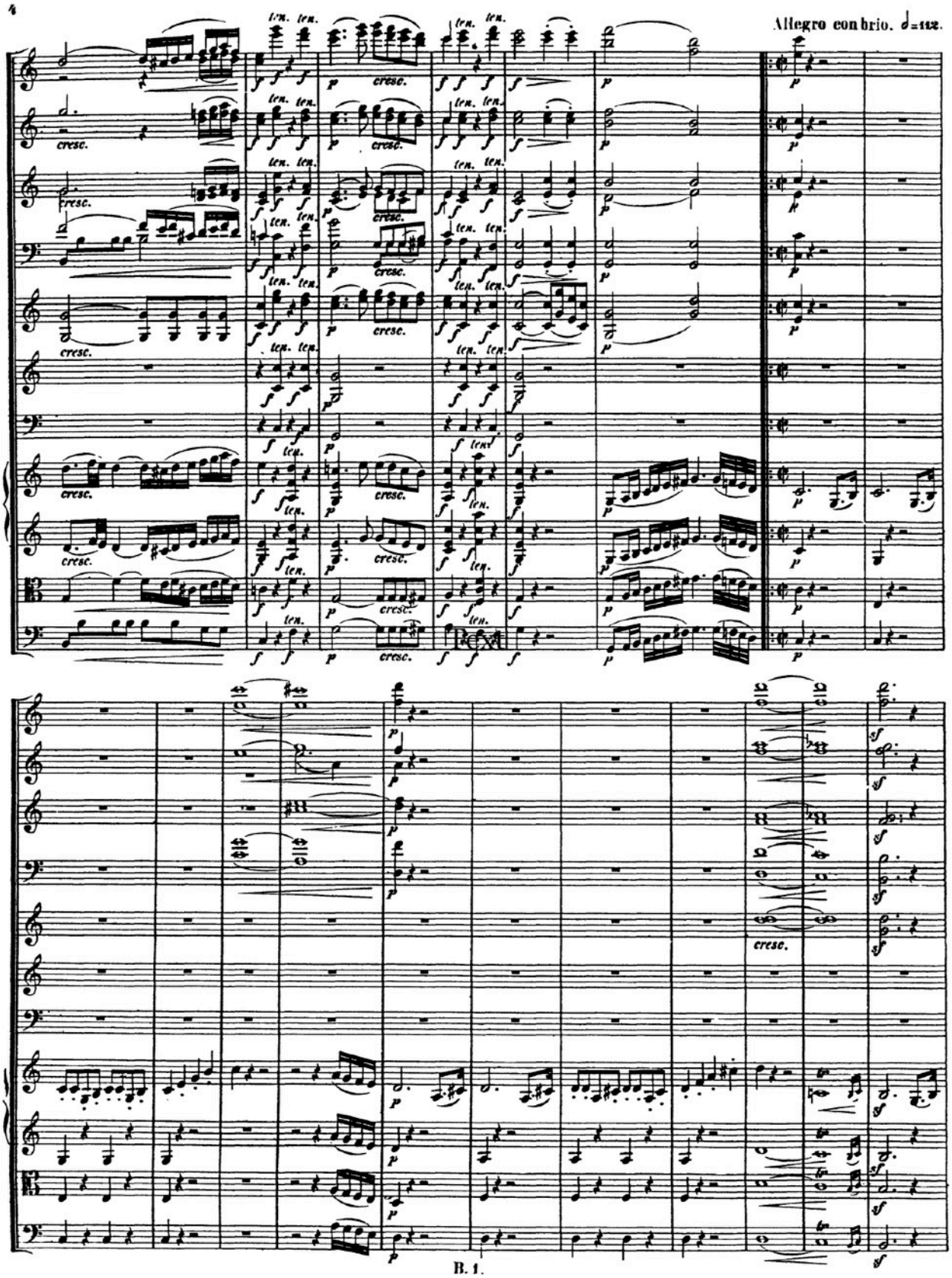
Ex. 3: Beethoven, Op. 18, No. 1, Movt. 1, bb. 1-8, chordified



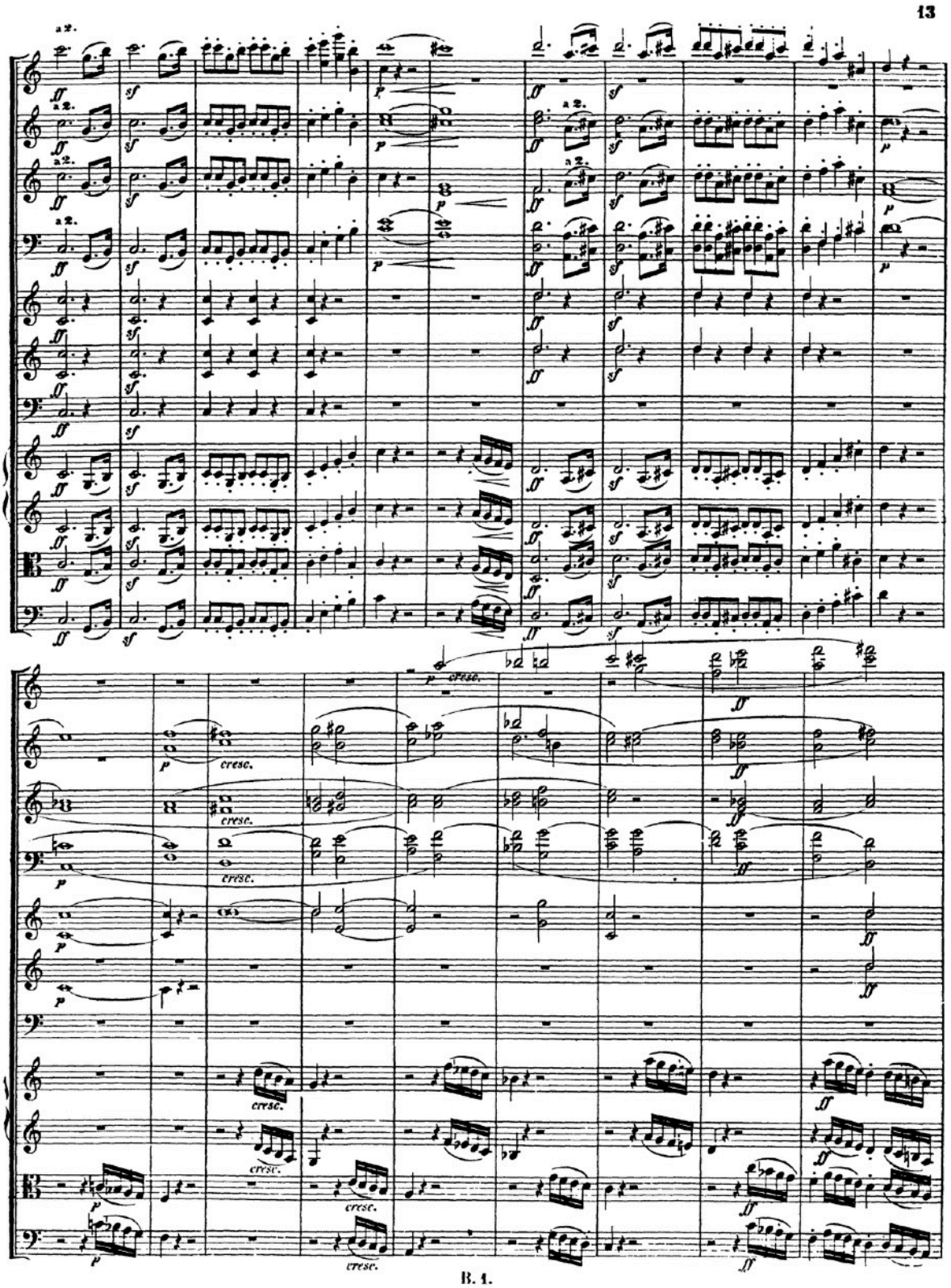
The matter of slow introductions, most typically associated with the symphony, is also significant. Of course, it is the opening bars of the fast music following the introduction that is usually reprised in the recapitulation, and so sampling the opening bars of the movement will fail to find the recapitulation. In order to compensate for this potential problem, if the recapitulation is not found, lines 263-268 take the bars immediately preceding the first double/repeat/final barline, and try these. It is often the case that the beginning of the recapitulation is slightly different from the start of the exposition, as it is not emerging from a slow introduction (e.g. Ex. 4: Beethoven Symphony No. 1, Op. 21, Movt. 1, Start of Exposition & Recapitulation), in which case the recapitulation will not be found.

Another anomaly are cases where the opening bars are repeated within the exposition (e.g. Beethoven, String Quartet Op. 18, No. 1, Movt. I, bb. 1 & 9). Here, it is assumed (as in this example) that this repetition will be reprised in the recapitulation, so there will be four statements of the opening bars. Thus, if this is the case, it is the third result in the list that is identified as the recapitulation. It seems highly unlikely that were there to be four repetitions of the opening bars they would not be organised like this (for example, three in the exposition and one in the recapitulation).

Ex. 4a: Beethoven Symphony No. 1, Movt. 1, Start of Exposition



Ex. 4b: Beethoven Symphony No. 1, Movt. 1, Start of Recapitulation



The Medial Caesura: In Search of Silence

Finding the medial caesura presents rather more of a complex problem: there is no shortcut. Indeed, even the concept itself is rather more slippery. The method is based on Hepokoski & Darcy's definition, which is relevant to those expositions that they term 'two-part'. They define the medial caesura as "the brief, rhetorically reinforced break or gap that serves to divide an exposition into two parts, tonic and dominant (or tonic and mediant in most minor-key sonatas)."[21] It is worth acknowledging that whereas they allow cases in which the medial caesura is not actually silent, but rather exists as a sustained period of static harmony & texture ('caesura-fill'), here the definition is restricted to a period of silence.[22]

Referring again to Appendix 1, it is lines 158-233 which primarily are focussed on finding the medial caesura. A short explanation of this is as follows: similar code to the above separates off the exposition (again using barlines), all the periods of silence are then compiled into a list, and that which is the medial caesura is identified, either because it is the only silence, or because it is the longest silence enclosed within two passages in different keys (tonic and dominant or tonic and mediant), and its position written down.

Concerning the detection of the exposition, it is worth pointing out that in this code, if there is no central barline, the computer instead uses the passage that comprises the middle two quarters of the given movement. This is a wide enough span that it typically includes the medial caesura, but limits the number of rests in the resulting list, and avoids any possible repeat of the caesura in the recapitulation.

A two-part approach has been taken to identifying the medial caesura. The first stage is to assess if the list of rests has only one item in it. If so, this must be the medial caesura, and so it has correctly been identified. However, in most cases there are many more than this. If this happens, then the music on either side of each rest is analysed for its key, and if the following section is in a key a fifth higher than the preceding section (i.e. there has been a modulation from the tonic to the dominant), this rest is added to a further list. A caveat to this catches those cases in which the preceding key is minor: rather than looking for a fifth higher, it looks for a minor third higher, to allow for a modulation to the relative major. This relies quite heavily on the key analysis function of music21, which though effective, is not perfect. Of course, especially in later music, composers made use of different tonal strategies, and so the fairly simplistic assumption that the modulation will either have been to the dominant or the relative major does not hold. Nonetheless, this is a successful strategy.

In addition, false positives arise fairly easily: as the key analysis is often of a large swathe of music, it is easy for other rests close to the medial caesura to have similar characteristics. If this revised list still contains more than one element, the code opts for that silence which has the longest duration (lines 211-227 are concerned with calculating the combined lengths of successive silences) (consider Beethoven, String Quartet Op. 18, No. 1, Movt. I, for an example of an exposition littered with rests). This is an important assumption, and one not explicitly made by Hepokoski & Darcy. Of durations, they say only that "In the normative mid- or late-eighteenth-century style this GP-gap typically lasts for only a beat or two (a "quick breath") — perhaps for a bar, but rarely longer."[23] Given the rhetorical nature of the medial caesura, however, it seems unlikely that

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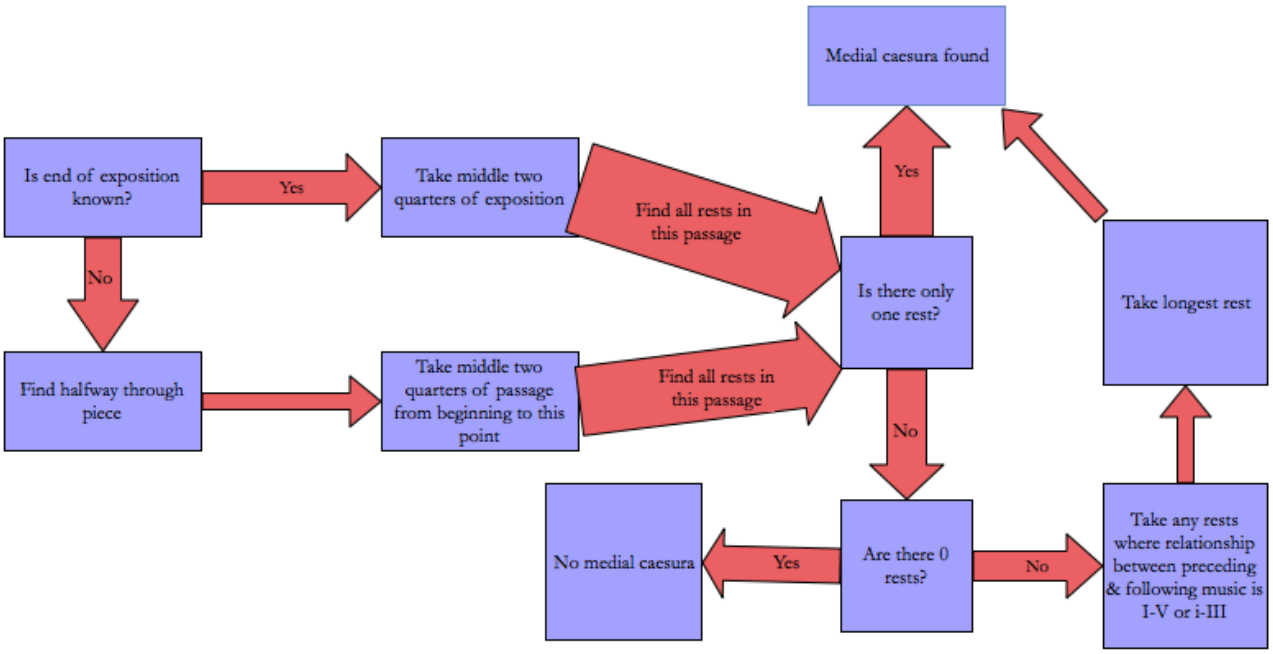
[21] Hepokoski & Darcy, *Elements of Sonata Theory*, pp. 23-24; also, their 'The Medial Caesura and its Role in the Eighteenth-Century Sonata Exposition', *Music Theory Spectrum* 19 (1997), pp. 115-154
[22] Hepokoski & Darcy, *Elements of Sonata Theory*, p. 34
[23] Ibid., p. 34

there will have been a longer silence in the exposition, or the rhetorical effect of this silence will have been lost. As this process is rather complex, Ex. 5 expresses this as a flowchart.

Ex. 5: Flowchart for Finding Medial Caesura



Results

Introduction

Having applied the above methodology to the corpus, the total results are given as Appendix 2. Prior to further processing, any results which are clearly erroneous have been removed (for example, that the length of Beethoven, Piano Sonata No. 19, Op. 49, No. 1 is 2 bars). Various randomly selected works have also been checked at points during the writing of the code to ensure that the correct values are being found.

At this point, a brief discussion of generic classification is in order. The list of genres employed is: symphony, concerto, sonata, chamber music. Though, in most cases, these assignations are self-explanatory, there are a few that merit some explication. Divertimentos have been grouped with chamber music. As Unverricht & Eisen posit, the genre is rather elusive.[24] Nevertheless, it seems initially to have been conceived as a solo genre, played one-to-a-part like chamber music, and so despite its 'Janus-faced' nature, is classified as chamber music. The isolated 'Allegro' movements for solo piano are similarly estranged from simple generic classification. Here, they have been grouped with sonatas, as they are closely related to the first movements of keyboard sonatas.

In the data discussed below, proportions have been rounded to two decimal places, as this is an appropriate level of precision given the calculations from total lengths being made. Where graphs have a line of best fit, this is linear.

Dates used for individual works are, where available, the date of composition. If this is unknown, then the date of publication has been used (e.g. the Dussek Sonatas), and if this too is unclear, then the date of first performance. If none of these dates is known, the median year of the composer's life has been used as a rough proxy for their time of activity (e.g. Cimarosa).

[24] Hubert Unverricht & Cliff Eisen, 'Divertimento' in *Grove Music Online* (published online 2001)

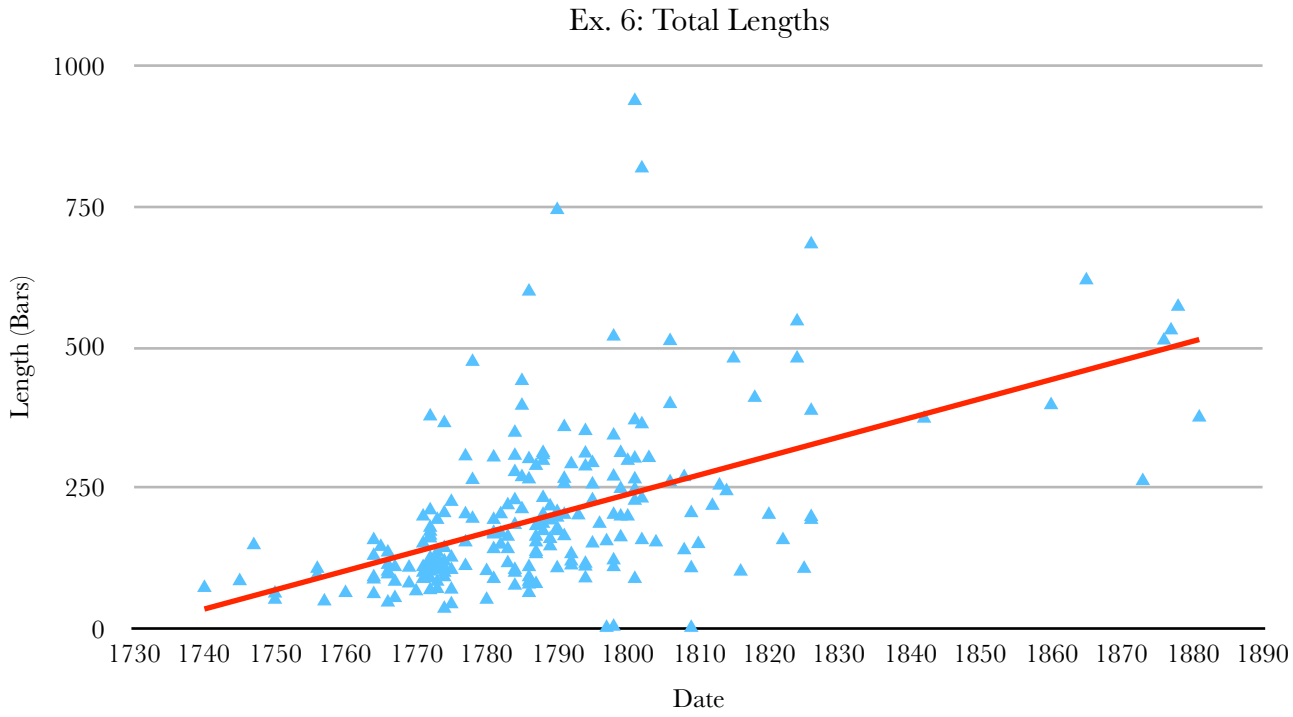
Total Lengths

Starting with the ends of these pieces, it is, unsurprisingly, for the total lengths of pieces that the greatest number of data points (233) has been found. Ex. 6 gives a graph of these organised by date. Expectations are largely that movements will have got longer over time, and that pieces for larger ensembles will be longer.[25]

As is evident from Ex. 6, there is a clear chronological trend of increasing piece duration. Though there are certainly exceptions, the general progression is unmissable, and confirmed by a comparison of mean durations by composer (Ex. 7a & 9a): over time, sonata movements became longer. This tallies with the results of Cannon's study of later symphonic sonata movements.[26]

When sorting durations by genre (Ex. 7b & 9b), a similar trend of increasing piece length across size of ensemble appears (i.e. the more players in the genre, the longer the piece). Each genre includes a fairly wide selection of composers, ensuring that there is little risk of these being influenced by the correlation between length and chronological position. The only exception to this is the concerto, for which the vast majority of data come from Mozart.

Ex. 8 gives the mean durations for Mozart, Haydn, and Beethoven, respectively, then subdivided by genre. These composers have been used not only due to their historical and canonical significance, but because they are the only composers with significant representation in all genres (except the concerto, where Haydn is represented once and Beethoven never). The generic trend is clear, as is the overall trend of the generational difference between Mozart and Haydn, and Beethoven. It is nonetheless interesting to note the disparity between sonata movement lengths for Mozart & Haydn: whereas they are fairly similar for chamber music and symphonies, Haydn's sonata movement lengths are only approximately $^{2}/_{3}$ the size of Mozart's.



[25] See for example, William S. Newman, *A History of the Sonata Idea, Vol. II 'The Sonata in the Classic Era'* (Chapel Hill: University of North Carolina Press, 1963), p. 136

[26] Cannon, 'Sonata Form in the Nineteenth-Century Symphony', p. 213

Ex. 7a: Total Length Averages

Composer	Mean
Nichelmann	73
Soler	107
W. F. Bach	64
C. P. E. Bach	149
Mozart	196
Cannabich	146
Cimarosa	105
Haydn	158
Dussek	87
Cambini	158
Beethoven	271
Schubert	368
Schumann	374
Brahms	468

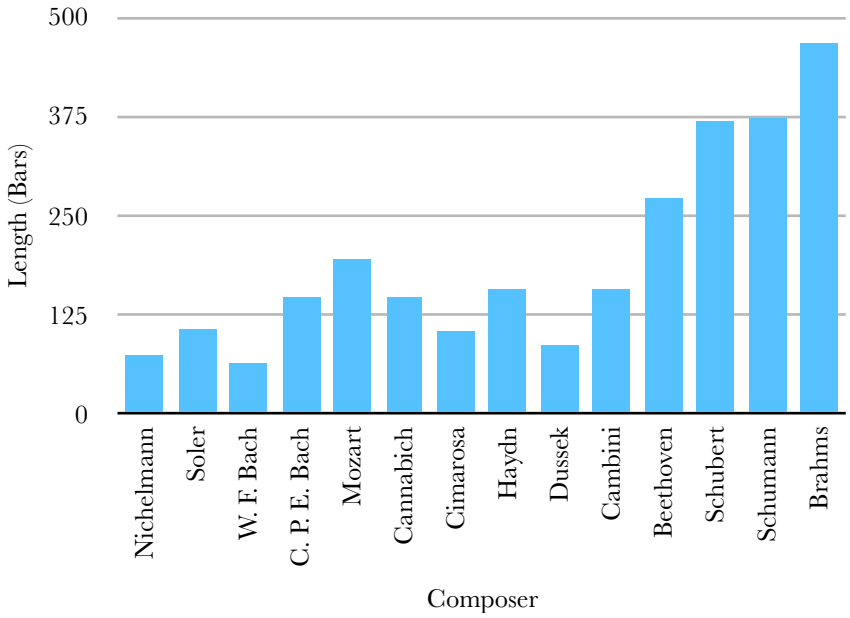
Ex. 7b: Total Length Averages

Genre	Mean
Sonata	168
Chamber Music	184
Concerto	307
Symphony	301

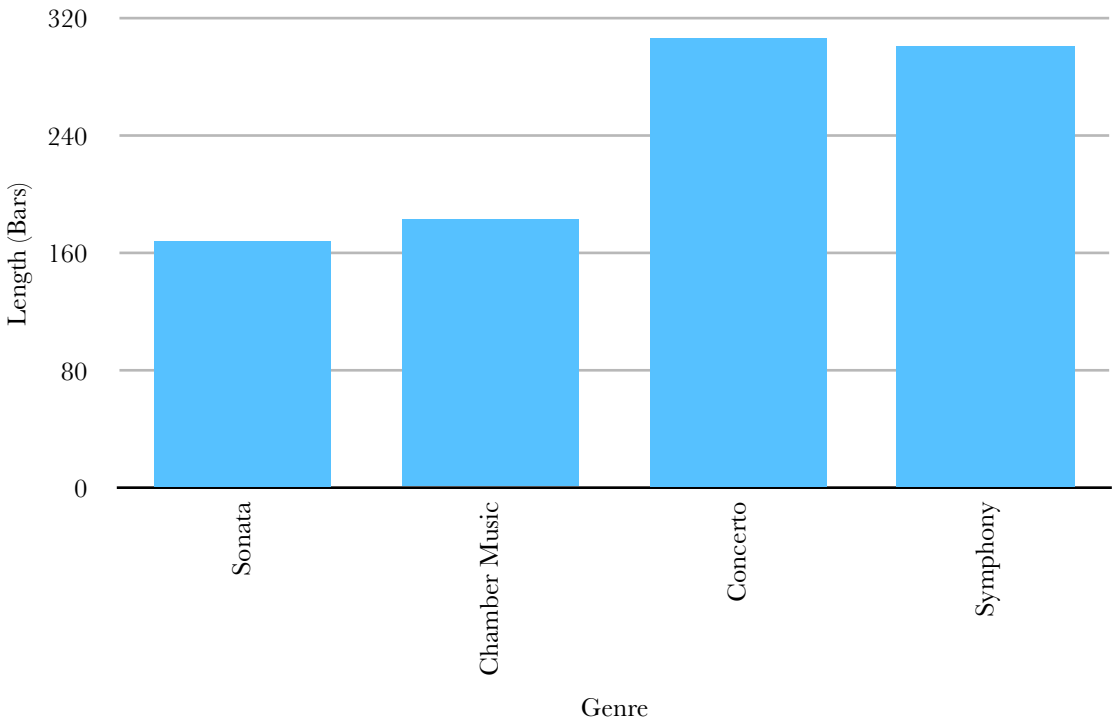
Ex. 8: Total Length Averages

Genre	Mozart Mean	Haydn Mean	Beethoven Mean
Sonata	154	115	276
Chamber Music	167	144	233
Concerto	308		
Symphony	236	256	372

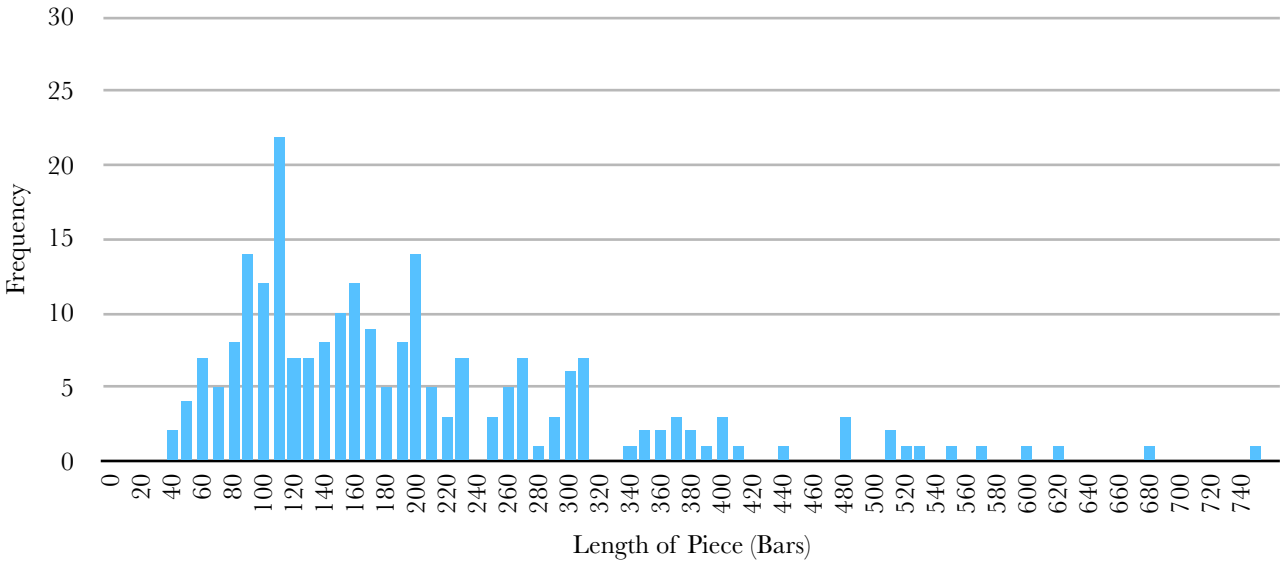
Ex. 9a: Total Length Averages



Ex. 9b: Total Length Averages



Ex. 10: Total Length Histogram



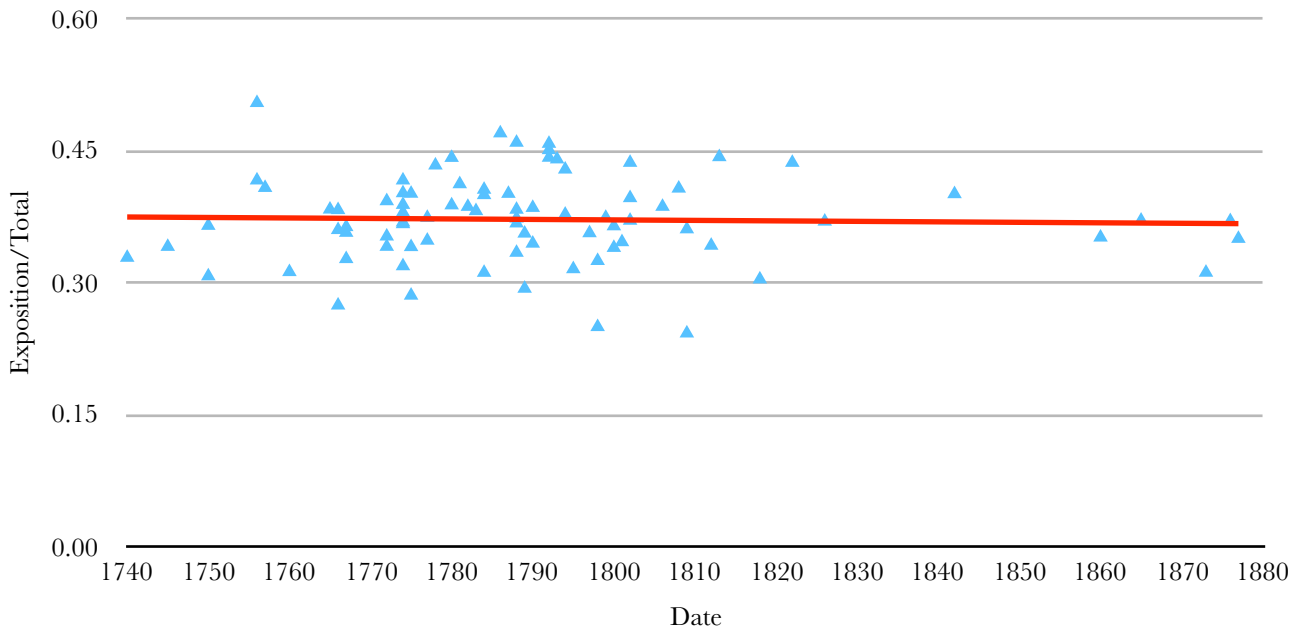
Ex. 10 then gives an histogram for the total dataset (rounded to the nearest 10), with a fairly clear concentration around the modal value of 110 bars, although **μ**=203 for this dataset. 42% of the data fall with 1 **σ** (**σ**=140) of **μ**, and 82% within 2 **σ**; meanwhile the positive skew of the distribution is evident. For the data to be arranged according to the normal distribution, 68% would be expected within 1 **σ**, and 95% within 2 **σ**, and so this clearly is not. This suggests that, despite the trend of increasing piece size, composers had a tendency to write movements towards the shorter end of the scale, a fact that may well be explained by the relatively high proportions of sonata and chamber music pieces within the corpus, as well as comparatively fewer later pieces.

The Exposition

Turning now to the relationship between the length of the exposition as compared to the whole, the number of data points is rather less: 87. Despite this, the data are fairly evenly distributed amongst composers and genres, and so this is a useful sample. Here, proportional values are of more interest than absolute numbers of bars, and so, for each work, the proportion of the whole duration occupied by the exposition has been calculated, and it is on these figures that subsequent work has been based. The expectation would likely be that expositions would become shorter across this period. On the whole, sonata forms in this period tend to be thought of as having increasingly longer developments and codas, at the expense of the proportional size of the exposition.[27]

Ex. 11 shows the data as organised by date. It suggests an interesting, and rather unexpected situation: rather than expositions gradually taking up less of the overall piece, the results are very stable. Indeed, the line of best fit is almost flat. Comparing the means of different composers allows refinement of this picture (Ex. 12a & 14a). Here, there is something of a gradual descent overall, although it again is minimal. Indeed, although the mean for Brahms, 0.35, is toward the lower end of the scale, it is not particularly far from other, earlier, composers, such as W. F. Bach, Haydn, or Schubert: clearly there is lots of variety between individual composers. Indeed, the disparity between Ex. 11 and Ex. 14a suggests that this was rather an idiosyncratic practice. Rather than a general change over time, composers instead had more individualistic approaches. It would be a fair criticism, however, to question the validity of these conclusions in the mid- to late nineteenth century given the sparsity of data for this period. Unquestionable, however, is the situation as regards Beethoven, especially compared to his colleagues: his expositions are approximately the same length as those of Mozart, and are, in fact, longer than those of Haydn. This seems an unexpected outcome, given that Beethoven typically is credited with expanding the development and the coda: as Rosen remarks about the coda, "Beethoven's codas almost never sound like those of his predecessors, [… they are] a radical but logical expansion of their practice."[28]

Ex. 11: Exposition Proportions



[27] Rosen, *Sonata Forms*, p. 324; Webster, 'Sonata Form'

[28] Rosen, *Sonata Forms*, p. 324

Ex. 12a: Exposition Proportion Averages

Composer	Mean
Nichelmann	0.41
Soler	0.50
W. F. Bach	0.34
Mozart	0.41
Cannabich	0.38
Cimarosa	0.29
Haydn	0.40
Cambini	0.44
Beethoven	0.43
Schubert	0.39
Schumann	0.40
Brahms	0.35

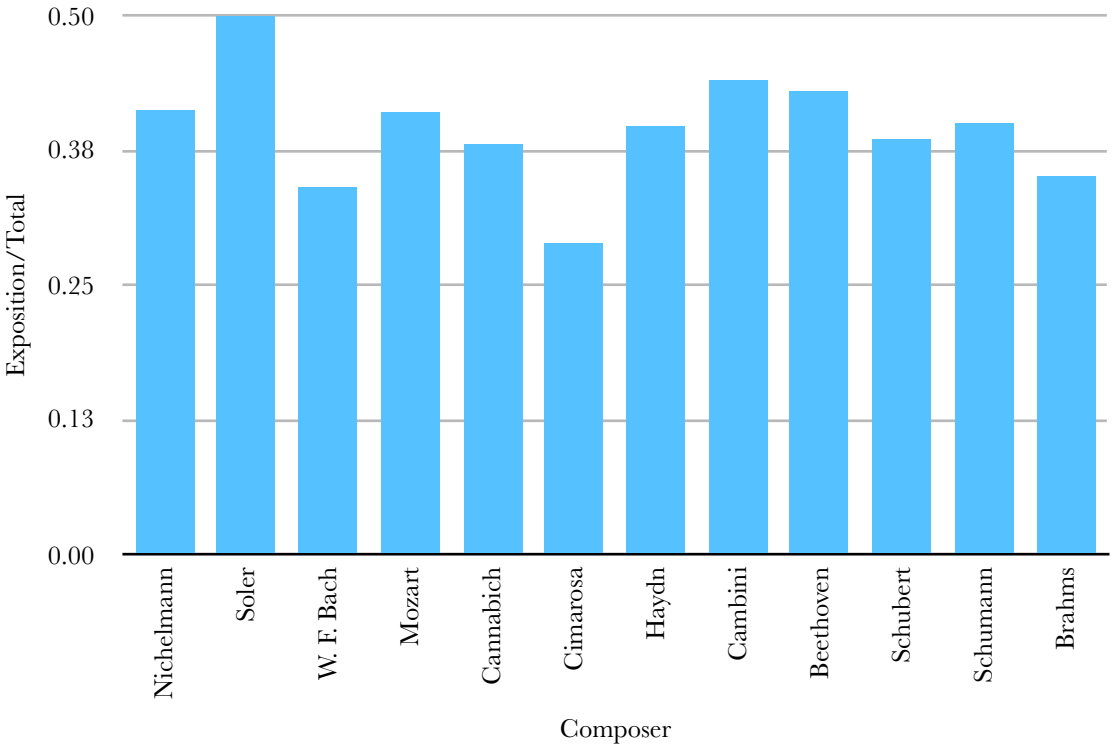
Ex. 12b: Exposition Proportion Averages

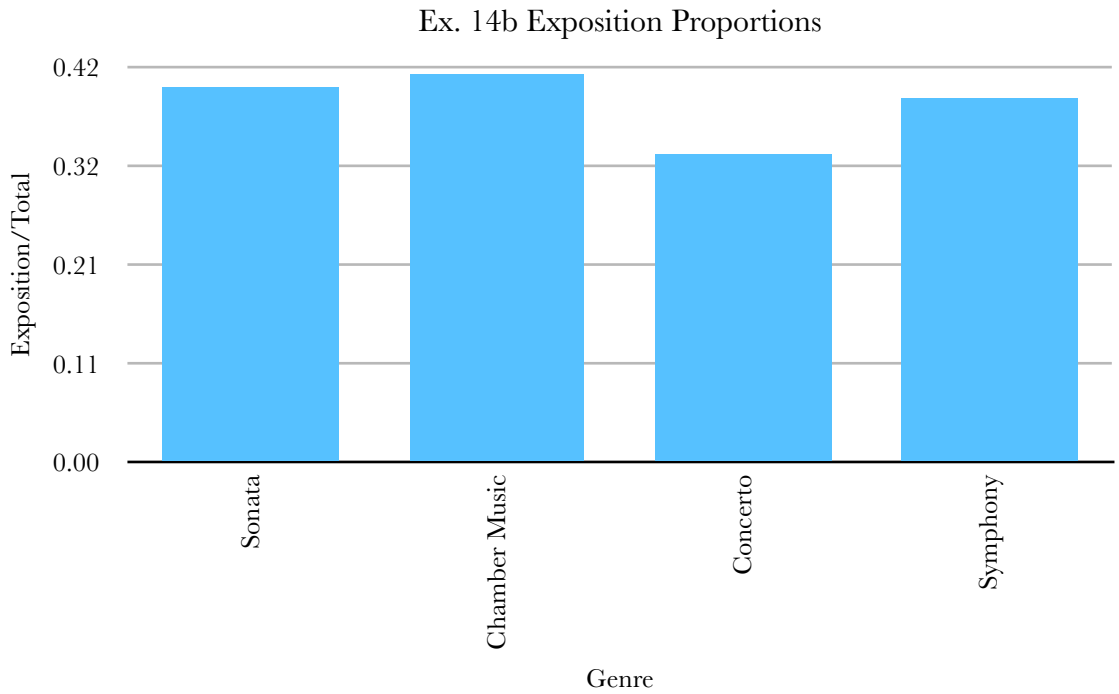
Genre	Mean
Sonata	0.40
Chamber Music	0.41
Concerto	0.33
Symphony	0.39

Ex. 13: Exposition Proportion Averages

Genre	Mozart Mean	Haydn Mean	Beethoven Mean
Sonata	0.42	0.41	0.40
Chamber Music	0.39	0.37	0.52
Symphony	0.40	0.40	0.37

Ex. 14a: Exposition Proportions





Consideration of genre is similarly interesting, with very consistent results. Looking at the mean values (Ex. 12b & 14b), it is worth bearing in mind that that for concerto is based on only one data point, and so should not be treated as representative of the genre. Otherwise, sonata, chamber music, and symphony are all very close: with **σ** of 0.06, a difference of 0.01 is immaterial.

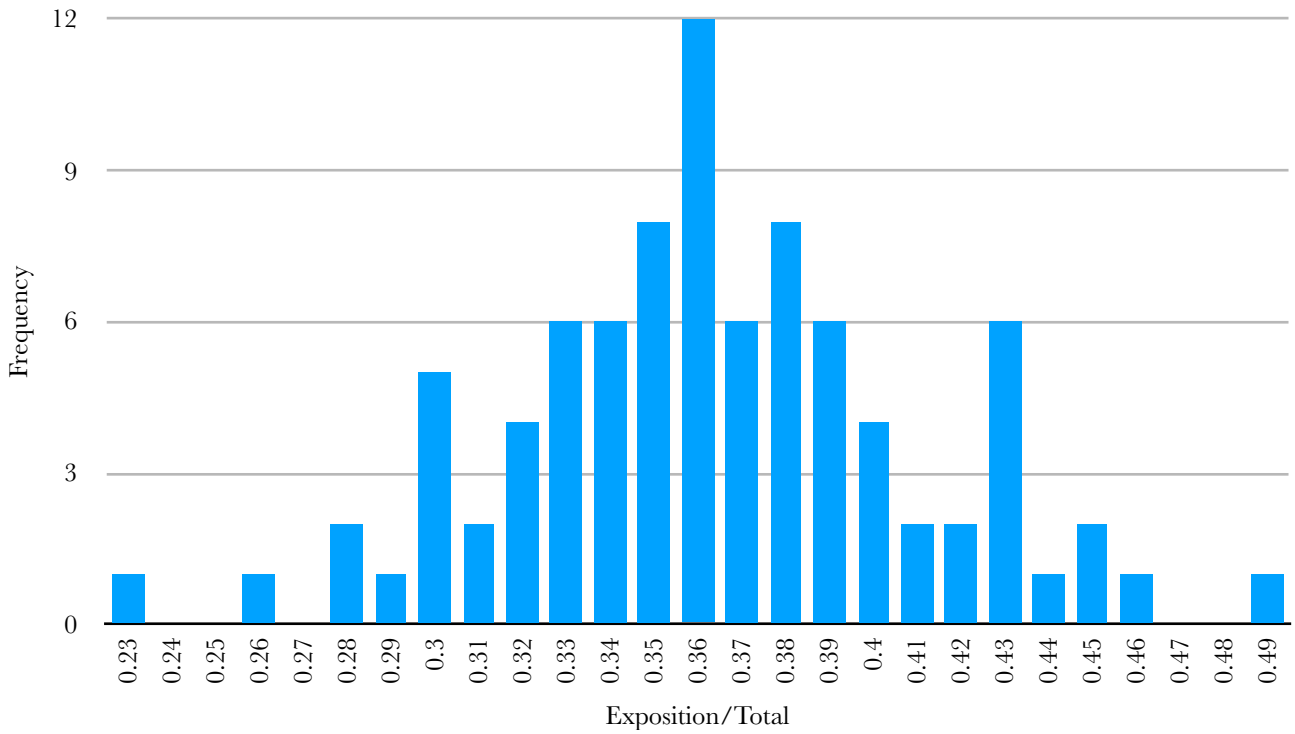
Ex. 13 shows the mean values for the Viennese triumvirate, again subdivided by genre. The consistency between Mozart and Haydn is remarkable, never more than 2% from each other: likewise with Beethoven's sonata and symphony figures, which are only, at maximum, 3% from his predecessors. His chamber music figure is more unusual, with a 14% difference from the mean of Mozart and Haydn combined. This is particularly notable as it again diverges from expectations: rather than shrinking expositions to allow for greater development, Beethoven remains fairly stable.

This overall conclusion is particularly interesting given Cannon's study, in which he finds that there is a general trend towards shortened expositions and lengthened developments over the period that he considers (1800-1899).[29] Perhaps the 3% ($^1/_2$ **σ**) difference in Beethoven's symphonies is beginning a trend, but it seems questionable to extrapolate from such a small alteration. Rather, it appears that this change took place in the years following Beethoven, rather than genuinely being a process started by him.

Ex. 15 gives an histogram of the various data points, and here the bell-curve is unmistakeable. However, with a **μ** of 0.37 and **σ** of 0.06, 60% of the data points are within 1 **σ** of **μ**, and 82% within 2 **σ**. Thus, although it is close, it is not quite arranged according to the normal distribution. Nonetheless, the bell-curve supports the sense of general consistency found above: though there was of course variety, composers approached this element of the structure in a fairly normalised manner.

[29] Cannon, 'Sonata Form in the Nineteenth-Century Symphony', Fig. 5, pp. 213-216

Ex. 15: Exposition Proportions Histogram



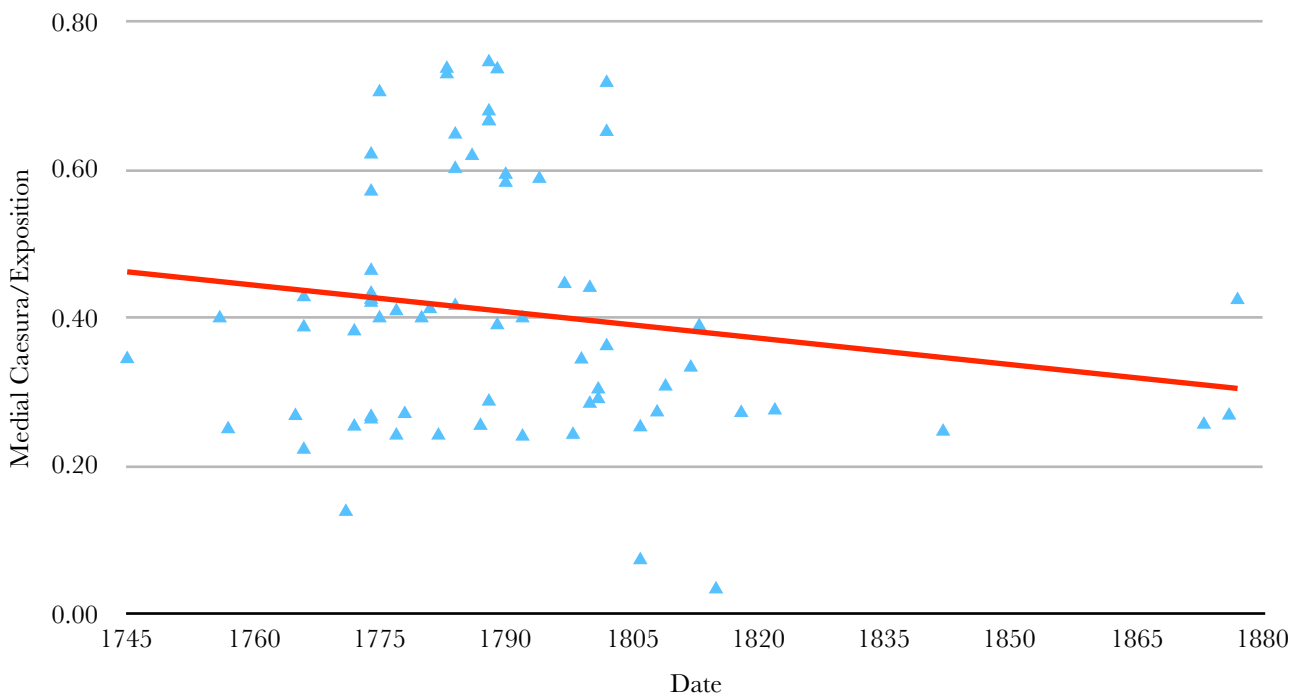
The Medial Caesura

The position of the medial caesura is of interest, primarily, as it divides the exposition into two parts, between the first group and transition, and the second group. As a result, though the position of the medial caesura has been found for many works, the following discussion is limited to those 68 works in which the end of the exposition has also been found. This, therefore, allows the calculation of the position of the medial caesura in the exposition; its position in the piece as a whole is of little interest. Expectations are that the medial caesura be at the halfway point at the latest, thus dividing the exposition in half, but likely earlier, as it is typically thought that second groups are longer than first groups. As regards any change over time, the medial caesura might be expected to get slightly earlier, to allow for an enlarged second group, and particularly for more codetta space in the 'closing zone'.[30]

Before delving into the details of particular trends, a brief discussion of the structural implications of **μ** (0.40), is required. What this confirms is the long-held assumption that the second group tends to be longer than the first group (even including the transition). Indeed, quickly scanning the figures in Ex. 17, everything is less than or equal to 0.50: the medial caesura is never beyond the halfway point. Later discussion will expand upon this, but it is a notable first observation.

Organised by date, Ex. 16 shows a consistently varied field, with high values littered throughout the dataset. There does appear, however, to be a reasonably clear trend of decreasing values across the time period, suggesting that first parts of expositions were getting shorter as time progressed, perhaps in response to the codettas of second parts becoming more common and being expanded. Ex. 17a & 19a confirm both of these observations: though there is lots of variety, there does also appear to be a generally decreasing trend, especially considering the values for Mozart, Haydn, Beethoven, and then Brahms, the best-represented figures here (0.49, 0.41, 0.33, 0.32 respectively).

Ex. 16: Medial Caesura Proportions



[30] See for example William E. Caplin, 'Structural Expansion in Beethoven's Symphonic Forms' in *Beethoven's Compositional Process* (Lincoln: University of Nebraska Press, 1991), ed. William Kinderman, p. 27

Ex. 17a: Medial Caesura Proportion Averages

Composer	Mean
Nichelmann	0.33
W. F. Bach	0.39
Mozart	0.49
Cannabich	0.27
Haydn	0.41
Cambini	0.36
Beethoven	0.33
Schubert	0.36
Schumann	0.25
Brahms	0.32

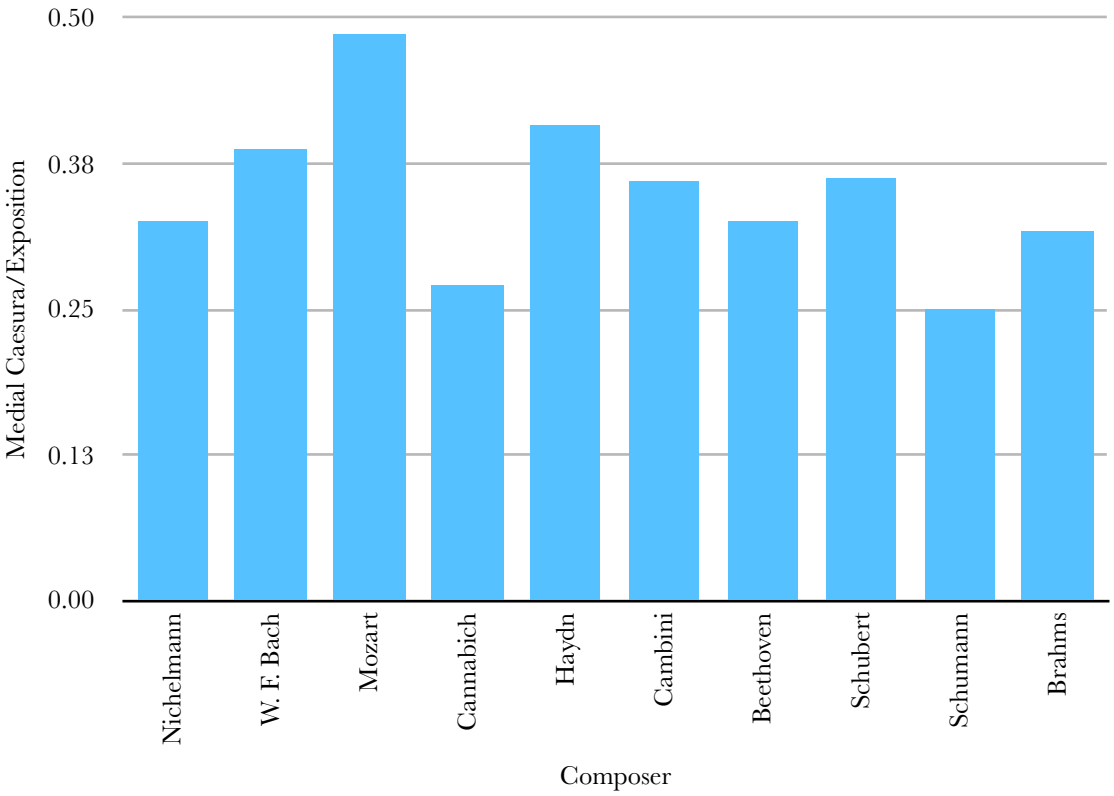
Ex. 17b: Medial Caesura Proportion Averages

Genre	Mean
Sonata	0.40
Chamber Music	0.34
Concerto	0.41
Symphony	0.50

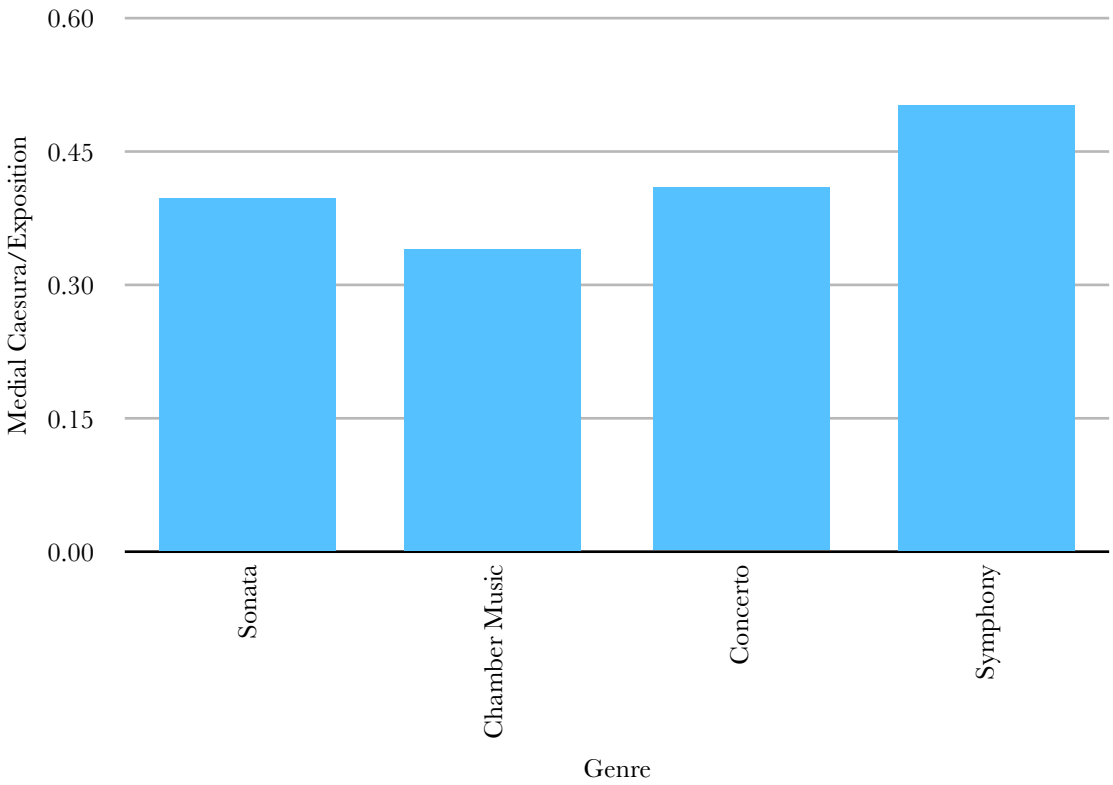
Ex. 18: Medial Caesura Proportion Averages

Genre	Mozart Average	Haydn Average	Beethoven Average
Sonata	0.48	0.33	0.33
Chamber Music	0.38	0.51	0.26
Symphony	0.59		0.42

Ex. 19a: Medial Caesura Proportions



Ex. 19b: Medial Caesura Proportions

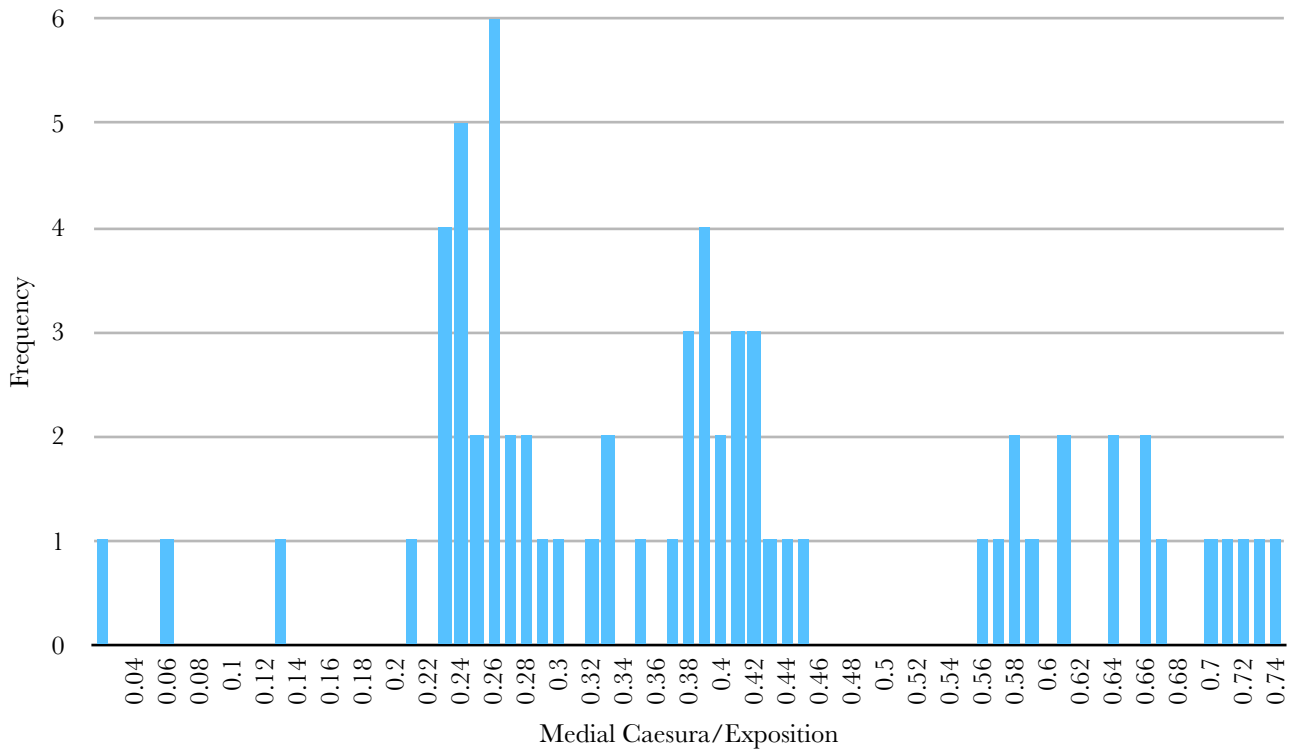


Concerning generic organisation, Ex. 17b & 19b suggest a fairly consistent picture across genres. Nonetheless, there is a wide disparity between the values for chamber music and the symphony, whilst the values for sonata and concerto are clustered around **μ**. Despite this, with **σ** of 0.17, the difference from the mean of 0.10 for the symphony, and 0.06 for chamber music is not too extreme. The figure for the symphony can also be understood by considering slow introductions, which here will have been counted as belonging to the first group, and thus will have increased the proportion of time preceding the medial caesura. Indeed, that this can be the case and still result in a mean of only 0.50 confirms the overall picture of a 'back-weighted' exposition.

The results for Mozart, Haydn, and Beethoven have been subdivided by genre as previously (Ex. 18). It is noteworthy that with the exception of Haydn's chamber music, Mozart's figures are above the other two for each genre, and indeed his overall mean is higher than any other composer by 0.08, approximately $^1/_2$ **σ**. The fairly high number of symphonies (23%) in his dataset might go some way to explaining this, but compared to Beethoven (16%), the discrepancy is not huge. Rather, this suggests that Mozart's expositions genuinely were different.

Ex. 20, an histogram for the data, confirms the wide variety suggested above. Only 34% of the data points lie within 1 **σ** of **μ**, and 54% within 2 **σ**, and there is a noticeable lack of symmetry around **μ**: the modal value is instead 0.27, though the data surrounding this is not arranged in a particularly systematic manner either. There is marginally positive skew, but, with such diverging results, this observation is of limited interest, and though it may be bimodal, the dataset is not large enough to make this distinction. What this indicates, therefore, is that this was a particularly idiosyncratic feature: composers diverged greatly, both from each other, and in their own works.

Ex. 20: Medial Caesura Proportions Histogram

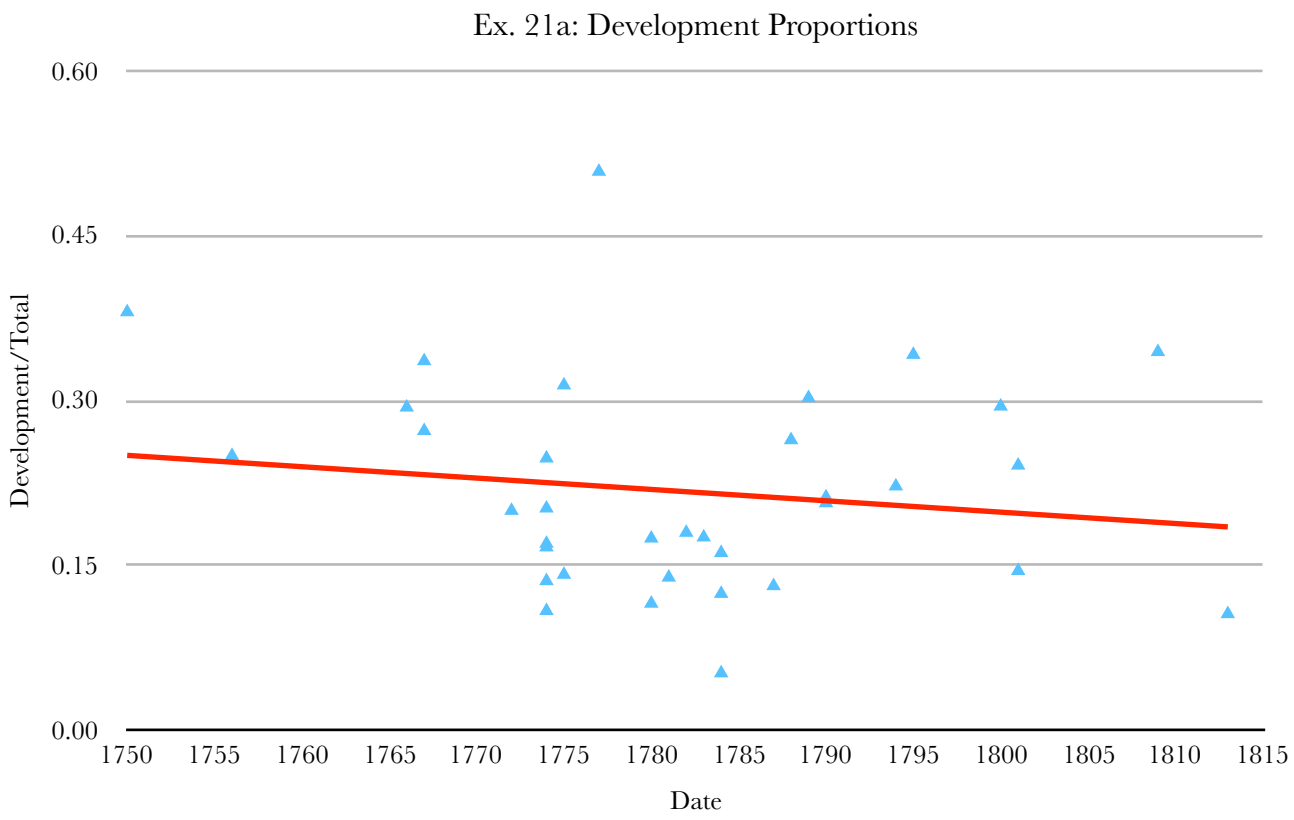


The Development

Contemplating the development, there is a comparatively small dataset of 37 data points, as this requires identification of the end of the exposition, the beginning of the recapitulation, and the total length of the piece. Here, the interest is in the length of the development compared to the whole piece, so again the data points used refer to this proportion. Mozart's works are well represented in the dataset, yet there are enough other composers to legitimate the data. Conventional wisdom holds that, over time, development sections became longer. Recalling Webster, "Mozart's developments are fairly short, perhaps 50-60% of the length of the exposition. […] Haydn's typical developments are perhaps 75% of the length of the exposition, Beethoven's perhaps 90%; occasionally, they wrote developments longer than the exposition".[31] Webster's point of reference is thus slightly different from that outlined below: he is interested in the relationship between exposition and development, rather than the development as a proportion of the entire piece.

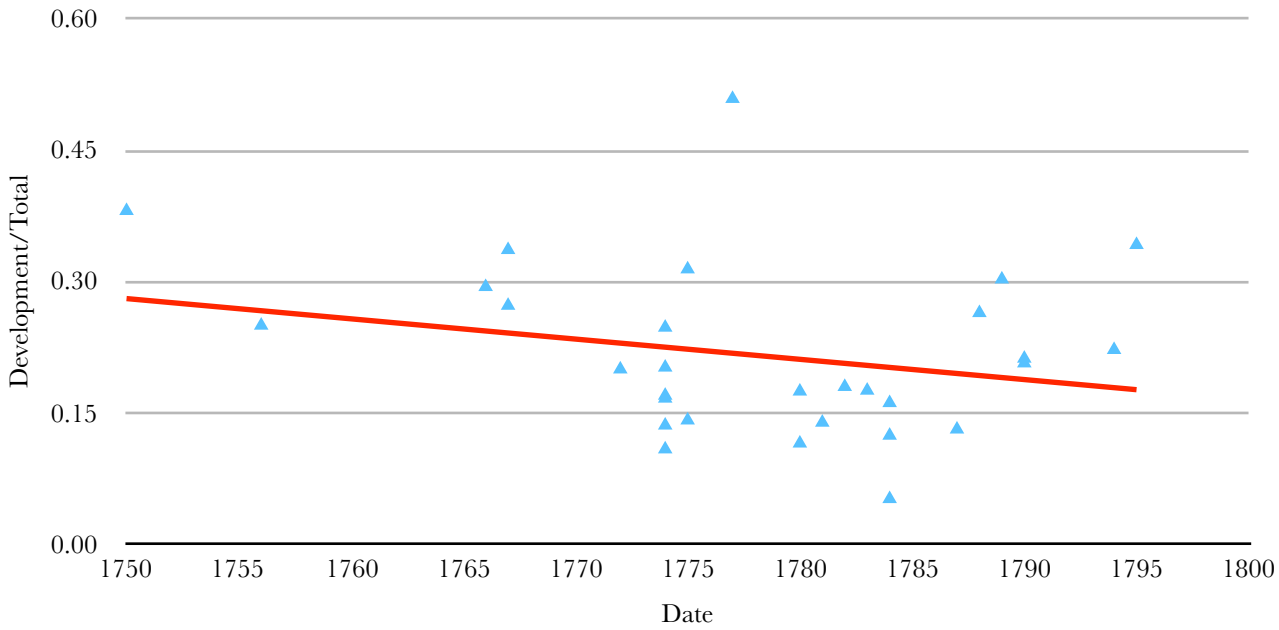
Looking initially at Ex. 21a, the data suggests something rather unexpected: as time progresses, the development section gets proportionally shorter. Though the gradient of the trend line is not particularly steep, and there is some variety across the dataset, the general trend appears to be clear. The mean values, presented in Ex. 22a & 23 present the same pattern: the trend is of descent. The data here only spans the period from 1750-1813: the latest piece included is Schubert's String Quartet No. 10, Op. 125, and indeed most of the repertoire spans the period from 1750-1800. Nonetheless, even restricting the data to this period, as in Ex. 21b, the trend remains clear. This appears fully to push against the direction of expectation.

In contrast to this, however, considering Mozart, Haydn, and Beethoven (0.19, 0.26, 0.27, respectively), shows a rather different picture, as they swim against the tide of shortening development sections. To interpret Webster's claim, Ex. 22a has been expanded to include the relation of these composers' respective



[31] Webster, 'Sonata Form'

Ex. 21b: Development Proportions



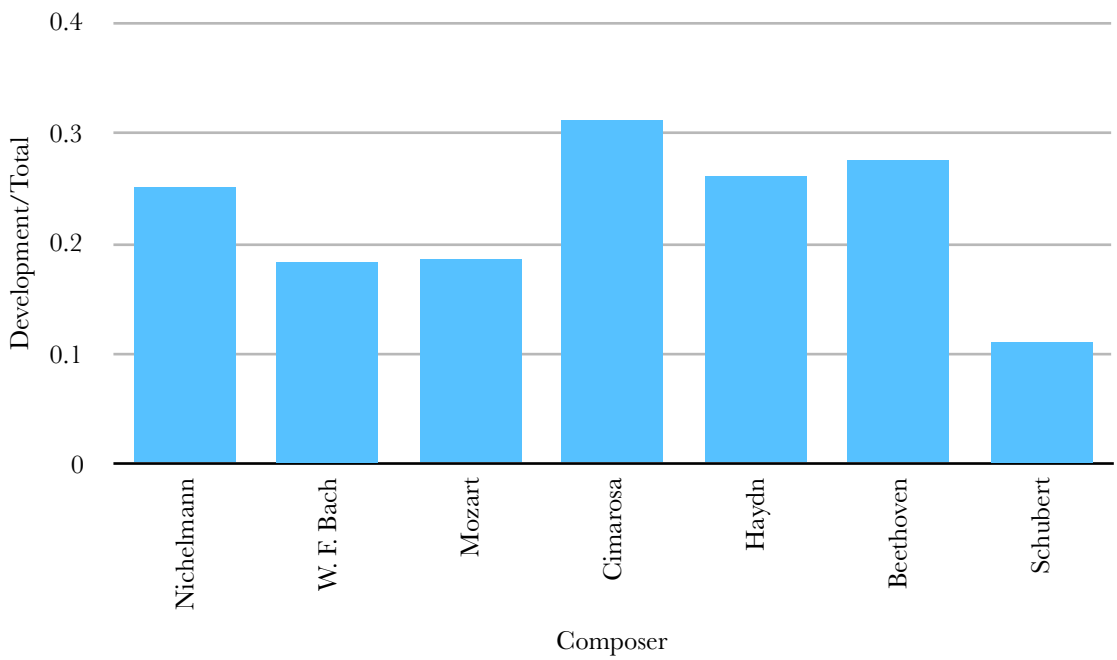
Ex. 22a: Development Proportion Averages

Composer	Development: Mean	Exposition: Mean	Development as % of Exposition
Nichelmann	0.25		
W. F. Bach	0.18		
Mozart	0.19	0.41	46
Cimarosa	0.31		
Haydn	0.26	0.40	65
Beethoven	0.27	0.43	62
Schubert	0.11		

Ex. 22b: Development Proportion Averages

Genre	Mean
Sonata	0.23
Chamber Music	0.19

Ex. 23: Development Proportion Averages

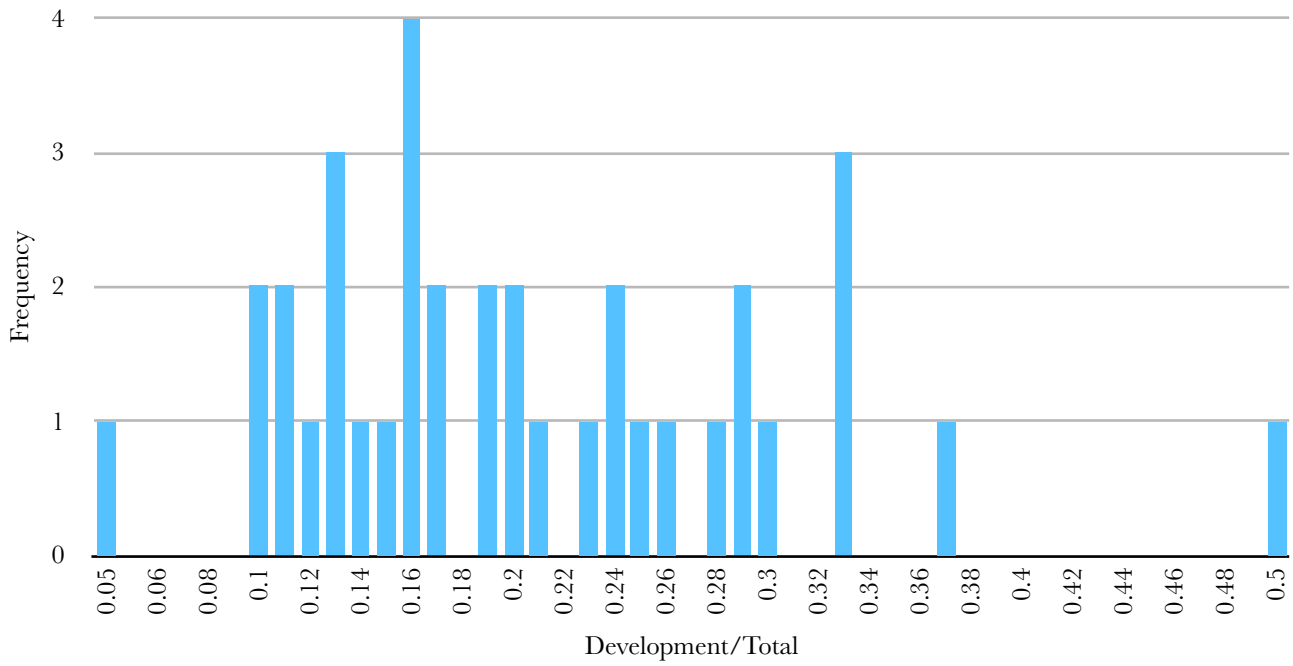


development sections to their expositions. Though Webster is certainly correct about Mozart's developments being small, compared to his colleagues, he vastly over-exaggerates Beethoven's difference from either of the other composers, and fully misrepresents Haydn's place in this trio. His figures are also all too high, though it is unclear what sort of error bounds he might have in mind for Haydn and Beethoven. If 5% is assumed in either direction (giving him the same 10% span as he provided for Mozart) he is incorrect on both occasions. As noted above, the later repertoire is covered less well in this dataset, so it could be argued that Beethoven's representation is skewed disproportionately towards his earlier work. Nonetheless, this could not justifiably be levelled at the data for Mozart or Haydn.

Ex. 22b shows the data organised by genre, although it is only sufficient to make meaningful comments about proportions in sonatas and chamber music, and though there is a small discrepancy between the two, as $\boldsymbol{\sigma}$=0.09, this constitutes slightly under $^1/_2\boldsymbol{\sigma}$, and so is of little importance.

Ex. 24 is an histogram for the total dataset, which shows a fairly varied field, with $\boldsymbol{\mu}$=0.22. 31% of the data fall within 1 $\boldsymbol{\sigma}$ of $\boldsymbol{\mu}$, and 72% within 2 $\boldsymbol{\sigma}$, although the mode is 0.17. Thus, although the data are fairly variable within their bounds, these bounds are, themselves, quite close. This indicates that, although the sizes of the development were fairly restricted, within this composers clearly explored a variety of different lengths.

Ex. 24: Development Proportion Histogram



The Recapitulation

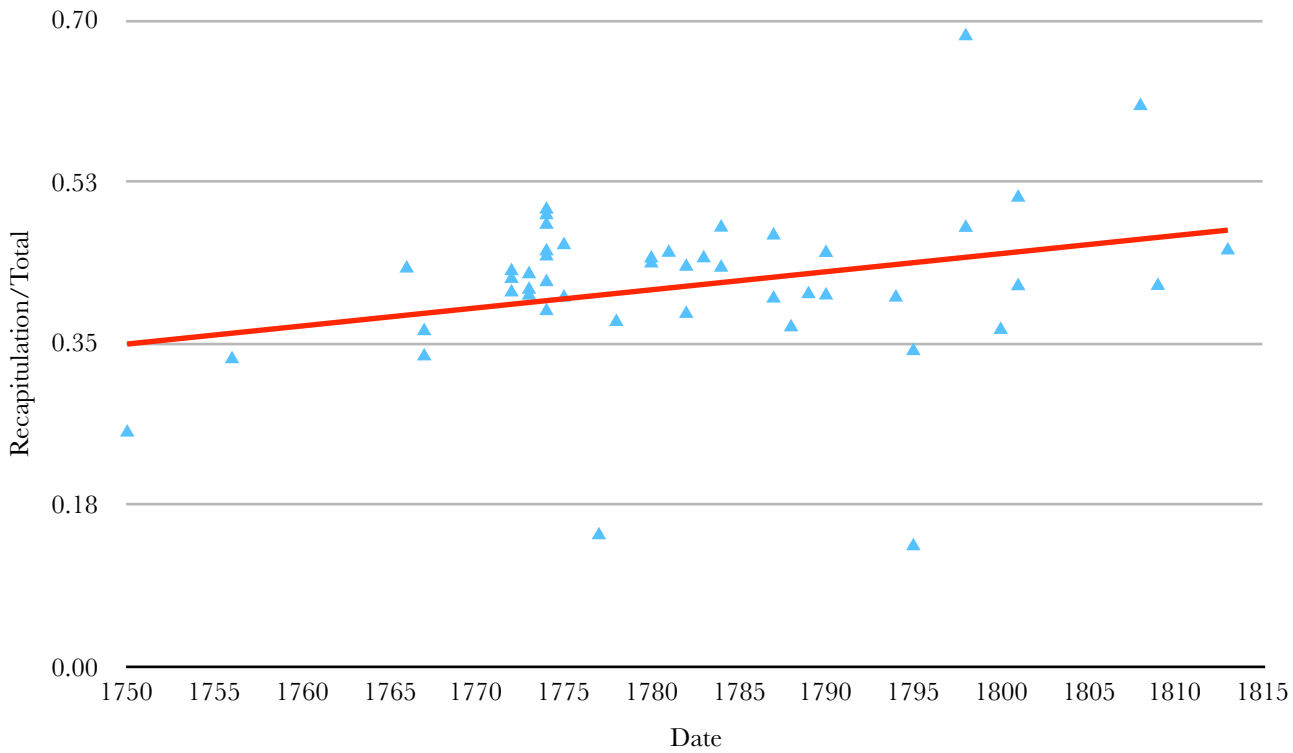
As for the recapitulation, expectations are for it to be of similar length to the exposition, or perhaps slightly longer due to the transformation of a codetta to a coda. A gradual increase in this proportion across time might be expected, as the expansion of codas is typically a trait associated with later composers.[32] There are 54 data points for this section, again particularly slanted towards sonatas and chamber music (89%).

Ex. 25 largely confirms this view, with a rising trend across time. Indeed, the three highest values are all in Beethoven's works. Likewise, Ex. 26a & 27a show a general increase in size, though with a noteworthy decrease between Mozart and Haydn.

Turning to Ex. 26b & 27b to consider genre, this interestingly shows a fairly consistent picture, with the exception of the concerto. The lower value for concertos may be due to the absence of cadenzas (typically positioned in the recapitulation/coda space) from the engraving files, or their common formatting as lasting for only one bar, despite taking up a greater length of time. Nevertheless, though Ex. 27b might appear to imply that it is vastly different, its difference from the mean of the other three is slightly under 0.03, which is $^1/_3$ **σ** (**σ**=0.09). Likewise, the difference between sonata and chamber music is of minimal significance: a change of 0.02 is hardly particularly important.

Ex. 28 is an histogram for the data, and shows a fairly evenly positioned symmetrical bell-curve, roughly around **μ**, which is 0.41. The set is bimodal, with 0.40 and 0.44 as the modal values, though again the difference between these of 0.04 is less than $^1/_2$ **σ**, and so does little to alter the general cohesion of the dataset. Similarly, 66% fall within 1 **σ** of **μ**, and 87% within 2 **σ**, reinforcing the same point. As with the expositions, this shows a general sense of consistency amongst composers.

Ex. 25: Recapitulation Proportions



[32] See for example Newman, *The Sonata in the Classic Era*, p. 146

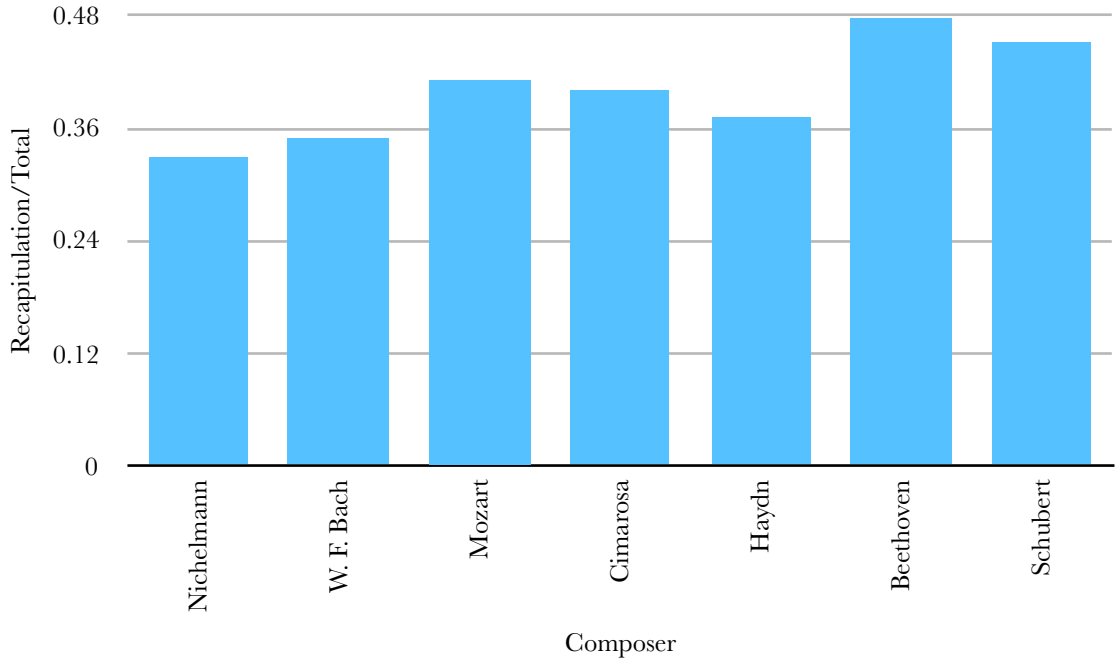
Ex. 26a: Recapitulation Proportion Averages

Composer	Mean
Nichelmann	0.33
W. F. Bach	0.35
Mozart	0.41
Cimarosa	0.40
Haydn	0.37
Beethoven	0.48
Schubert	0.45

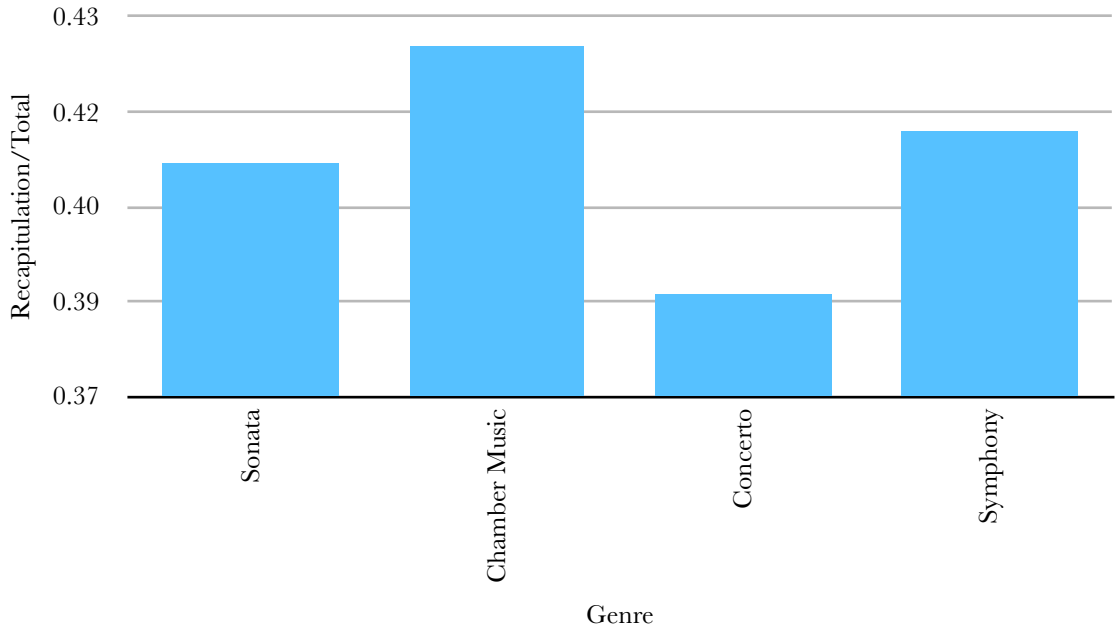
Ex. 26b: Recapitulation Proportion Averages

Genre	Mean
Sonata	0.41
Chamber Music	0.43
Concerto	0.39
Symphony	0.41

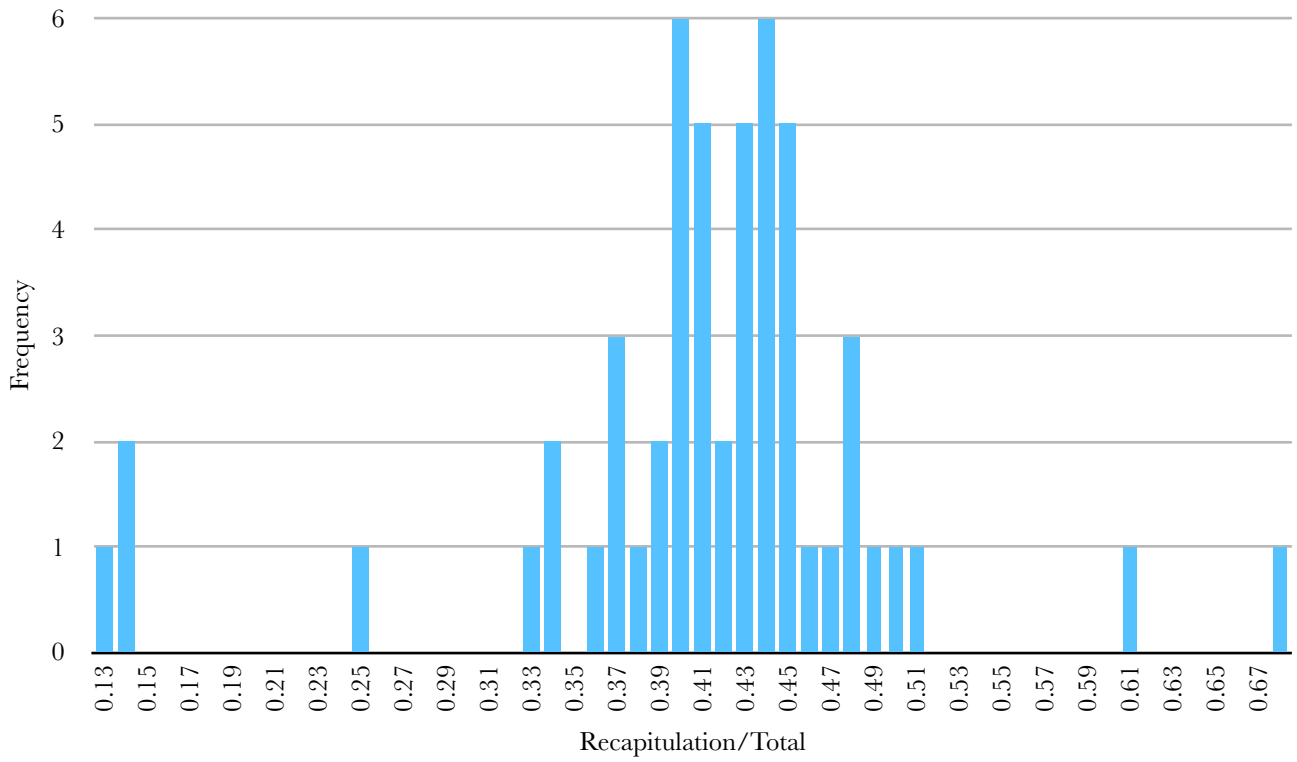
Ex. 27a: Recapitulation Proportion Averages



Ex. 27b: Recapitulation Proportion Averages



Ex. 28: Recapitulation Proportion Histogram



Overall Comments

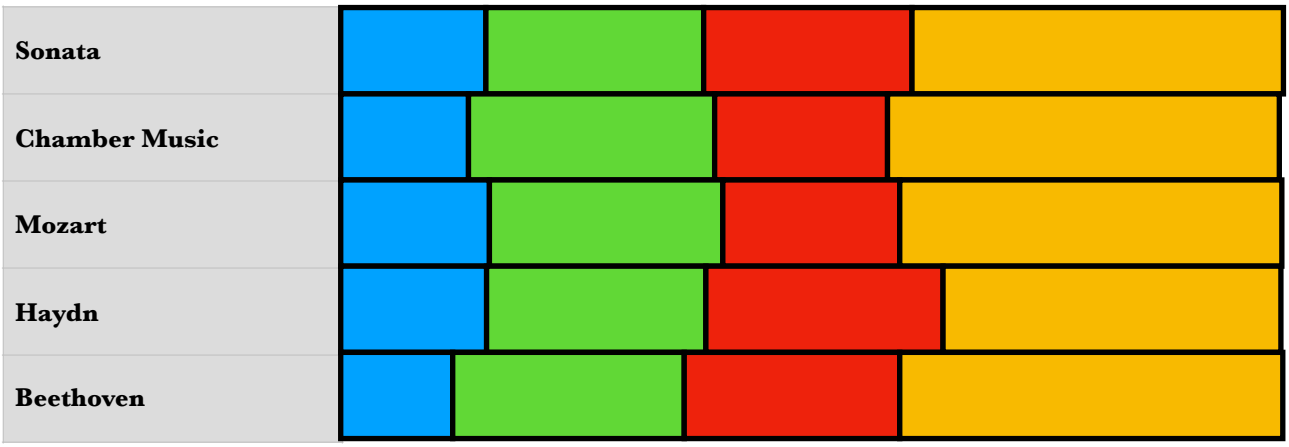
Having outlined and discussed the data for each individual formal section, it is possible to make some general comments about the overall trends. Ex. 29 shows the data for each of five different categories, comprising those genres and composers for which there are enough data to make legitimate claims. In each case, the mean datums for each section of the form (the medial caesura has been employed to subdivide the exposition) has been used, and then the five categories have been re-scaled to give values summing to 1, before rounding to three decimal places. Ex. 30 then illustrates these data diagrammatically.

Comparing composers, possibly the most interesting comment to make is how uniform these results are. Clearly there are changes in all areas, but none of these are huge. Between Mozart and Haydn, both the proportion of the exposition to the whole, and the internal proportions of the exposition itself are very similar (within 2% each time). They diverge more significantly, however, in the length of the development (6%), and recapitulation (5%). The comparison of the exposition total to recapitulation is of interest, however. In Mozart's case, they are exactly the same length, suggesting that the expansion of a codetta to a coda is unusual, or if carried out, is compensated for by the reduction of other material. Haydn's figures are even more interesting, with the exposition tending to be *longer* than the recapitulation. These results may well be explained by the ample number of symphonies in these composers' bodies of works included in the corpus, where the presence of slow introductions may well expand those sections measured with the exposition.

Ex. 29: Total Proportions

Genre/ Composer	Exposition Part 1	Exposition Part 2	Exposition Total	Development	Recapitulation
Sonata	0.154	0.231	0.385	0.221	0.394
Chamber Music	0.136	0.262	0.398	0.184	0.417
Mozart	0.158	0.248	0.406	0.188	0.406
Haydn	0.155	0.233	0.388	0.252	0.359
Beethoven	0.119	0.246	0.365	0.229	0.407

Ex. 30: Total Proportions



Meanwhile, comparing the mean of their results to Beethoven, it is surprisingly part one of the exposition where there is the greatest difference (4% smaller for Beethoven); by contrast the recapitulation is only 2% longer for Beethoven. Indeed, probably the most surprising figure of all is that of Haydn's developments, which are 2% longer than Beethoven's, and 6% longer than Mozart's. Though his relationship with Beethoven is largely to be expected, given the overall trend of shortening development sections found above, his divergence from Mozart certainly opposes this pattern. A brief note of explanation is required concerning the disparity between Ex. 22a and Ex. 29: the means calculated in Ex. 22a, which have Mozart, Haydn, and Beethoven's developments at 0.19, 0.26, 0.27, respectively, of the whole, appear to disagree with the trend presented in Ex. 29. However, Ex. 22a also shows the developments as a percentage of the exposition (46%, 65%, 62%, respectively), where the same pattern appears as in Ex. 29. This latter calculation is a more significant one, as it takes into account the varying lengths of the other sections of the piece, rather than just treating the other music as an undivided entity. What this suggests is that it is perhaps Mozart who is the anomalous figure here, rather than Haydn or Beethoven, with noticeably short developments compared to his colleagues.

Generic classification, by contrast, remains fairly stable, with exposition, development, and recapitulation all within 3% of each other when comparing sonata and chamber music structures. The only major change is in the internal structure of the exposition: though part two is longer than part one in both cases, this difference is much more extreme (12% rather than 8%) for chamber music. This overall stability reflects the general trends; indeed, the only generic category that is, at times, unusually idiosyncratic, is the symphony.

Conclusions

Did We Prove It?

In several cases, the answer appears to be 'yes'. Sonata movements do indeed get longer later in time, and also when in a genre with a greater number of instruments. Likewise, the division of expositions around the medial caesura clearly follows the expected trajectory, with second parts getting progressively longer over time. The growing length of recapitulations similarly confirms expectations. The two areas that rather subvert common wisdom are the overall lengths of expositions, which tend to remain the same, rather than getting shorter, and the lengths of developments, which tend to get shorter, instead of expanding, even if particular composers contradict these general trends. As regards general consistency, the results tend to be fairly coherent, although in some areas there is more idiosyncratic divergence by individuals. Meanwhile, generically, there is hardly any difference in terms of internal proportions: the only important incongruity here regards the symphony, where slow introductions sometimes skew the results. To answer the above question: Mozart's music appears to be closer to general practice of sonatas than Haydn's music.

Having established these various expectations for particular composers, archetypal movements can be identified: those in the corpus for which all data points have been identified, which come closest to these 'ideal' structures, and so demonstrate the proportions to which these composers were adhering. These have been chosen by calculating the difference from the mean for the relevant composer for each section, and then identifying that movement with the lowest total difference. In the case of Mozart, it is the Sonata for Two Pianos, K. 448/375a, Movt. 1, with proportions of 0.170 (exposition part 1), 0.242 (exposition part 2), 0.412 (exposition total), 0.139 (development), 0.448 (recapitulation), and an overall difference from the mean of 0.115. For Haydn, it is the Piano Sonata in D Major, Movt. 1, with proportions of 0.155, 0.233, 0.388, 0.175, 0.437, and a difference from the mean of 0.156. Finally, within Beethoven's works, it is the String Quartet No. 5, Op. 18, No. 5, Movt. 1, with proportions of 0.105, 0.241, 0.346, 0.241, 0.412, and a difference from the mean of 0.055.

Looking Forward

There are several clear directions in which further research could be directed. Firstly, this sort of study would benefit from a larger corpus. In particular, it would be of great interest to add to the number of non-canonical works included. Furthermore, it would be valuable to expand this approach to later works, particularly those between Beethoven and Brahms, such as Dvořák or Tchaikovsky. Indeed, given the apparent difference between the works of Mozart and Haydn, and Brahms, it would be fascinating to see in which direction these mid-nineteenth-century composers tend, or whether they display a gradual trajectory. Until OMR software becomes advanced enough to be employed reliably without needing extensive proofreading, this is unlikely to be more than a pipe-dream. However, even the addition of features like repeat and final barlines to many of the files in this corpus would quickly expand the reach of this sort of work.

Another obvious direction of study is into the details of the individual sections. Though the major formal junctures have been identified in this project, a lot could be gained by further subdividing the exposition, taking account of any transition material and any possible codetta. Likewise, identifying the start of the coda at the end of the recapitulation would add to the subtlety of this proportional understanding.

Fundamentally, the methods used here are quite crude, often relying on proxies. A more sophisticated analytical framework would replace these proxies with more direct analytical queries regarding harmony and thematic material. An obvious example concerns the start of the recapitulation: whereas here, even despite the chordify tool, the code still relies on there being no change of voicing in the harmony. It would be preferable to develop some tool that separates the thematic material from the surrounding harmony, and thus search for the recurrence of the relevant thematic material in the 'correct' tonal context, which would also allow this approach to be applied effectively to later repertoire, where unaltered repeats are rare, if not wholly absent.

More broadly, this project functions as an example of how these sorts of computational techniques can be used to test the statistical veracity of particular authors' statements and conventional ideas. The bounds of this approach are limited only by the number of ideas to test, and the ingenuity of the analyst in finding apposite digital procedures. As Alan Turing put it, "We can only see a short distance ahead, but we can see plenty there that needs to be done."

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Sources of Scores

- Gutenberg Project, http://www.gutenberg.org
- IMSLP, http://imslp.org/
- KernScores, http://kern.ccarh.org
- MuseScore, https://musescore.com
- MuseData, http://www.musedata.org
- *Tobi's Notenarchiv,* http://www.tobis-notenarchiv.de
- Various private individuals

Appendix 1: Annotated Code

Code Line	Code	Comments
1	`for el in relevantPieces:`	for each work in the list of corpus
2	`    try:`	
3	`        mcPosition = []`	define this as an empty list
4	`        expoEndPosition = []`	define this as an empty list
5	`        recapStartPosition = []`	define this as an empty list
6	`        pieceEnd = []`	define this as an empty list
7	`        thePiece = converter.parse(el)`	load this piece
8	`        fileTitle = el`	define the sourcepath as the fileTitle
9	`        if 'Haydn' in str(el):`	if 'Haydn' is in the sourcepath
10	`            Composer = 'Haydn'`	set the composer to be 'Haydn'
11	`        if 'haydn' in str(el):`	
12	`            Composer = 'Haydn'`	
13	`        if 'Mozart' in str(el):`	
14	`            Composer = 'Mozart'`	
15	`        if 'mozart' in str(el):`	
16	`            Composer = 'Mozart'`	
17	`        if 'Schubert' in str(el):`	
18	`            Composer = 'Schubert'`	
19	`        if 'schubert' in str(el):`	
20	`            Composer = 'Schubert'`	
21	`        if 'Beethoven' in str(el):`	
22	`            Composer = 'Beethoven'`	
23	`        if 'beethoven' in str(el):`	
24	`            Composer = 'Beethoven'`	
25	`        if 'Schumann' in str(el):`	
26	`            Composer = 'Schumann'`	
27	`        if 'schumann' in str(el):`	
28	`            Composer = 'Schumann'`	

Code Line	Code	Comments
29	`        if 'Brahms' in str(el):`	
30	`            Composer = 'Brahms'`	
31	`        if 'brahms' in str(el):`	
32	`            Composer = 'Brahms'`	
33	`        if 'W. F. Bach' in str(el):`	
34	`            Composer = 'W. F. Bach'`	
35	`        if 'w. f. bach' in str(el):`	
36	`            Composer = 'W. F. Bach'`	
37	`        if 'Cimarosa' in str(el):`	
38	`            Composer = 'Cimarosa'`	
39	`        if 'cimarosa' in str(el):`	
40	`            Composer = 'Cimarosa'`	
41	`        if 'Cannabich' in str(el):`	
42	`            Composer = 'Cannabich'`	
43	`        if 'cannabich' in str(el):`	
44	`            Composer = 'Cannabich'`	
45	`        if 'Cambini' in str(el):`	
46	`            Composer = 'Cambini'`	
47	`        if 'cambini' in str(el):`	
48	`            Composer = 'Cambini'`	
49	`        if 'Dussek' in str(el):`	
50	`            Composer = 'Dussek'`	
51	`        if 'dussek' in str(el):`	
52	`            Composer = 'Dussek'`	
53	`        if 'Giuliani' in str(el):`	
54	`            Composer = 'Giuliani'`	
55	`        if 'giuliani' in str(el):`	
56	`            Composer = 'Giuliani'`	
57	`        if 'Soler' in str(el):`	

Code Line	Code	Comments
58	`            Composer = 'Soler'`	
59	`        if 'soler' in str(el):`	
60	`            Composer = 'Soler'`	
61	`        if 'C. P. E. Bach' in str(el):`	
62	`            Composer = 'C. P. E. Bach'`	
63	`        if 'c. p. e. bach' in str(el):`	
64	`            Composer = 'C. P. E. Bach'`	
65	`        if 'Nichelmann' in str(el):`	
66	`            Composer = 'Nichelmann'`	
67	`        if 'nichelmann' in str(el):`	
68	`            Composer = 'Nichelmann'`	
69	`        if 'Piano Sonata' in str(el):`	
70	`            Genre = 'Sonata'`	
71	`        if 'Keyboard Sonata' in str(el):`	
72	`            Genre = 'Sonata'`	
73	`        if 'piano/sonata' in str(el):`	
74	`            Genre = 'Sonata'`	
75	`        if 'keyboard/uesonatas' in str(el):`	
76	`            Genre = 'Sonata'`	
77	`        if 'Sonata in' in str(el):`	
78	`            Genre = 'Sonata'`	
79	`        if 'Sonata for' in str(el):`	
80	`            Genre = 'Sonata'`	
81	`        if 'Sonate' in str(el):`	
82	`            Genre = 'Sonata'`	
83	`        if 'Violin Sonata' in str(el):`	
84	`            Genre = 'Sonata'`	
85	`        if 'Sonata in' in str(el):`	
86	`            Genre = 'Sonata'`	

Code Line	Code	Comments
87	`        if 'Cello Sonata' in str(el):`	
88	`            Genre = 'Sonata'`	
89	`        if 'Symphony' in str(el):`	
90	`            Genre = 'Symphony'`	
91	`        if 'sym' in str(el):`	
92	`            Genre = 'Symphony'`	
93	`        if 'String Quartet' in str(el):`	
94	`            Genre = 'String Quartet'`	
95	`        if 'quart' in str(el):`	
96	`            Genre = 'String Quartet'`	
97	`        if 'qrtets' in str(el):`	
98	`            Genre = 'String Quartet'`	
99	`        if 'Concerto' in str(el):`	
100	`            Genre = 'Concerto'`	
101	`        if 'genre=conc' in str(el):`	
102	`            Genre = 'Concerto'`	
103	`        if 'Sextet' in str(el):`	
104	`            Genre = 'Sextet'`	
105	`        if 'Trio' in str(el):`	
106	`            Genre = 'Trio'`	
107	`        if 'Sonata for' in str(el):`	
108	`            Genre = 'Sonata'`	
109	`        if 'Quintet' in str(el):`	
110	`            Genre = 'Quintet'`	
111	`        if 'Divertimento' in str(el):`	
112	`            Genre = 'Divertimento'`	
113	`        if 'divert' in str(el):`	
114	`            Genre = 'Divertimento'`	
115	`        if 'Duo' in str(el):`	

Code Line	Code	Comments
116	`Genre = 'Duo'`	
117	`if 'Allegro in' in str(el):`	
118	`Genre = 'Allegro'`	
119	`chordifiedPiece = thePiece.stripTies().chordify()`	remove ties from the piece and chordify it
120	`listOfMeasureNumbers = []`	define this as an empty list
121	`for el in chordifiedPiece:`	for each element in the chordified piece
122	`listOfMeasureNumbers.append(el.measureNumber)`	add its measure number to the list of all measure numbers
123	`finalMeasureNumberPosition = len(listOfMeasureNumbers)-1`	
124	`finalMeasureNumber = listOfMeasureNumbers[finalMeasureNumberPosition]`	
125	`pieceEnd.append(finalMeasureNumber)add the final measure number to the list pieceEnd`	
126	`barlines = thePiece.flat.recurse().getElementsByClass('Barline')`	flatten the piece + search for all barlines within the piece
127	`importantBarlines = []`	define this as an empty list
128	`for i in barlines:`	
129	`if i.style == 'final':`	look for 'final' barlines
130	`importantBarlines.append(i.measureNumber)`	add these measure numbers to the list
131	`for i in barlines:`	
132	`if i.style == 'repeat':`	look for 'repeat' barlines
133	`importantBarlines.append(i.measureNumber)`	add these measure numbers to the list
134	`newimportantBarlines = list(set(importantBarlines))`	remove duplicates
135	`importantBarlinesList = list(map(float, newimportantBarlines))`	turn strings into floats
136	`if(len(newimportantBarlines)) == 1:`	if there is only one of these type of barlines
137	`expoEndPosition.append('not found')`	add 'not found' to the list expoEndPosition
138	`if(len(newimportantBarlines)) == 2:`	
139	`expoEndPosition.append(min(newimportantBarlines))`	
140	`if(len(newimportantBarlines)) == 3:`	
141	`penultimateBarline = newimportantBarlines[1]`	
142	`lastBarline = newimportantBarlines[2]`	
143	`offsetDifference = lastBarline-penultimateBarline`	define offsetDifference as the difference between the last two significant barlines
144	`if offsetDifference > 16:`	

Code Line	Code	Comments
145	`expoEndPosition.append(penultimateBarline)`	
146	`else:`	
147	`firstBarline = newimportantBarlines[0]`	
148	`expoEndPosition.append(firstBarline)`	
149	`if(len(newimportantBarlines)) == 4:`	
150	`penultimateBarline = newimportantBarlines[2]`	
151	`lastBarline = newimportantBarlines[3]`	
152	`offsetDifference = lastBarline-penultimateBarline`	
153	`if offsetDifference > 16:`	
154	`expoEndPosition.append(penultimateBarline)`	
155	`else:`	
156	`antePenultimateBarline = newimportantBarlines[1]`	
157	`expoEndPosition.append(antePenultimateBarline)`	
158	`if len(importantBarlinesList) == 0:`	if the number of significant barlines is 0
159	`flatPiece = thePiece.flat`	flatten the piece
160	`sIter = flatPiece.iter`	
161	`n = sIter.getElementsByClass('MeasureNumber')`	get all measure numbers
162	`listOfMeasureNumbers = []`	define this as an empty list
163	`for el in n:`	for each measure number
164	`listOfMeasureNumbers.append(el)`	add this to the list
165	`if len(listOfMeasureNumbers) > 0:`	if there are some recorded measure numbers
166	`halfwayThroughMeasureNumber = finalMeasureNumber/2`	the middle measure number is found
167	`shortExpoLastBarline = int(halfwayThroughMeasureNumber)`	this middle measure number is converted to an integer and defined as the end of the 'short exposition'
168	`oneEighthThrough = halfwayThroughMeasureNumber/4`	one tenth of the way through the piece is found
169	`initialPointInteger = int(oneEighthThrough)`	this measure number, one eighth of the way through, is converted to an integer and defined as the start of the 'short exposition'
170	`finalPointInteger = shortExpoLastBarline-initialPointInteger`	
171	`if len(importantBarlinesList) > 0:`	if the number of significant barlines is greater than 0

Code Line	Code	Comments
172	`firstImportantBarline = int(min(importantBarlinesList))`	the first significant barline is defined as the first barline in the list of significant barlines
173	`lastImportantBarline = int(max(importantBarlinesList))`	the last significant barline is defined as the last barline in the list of significant barlines
174	`if firstImportantBarline == lastImportantBarline:`	if these are the same barline
175	`expositionEnd = int(firstImportantBarline/2)`	establish a point 1/3 of the way through as the estimated end of the exposition
176	`initialPoint = float(expositionEnd)/4`	establish a point 1/4 of the way through the estimated exposition
177	`initialPointInteger = int(initialPoint)`	turn this into an integer
178	`finalPoint = float(expositionEnd)-float(expositionEnd)/4`	establish a point 3/4 of the way through the estimated exposition
179	`finalPointInteger = int(finalPoint)`	turn this into an integer
180	`else:`	
181	`initialPoint = float(firstImportantBarline)/4`	establish a point 1/4 of the way through the exposition
182	`initialPointInteger = int(initialPoint)`	turn this into an integer
183	`finalPoint = float(firstImportantBarline)-float(firstImportantBarline)/4`	establish a point 3/4 of the way through the exposition
184	`finalPointInteger = int(finalPoint)`	turn this into an integer
185	`smallExposition = chordifiedPiece.measures(initialPointInteger`	finalPointInteger)section off the middle two quarters of the exposition
186	`smallExpositionFlat = smallExposition.flat`	flatten the Stream of the middle half of the exposition
187	`sIter = smallExpositionFlat.iter`	
188	`m = sIter.getElementsByClass('Rest')`	filter to just rests
189	`listOfRests = []define this as an empty list`	
190	`for el in m:for each element in the list of just rests`	
191	`listOfRests.append(el)`	add this to the list
192	`if len(listOfRests) == 1:if there is one rest in this list`	
193	`mcPosition.append(el.measureNumber)`	add the measure number of this rest to 'mcPosition'
194	`else:`	
195	`revisedListOfRests = []`	define this as an empty list
196	`for el in listOfRests:`	
197	`chordifiedExpo = chordifiedPiece.measures(0, finalPointInteger)`	define chordified exposition as from the beginning to 3/4 through the exposition

Code Line	Code	Comments
198	`precedingSection = chordifiedExpo.measures(0, int(el.measureNumber))`	define the preceding section
199	`precedingSectionKey = precedingSection.analyze('key')`	analyse the key of this section
200	`followingSection = chordifiedExpo.measures(int(el.measureNumber), finalPointInteger)`	define the following section
201	`followingSectionKey = followingSection.analyze('key')`	analyse the key of this section
202	`if precedingSectionKey.transpose('P5') == followingSectionKey:`	if the preceding section key transposed by a perfect fifth is the following section key
203	`revisedListOfRests.append(el)`	add this to the list
204	`if precedingSectionKey == 'minor':`	if the key of the preceding section is minor
205	`if precedingSectionKey.transpose('m3') == followingSectionKey:#`	if the preceding section key transposed by a minor third is the following section key
206	`revisedListOfRests.append(el)`	add this to the list
207	`if len(revisedListOfRests) == 0:`	if the length of the list is 0
208	`mcPosition.append('not found once')`	add 'not found' to the medial caesura position list
209	`newListOfRests = []`	define this as an empty list
210	`for i in revisedListOfRests:`	for each element in this list
211	`if listOfRests.index(i)+1 == len(listOfRests):`	if this is the final rest in the list
212	`newListOfRests.append(i)`	add the rest to this list
213	`else:`	
214	`j = listOfRests.index(i) + 1`	define j as the next rest in the list
215	`if i.offset + i.quarterLength == listOfRests[j].offset:`	if the position of the first rest + its duration is the position of the second rest (i.e. if there are two consecutive rests)
216	`k = note.Rest`	define k as a new rest
217	`k.quarterLength = i.quarterLength + listOfRests[j].quarterLength`	with length of both rests put together
218	`k.offset = i.offset`	and position of the first rest
219	`newListOfRests.append(k)`	add this rest (k) to this list
220	`else:`	
221	`newListOfRests.append(i)`	add the rest to this list
222	`newListOfRestsLengths = []`	define this as an empty list
223	`for el in newListOfRests:`	for each rest in this list
224	`newListOfRestsLengths.append(el.quarterLength)`	append the duration of the rest to this list
225	`longestRest = []t`	define this as an empty lis

Code Line	Code	Comments
226	`longestRest.append(max(newListOfRestsLengths))`	append the longest rest duration to this list
227	`if len(longestRest) == 1:`	if the length of this list is 1
228	`for el in longestRest:`	for each element in this list (and there will only be 1)
229	`if longestRest in newListOfRestsLengths:`	if it is in this list of rest lengths
230	`longestRestInfo = listOfRests[newListOfRestsLengths.index(longestRest)]`	define this as the position of this rest
231	`mcPosition = longestRestInfo.measureNumber`	add the measure number of this rest to the medial caesura position list
232	`else:`	
233	`mcPosition.append('not found twice')`	add 'not found twice' to the medial caesura position list
234	`expoSample = chordifiedPiece.measures(2, 3)`	section off the second & third bars of the exposition
235	`def rot(lst, n, p=-1):`	define the function 'rot' with three arguments
236	`return list(zip(*([lst[i+p:] + lst[:i+p] for i in range(n)])))`	'rot' passes a 'rolling window' over a list
237	`listOfMeasureNumberPairs = rot(listOfMeasureNumbers, 2)`	apply the function 'rot' to the list of bar numbers with 2-bar windows
238	`recapBarCombinations = []`	define this as an empty list
239	`for el in listOfMeasureNumberPairs:`	for each element in this list (i.e. each pair of measure numbers)
240	`if None in el:`	if one of the measure numbers is 'None'
241	`pass`	do nothing
242	`else:`	
243	`recapBarCombinations.append(chordifiedPiece.measures(el[0], el[1]))`	append these elements to this list
244	`recapPossibilities = []`	define this as an empty list
245	`for el in recapBarCombinations:`	for each element (i.e. pair of bars) in this list
246	`if el.pitches == expoSample.pitches:`	if its pitches are the same as those of the second & third bars
247	`recapPossibilities.append(recapBarCombinations.index(el)-1)`	append the position of these bars to this list
248	`else:`	
249	`pass`	
250	`if len(recapPossibilities) == 2:`	if there are two elements in this list
251	`recapStartPosition.append(recapPossibilities[1]-1)`	append the first of these to the list
252	`else:`	

Code Line	Code	Comments
253	`pass`	
254	`if len(recapPossibilities) == 4:`	if there are four elements in this list
255	`recapStartPosition.append(recapPossibilities[2]-1)`	append the first of these to the list
256	`else:`	
257	`pass`	
258	`if len(recapPossibilities) == 0:`	if there are no elements in this list
259	`recapStartPosition.append('not found 0')`	append 'not found' to the list
260	`else:`	
261	`pass`	
262	`if len(recapPossibilities) == 1:`	if there is one element in this list
263	`if len(newimportantBarlines) > 1:`	if the number of significant barlines is greater than 1
264	`newExpoSample = chordifiedPiece.measures(newimportantBarlines[0]+2, newimportantBarlines[0]+3)`	define the new exposition sample as the second and third bars after the first significant barline
265	`for el in recapBarCombinations:`	for each element in the list of pairs of measures
266	`newRecapPossibilities = []`	define this as an empty list
267	`if el.pitches == newExpoSample.pitches:`	[for each element] if its pitches and the same as those of the new exposition sample
268	`newRecapPossibilities.append(recapBarCombinations.index(el)-2)`	append the position of these bars to this list
269	`else:`	
270	`pass`	
271	`if len(newRecapPossibilities) == 2:`	if there are two elements in this list
272	`recapStartPosition.append(recapPossibilities[1]-1)`	append the first of these to the list
273	`if len(newRecapPossibilities) == 0:`	if there are no elements in this list
274	`recapStartPosition.append('not found at all')`	append 'not found' to the list
275	`if len(newRecapPossibilities) == 1:`	
276	`recapStartPosition.append('not found twice')`	
277	`if len(newRecapPossibilities) == 3:`	
278	`recapStartPosition.append('found three')`	
279	`if len(newRecapPossibilities) == 4:`	
280	`recapStartPosition.append('found four')`	

Code Line	Code	Comments
281	`            else:`	
282	`                recapStartPosition.append('not going to be found')`	append 'not found' to the list
283	`        else:`	
284	`            pass`	
285	`        if mcPosition == []:`	if the list of medial caesura positions is empty
286	`            mcPosition.append('finally not found')`	append 'not found' to the list
287	`        if expoEndPosition == []:`	if the list of exposition end positions is empty
288	`            expoEndPosition.append('finally not found')`	
289	`        if recapStartPosition == []:`	if the list of recapitulation start positions is empty
290	`            recapStartPosition.append('finally not found')`	
291	`        if pieceEnd == []:`	if the list of piece end positions is empty
292	`            pieceEnd.append('finally not found')`	
293	`        csvWriter()write these data to a csv file`	
294	`    except:`	if there is an error raised
295	`        pass`	ignore
	`n.b. the terminology 'significant barlines' is used to refer to 'final' and 'repeat' barlines`	

Appendix 2: Total Results

Filename	Date	Composer	Revised Genre	Generic Rank	Medial Caesura Position	Exposition End Position	Recapitulation Start Position	End of Piece
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Concertos/W. F. Bach Concerto in F Major Mvt. 1.xml	1740	W. F. Bach	Concerto	3	finally not found	24	not found at all	73
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in D Major F3 Mvt. 1.xml	1745	W. F. Bach	Sonata	1	10	29	not found at all	85
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/C. P. E. Bach/C. P. E. Bach Sonata in a minor for solo flute Wq 132 Mvt. 1.xml	1747	C. P. E. Bach	Sonata	1	finally not found	finally not found	not found at all	149
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in C Major F1 Mvt. 1.xml	1750	W. F. Bach	Sonata	1	finally not found	23	47	63
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in F Major F6 Mvt. 1.xml	1750	W. F. Bach	Sonata	1	finally not found	16	not found at all	52
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Nichelmann/Nichelmann Allegro in E Major (1756) Mvt.xml	1756	Nichelmann	Sonata	1	16	40	64	96
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Soler/Soler Keyboard Sonata in D Major R. 84 Mvt.xml	1756	Soler	Sonata	1	finally not found	54	3	107
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Nichelmann/Nichelmann Allegro in E Major (1757) Mvt.xml	1757	Nichelmann	Sonata	1	5	20	not found at all	49
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in C Major F. 2 Mvt. 1.xml	1760	W. F. Bach	Sonata	1	finally not found	20	not found at all	64
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in D Major F4 Mvt. 1.xml	1760	W. F. Bach	Sonata	1	finally not found	20	not found at all	64
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op01n0-01.krn&f=kern	1764	Haydn	Chamber Music	2	53	finally not found	not found 0	92
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op01n1-01.krn&f=kern	1764	Haydn	Chamber Music	2	54	finally not found	not found 0	62
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op01n2-01.krn&f=kern	1764	Haydn	Chamber Music	2	45	finally not found	not found 0	130
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op01n3-01.krn&f=kern	1764	Haydn	Chamber Music	2	29	finally not found	not found 0	88
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op01n4-01.krn&f=kern	1764	Haydn	Chamber Music	2	41	finally not found	not found 0	158
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op01n6-01.krn&f=kern	1764	Haydn	Chamber Music	2	40	finally not found	not found 0	64
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Cannabich/Cannabich London Duo 1 Mvt. 1.xml	1765	Cannabich	Chamber Music	2	15	56	finally not found	146
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Haydn/Piano Sonatas/Haydn Piano Sonata Hob.XVI7 Mvt. 1.mxl	1766	Haydn	Sonata	1	2	finally not found	not found at all	114
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Haydn/Piano Sonatas/Haydn Piano Sonata Hob.XVI8 Mvt. 1.mxl	1766	Haydn	Sonata	1	finally not found	finally not found	not found at all	97
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Haydn/Piano Sonatas/Haydn Piano Sonata No. 4 Hob.XVIG1 Mvt. 1.mxl	1766	Haydn	Sonata	1	12	28	58	102
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata13-1.krn&format=kern	1766	Haydn	Sonata	1	4	18	not found at all	47
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata29-3.krn&format=kern	1766	Haydn	Sonata	1	19	49	not found at all	136
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata12-1.krn&format=kern	1767	Haydn	Sonata	1	finally not found	20	35	55
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata15-1.krn&format=kern	1767	Haydn	Sonata	1	finally not found	30	finally not found	84
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata15-1.krn&format=kern	1767	Haydn	Sonata	1	finally not found	30	finally not found	84
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata16-1.krn&format=kern	1767	Haydn	Sonata	1	finally not found	36	73	110
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op09n2-01.krn&f=kern	1769	Haydn	Chamber Music	2	41	finally not found	not found 0	109
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op09n3-01.krn&f=kern	1769	Haydn	Chamber Music	2	34	finally not found	not found 0	81
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k080&format=kern&movement=01	1770	Mozart	Chamber Music	2	5	not found	not going to be found	67
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata33-3.krn&format=kern	1771	Haydn	Sonata	1	21	152	not found at all	152
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op17n1-01.krn&f=kern	1771	Haydn	Chamber Music	2	28	finally not found	not found 0	110
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op17n2-01.krn&f=kern	1771	Haydn	Chamber Music	2	31	finally not found	not found 0	101
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op17n3-01.krn&f=kern	1771	Haydn	Chamber Music	2	finally not found	finally not found	not found 0	100
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op17n5-01.krn&f=kern	1771	Haydn	Chamber Music	2	22	finally not found	not found 0	89
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op17n6-01.krn&f=kern	1771	Haydn	Chamber Music	2	44	finally not found	not found 0	200
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Haydn/Symphonies/Haydn Symphony No. 45 Mvt. 1.mxl	1772	Haydn	Symphony	4	finally not found	72	not found at all	211
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Chamber Music/Mozart Divertimento in D Mvt. 1.mxl	1772	Mozart	Chamber Music	2	finally not found	36	not found at all	102
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Chamber Music/Mozart String Quartet in Eb Major KV. 157 Mvt. 1.xml	1772	Mozart	Chamber Music	2	30	finally not found	72	378
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Chamber Music/Mozart String Quartet in G Major KV. 156 Mvt. 1.xml	1772	Mozart	Chamber Music	2	18	71	107	180
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Symphonies/Mozart Symphony No. 21 in A KV. 134 Mvt. 1.xml	1772	Mozart	Symphony	4	26	68	not found at all	173
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=divert&work=k137&format=kern&movement=01	1772	Mozart	Chamber Music	2	69	finally not found	not found 0	69
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=divert&work=k138&format=kern&movement=01	1772	Mozart	Chamber Music	2	89	finally not found	not found 0	90
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k155&format=kern&movement=01	1772	Mozart	Chamber Music	2	12	not found	69	119
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k156&format=kern&movement=01	1772	Mozart	Chamber Music	2	18	not found	107	180
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k157&format=kern&movement=01	1772	Mozart	Chamber Music	2	10	not found	72	126
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=divert&work=k136&format=kern&movement=01	1772	Mozart	Chamber Music	2	36	finally not found	not found 0	102
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op20n1-01.krn&f=kern	1772	Haydn	Chamber Music	2	finally not found	finally not found	not found 0	109
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op20n2-01.krn&f=kern	1772	Haydn	Chamber Music	2	21	finally not found	not found 0	106
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op20n5-01.krn&f=kern	1772	Haydn	Chamber Music	2	31	finally not found	not found 0	161
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op20n6-01.krn&f=kern	1772	Haydn	Chamber Music	2	30	finally not found	not found 0	166
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata34-1.krn&format=kern	1773	Haydn	Sonata	1	12	not found	116	194

http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k158&format=kern&movement=01	1773	Mozart	Chamber Music	2	10	not found	73	127
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k159&format=kern&movement=01	1773	Mozart	Chamber Music	2	5	not found	42	71
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k160&format=kern&movement=01	1773	Mozart	Chamber Music	2	8	not found	not going to be found	105
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k168&format=kern&movement=01	1773	Mozart	Chamber Music	2	8	finally not found	not found 0	108
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k169&format=kern&movement=01	1773	Mozart	Chamber Music	2	8	finally not found	not found 0	117
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k170&format=kern&movement=01	1773	Mozart	Chamber Music	2	8	finally not found	not found 0	84
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k172&format=kern&movement=01	1773	Mozart	Chamber Music	2	10	finally not found	not found 0	127
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k173&format=kern&movement=01	1773	Mozart	Chamber Music	2	8	finally not found	not found 0	136
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Chamber Music/Mozart Trio Sonata in F Major KV. 145 Mvt 1.xml	1774	Mozart	Chamber Music	2	23	37	47	92
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Concerto for Bassoon K. 191 Mvt. 1.mxl	1774	Mozart	Concerto	3	10	finally not found	not found 0	366
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Piano Sonata No. 1 in C Major KV. 279 Mvt. 1.xml	1774	Mozart	Sonata	1	10	38	55	100
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Piano Sonata No. 2 in F Major KV. 280 Mvt. 1.xml	1774	Mozart	Sonata	1	26	56	80	144
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Piano Sonata No. 3 in Bb Major KV. 281 Mvt. 1.xml	1774	Mozart	Sonata	1	17	40	67	109
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Sonata for Four Hands K. 381:123a Mvt. 1.mxl	1774	Mozart	Sonata	1	13	30	49	94
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Symphonies/Mozart Symphony No. 29 in A Major KV. 201 Mvt. 1.xml	1774	Mozart	Symphony	4	32	76	104	206
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata01-1.krn&format=kern	1774	Mozart	Sonata	1	3	not found	55	100
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata02-1.krn&format=kern	1774	Mozart	Sonata	1	32	56	80	144
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata03-1.krn&format=kern	1774	Mozart	Sonata	1	3	not found	67	109
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata04-1.krn&format=kern	1774	Mozart	Sonata	1	4	15	not found twice	36
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata05-1.krn&format=kern	1774	Mozart	Sonata	1	4	not found	70	120
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Violin Concerto No. 3 K. 216 Mvt. 1.mxl	1775	Mozart	Concerto	3	50	finally not found	not found 0	226
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in Eb Major F5 Mvt. 1.xml	1775	W. F. Bach	Sonata	1	6	15	not found at all	44
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in G Major F7 Mvt. 1.xml	1775	W. F. Bach	Sonata	1	finally not found	not found	not going to be found	70
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Cimarosa/Cimarosa Piano Sonata in D Major Mvt. 1.xml	1775	Cimarosa	Sonata	1	finally not found	30	63	105
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata06-1.krn&format=kern	1775	Mozart	Sonata	1	36	51	69	127
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Oboe Concerto K. 314 Mvt. 1.mxl	1777	Mozart	Concerto	3	77	188	not found twice	204
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Piano Sonata No. 7 Mvt. 1.xml	1777	Mozart	Sonata	1	14	58	finally not found	155
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Piano Sonata No. 9 Mvt. 1.xml	1777	Mozart	Sonata	1	finally not found	39	96	112
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata07-1.krn&format=kern	1777	Mozart	Sonata	1	4	not found	finally not found	155
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata09-1.krn&format=kern	1777	Mozart	Sonata	1	4	not found	96	112
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=conc&work=k271&format=kern&movement=01	1777	Mozart	Concerto	3	89	finally not found	not found 0	307
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k285&format=kern&movement=01	1777	Mozart	Chamber Music	2	8	finally not found	not found 0	154
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Concerto for Flute & Harp K. 299 Mvt. 1.mxl	1778	Mozart	Concerto	3	finally not found	not found	166	265
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Piano Sonata No. 8 Mvt. 1.mxl	1778	Mozart	Sonata	1	finally not found	475	77	475
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Violin Sonata No. 18 in G Major KV. 301 Mvt. 1.xml	1778	Mozart	Sonata	1	23	85	not found at all	196
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Haydn/Piano Sonatas/Haydn Piano Sonata in D Major Mvt. 1.mxl	1780	Haydn	Sonata	1	16	40	58	103
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in Bb Major F9 Mvt. 1.xml	1780	W. F. Bach	Sonata	1	finally not found	23	29	52
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Sonata for Two Pianos K. 448:375a Mvt. 1.mxl	1781	Mozart	Sonata	1	33	80	107	194
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k370&format=kern&movement=01	1781	Mozart	Chamber Music	2	8	finally not found	not found 0	142
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op33n1-01.krn&f=kern	1781	Haydn	Chamber Music	2	65	finally not found	not found 0	91
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op33n2-01.krn&f=kern	1781	Haydn	Chamber Music	2	51	finally not found	not found 0	90
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op33n3-01.krn&f=kern	1781	Haydn	Chamber Music	2	65	finally not found	not found 0	171
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op33n4-01.krn&f=kern	1781	Haydn	Chamber Music	2	64	finally not found	not found 0	89
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op33n5-01.krn&f=kern	1781	Haydn	Chamber Music	2	23	finally not found	not found 0	305
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op33n6-01.krn&f=kern	1781	Haydn	Chamber Music	2	21	finally not found	not found 0	168
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata10-1.krn&format=kern	1782	Mozart	Sonata	1	14	58	85	150
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k387&format=kern&movement=01	1782	Mozart	Chamber Music	2	8	finally not found	not found 0	170
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=sym&work=k385&format=kern&movement=01	1782	Mozart	Symphony	4	17	not found	126	204
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata13-1.krn&format=kern	1783	Mozart	Sonata	1	46	63	92	165
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k421&format=kern&movement=01	1783	Mozart	Chamber Music	2	8	finally not found	not found 0	117
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k428&format=kern&movement=01	1783	Mozart	Chamber Music	2	8	finally not found	not found 0	164
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=duos&work=k423&format=kern&movement=01	1783	Mozart	Chamber Music	4	11	not found	79	142
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=duos&work=k424&format=kern&movement=01	1783	Mozart	Chamber Music	4	149	202	not found at all	220
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Piano Concerto No. 17 Mvt. 1.mxl	1784	Mozart	Concerto	3	10	not found	not going to be found	100

/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/W. F. Bach/Sonatas/W. F. Bach Sonata in A Major F8 Mvt. 1.xml	1784	W. F. Bach	Sonata	1	10	24	28	77
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata12-1.krn&format=kern	1784	Mozart	Sonata	1	56	93	130	229
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata14-1.krn&format=kern	1784	Mozart	Sonata	1	48	74	97	185
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=conc&work=k450&format=kern&movement=01	1784	Mozart	Concerto	3	76	not found	not going to be found	308
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=conc&work=k453&format=kern&movement=01	1784	Mozart	Concerto	3	69	not found	not going to be found	349
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k458&format=kern&movement=01	1784	Mozart	Chamber Music	2	9	finally not found	not found 0	279
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op42-01.krn&f=kern	1784	Haydn	Chamber Music	2	21	finally not found	not found 0	105
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Piano Concerto No. 20 Mvt. 1.mxl	1785	Mozart	Concerto	3	32	not found	not going to be found	213
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Piano Concerto No. 21 K. 467 Mvt. 1.mxl	1785	Mozart	Concerto	3	36	not found	finally not found	441
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=conc&work=k466&format=kern&movement=01	1785	Mozart	Concerto	3	88	not found	not going to be found	397
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k464&format=kern&movement=01	1785	Mozart	Chamber Music	2	8	finally not found	not found 0	270
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Piano Concerto No. 24 K. 491 Mvt. 1.mxl	1786	Mozart	Concerto	3	99	not found	not going to be found	600
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Dussek/Dussek Sonate 1 Opus 46 No. 1 Mvt. 1.xml	1786	Dussek	Sonata	1	7	finally not found	not found 0	64
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Dussek/Dussek Sonate 2 Opus 46 No. 2 Mvt. 1.xml	1786	Dussek	Sonata	1	19	finally not found	not found 0	84
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Dussek/Dussek Sonate 3 Opus 46 No. 3 Mvt. 1.xml	1786	Dussek	Sonata	1	8	finally not found	not found 0	79
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Dussek/Dussek Sonate 4 Opus 46 No. 4 Mvt. 1.xml	1786	Dussek	Sonata	1	9	finally not found	not found 0	110
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Dussek/Dussek Sonate 5 Opus 46 No. 5 Mvt. 1.xml	1786	Dussek	Sonata	1	finally not found	finally not found	not found 0	94
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Dussek/Dussek Sonate 6 Opus 46 No. 6 Mvt. 1.xml	1786	Dussek	Sonata	1	10	finally not found	not found 0	92
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k499&format=kern&movement=01	1786	Mozart	Chamber Music	2	10	finally not found	not found 0	266
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=sym&work=k504&format=kern&movement=01	1786	Mozart	Symphony	4	88	142	not found at all	302
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Chamber Music/Mozart Eine Kleine Nachtmusik Mvt. 1.xml	1787	Mozart	Chamber Music	2	14	55	73	137
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Concertos/Mozart Horn Concerto No. 3 Mvt. 1.mxl	1787	Mozart	Concerto	3	25	not found	110	183
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k298&format=kern&movement=01	1787	Mozart	Chamber Music	2	8	finally not found	not found 0	80
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op50n1-01.krn&f=kern	1787	Haydn	Chamber Music	2	64	finally not found	not found 0	164
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op50n2-01.krn&f=kern	1787	Haydn	Chamber Music	2	21	finally not found	not found 0	290
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op50n3-01.krn&f=kern	1787	Haydn	Chamber Music	2	24	finally not found	not found 0	133
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op50n4-01.krn&f=kern	1787	Haydn	Chamber Music	2	23	finally not found	not found 0	184
http://kern.humdrum.org/cgi-bin/ksdata?l=musedata/haydn/quartet&file=op50n6-01.krn&f=kern	1787	Haydn	Chamber Music	2	21	finally not found	not found 0	154
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=quart&work=op54n2&format=kern&movement=01	1788	Haydn	Chamber Music	2	58	87	not found at all	233
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=quart&work=op55n1&format=kern&movement=01	1788	Haydn	Chamber Music	2	finally not found	64	110	174
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=quart&work=op55n3&format=kern&movement=01	1788	Haydn	Chamber Music	2	finally not found	not found	6	197
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=sym&work=k543&format=kern&movement=01	1788	Mozart	Symphony	4	106	142	not found at all	309
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=sym&work=k550&format=kern&movement=01	1788	Mozart	Symphony	4	68	100	not found at all	299
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=sym&work=k551&format=kern&movement=01	1788	Mozart	Symphony	4	80	120	not found at all	313
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=trios&work=k563&format=kern&movement=01	1788	Mozart	Chamber Music	4	88	finally not found	not found 0	187
http://kern.ccarh.org/cgi-bin/ksdata?location=musedata/haydn/quartet&file=op54n2-01.krn&format=kern	1788	Haydn	Chamber Music	2	25	87	not found at all	233
http://kern.ccarh.org/cgi-bin/ksdata?location=musedata/haydn/quartet&file=op54n3-01.krn&format=kern	1788	Haydn	Chamber Music	2	58	finally not found	not found 0	189
http://kern.ccarh.org/cgi-bin/ksdata?location=musedata/haydn/quartet&file=op55n2-01.krn&format=kern	1788	Haydn	Chamber Music	2	25	finally not found	not found 0	203
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Piano Sonata No. 15 K. 545 Mvt. 1.mxl	1789	Mozart	Sonata	1	13	finally not found	not found 0	147
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata59-1.krn&format=kern	1789	Haydn	Sonata	1	25	64	130	218
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/mozart/piano/sonata&file=sonata17-1.krn&format=kern	1789	Mozart	Sonata	1	42	57	not found at all	160
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k575&format=kern&movement=01	1789	Mozart	Chamber Music	2	8	finally not found	not found 0	193
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Chamber Music/Mozart String Quintet No. 5 Mvt. 1.mxl	1790	Mozart	Chamber Music	2	25	finally not found	233	745
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Mozart/Piano Sonatas/Mozart Allegro in G Minor KV. 312 Mvt.xml	1790	Mozart	Sonata	1	41	69	107	179
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=quart&work=op64n1&format=kern&movement=01	1790	Haydn	Chamber Music	2	35	60	96	174
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=quart&work=op64n2&format=kern&movement=01	1790	Haydn	Chamber Music	2	finally not found	not found	not going to be found	108
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k589&format=kern&movement=01	1790	Mozart	Chamber Music	2	8	finally not found	not found 0	208
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=qrtets&work=k590&format=kern&movement=01	1790	Mozart	Chamber Music	2	8	finally not found	not found 0	198
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-093&format=kern&movement=01	1791	Haydn	Symphony	4	12	finally not found	not found 0	267
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-094&format=kern&movement=01	1791	Haydn	Symphony	4	15	finally not found	not found 0	258
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-095&format=kern&movement=01	1791	Haydn	Symphony	4	12	finally not found	not found 0	165
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-096&format=kern&movement=01	1791	Haydn	Symphony	4	finally not found	finally not found	not found 0	203
http://www.musedata.org/cgi-bin/mddata?composer=mozart&edition=bh&genre=conc&work=k622&format=kern&movement=01	1791	Mozart	Concerto	3	88	not found	not going to be found	359
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Wind Duos/Beethoven Wind Duo No. 1 Mvt. 1.xml	1792	Beethoven	Chamber Music	2	12	50	not found at all	113

/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Wind Duos/Beethoven Wind Duo No. 2 Mvt. 1.xml	1792	Beethoven	Chamber Music	2	finally not found	55	not found at all	120
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Wind Duos/Beethoven Wind Duo No. 3 Mvt. 1.xml	1792	Beethoven	Chamber Music	2	24	60	not found at all	133
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-097&format=kern&movement=01	1792	Haydn	Symphony	4	17	finally not found	not found 0	293
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-099&format=kern&movement=01	1793	Haydn	Symphony	4	finally not found	89	not found at all	202
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Haydn/Chamber Music/Haydn London Trio No. 1 Mvt. 1.mxl	1794	Haydn	Chamber Music	2	finally not found	34	54	90
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-100&format=kern&movement=01	1794	Haydn	Symphony	4	73	124	not found at all	289
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-101&format=kern&movement=01	1794	Haydn	Symphony	4	finally not found	finally not found	not found at all	352
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-102&format=kern&movement=01	1794	Haydn	Symphony	4	finally not found	24	not found at all	312
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata61-1.krn&format=kern	1794	Haydn	Sonata	1	47	finally not found	not found 0	111
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/haydn/keyboard/uesonatas&file=sonata62-1.krn&format=kern	1794	Haydn	Sonata	1	3	not found	not going to be found	116
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 1 Mvt. 1.mxl	1795	Beethoven	Sonata	1	finally not found	48	100	152
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-103&format=kern&movement=01	1795	Haydn	Symphony	4	40	finally not found	199	229
http://www.musedata.org/cgi-bin/mddata?composer=haydn&edition=eulen&genre=sym&work=s-104&format=kern&movement=01	1795	Haydn	Symphony	4	25	finally not found	not found at all	295
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata03-1.krn&format=kern	1795	Beethoven	Sonata	1	finally not found	not found	finally not found	257
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Haydn/Concertos/Haydn Trumpet Concerto in Eb Hob. VIIe1 Mvt. 1.mxl	1796	Haydn	Concerto	3	26	not found	not going to be found	187
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 19 Op. 49 No. 1 Mvt. 1.xml	1797	Beethoven	Sonata	1	finally not found	not found	not found 0	2
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 20 Op. 49 No. 2 Mvt. 1.xml	1797	Beethoven	Sonata	1	finally not found	finally not found	not found 0	3
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata for Four Hands Mvt. 1.mxl	1797	Beethoven	Sonata	1	25	56	not found at all	157
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata04-1.krn&format=kern	1797	Beethoven	Sonata	1	26	not found	not going to be found	156
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 5 Op. 10 No. 1 Mvt. 1.mxl	1798	Beethoven	Sonata	1	26	finally not found	165	520
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 6 Op. 10 No. 2 Mvt. 1.xml	1798	Beethoven	Sonata	1	finally not found	1	not found twice	4
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata06-1.krn&format=kern	1798	Beethoven	Sonata	1	16	66	not found at all	203
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata07-1.krn&format=kern	1798	Beethoven	Sonata	1	10	not found	not going to be found	344
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata19-1.krn&format=kern	1798	Beethoven	Sonata	1	finally not found	not found	finally not found	110
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata20-1.krn&format=kern	1798	Beethoven	Sonata	1	finally not found	not found	64	122
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/quartet&file=quartet03-1.krn&format=kern	1798	Beethoven	Chamber Music	2	10	not found	not going to be found	271
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 9 Mvt. 1.mxl	1799	Beethoven	Sonata	1	21	61	not found at all	163
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata10-1.krn&format=kern	1799	Beethoven	Sonata	1	finally not found	not found	not going to be found	200
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/quartet&file=quartet01-1.krn&format=kern	1799	Beethoven	Chamber Music	2	10	not found	6	313
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/quartet&file=quartet02-1.krn&format=kern	1799	Beethoven	Chamber Music	2	8	not found	not going to be found	249
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 11 Mvt. 1.mxl	1800	Beethoven	Sonata	1	30	68	127	200
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Symphonies/Beethoven Symphony 1 Mvt. 1.mxl	1800	Beethoven	Symphony	4	31	109	not found at all	299
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 14 Op. 27 No. 2 Mvt. 1.mxl	1801	Beethoven	Sonata	1	finally not found	finally not found	not found at all	371
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 15 Mvt. 1.mxl	1801	Beethoven	Sonata	1	43	finally not found	267	939
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Violin Sonatas/Beethoven Violin Sonata No. 5 Op. 24 Mvt. 1.mxl	1801	Beethoven	Sonata	1	25	86	122	248
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata13-1.krn&format=kern	1801	Beethoven	Sonata	1	finally not found	finally not found	finally not found	89
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/quartet&file=quartet05-1.krn&format=kern	1801	Beethoven	Chamber Music	2	24	79	134	228
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/quartet&file=quartet06-1.krn&format=kern	1801	Beethoven	Chamber Music	2	57	finally not found	not found 0	266
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/quintet&file=quintet-op29-01.krn&format=kern	1801	Beethoven	Chamber Music	2	8	not found	not going to be found	303
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 17 Mvt. 1.mxl	1802	Beethoven	Sonata	1	60	92	not found at all	232
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 18 Op. 31 No. 3 Mvt 1.mxl	1802	Beethoven	Sonata	1	33	finally not found	not found at all	819
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Symphonies/Beethoven Symphony 2 Mvt. 1.mxl	1802	Beethoven	Symphony	4	97	135	not found at all	364
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Cambini/Cambini Wind Quintet No. 3 Mvt. 1.xml	1802	Cambini	Chamber Music	2	25	69	not found at all	158
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata21-1.krn&format=kern	1803	Beethoven	Sonata	1	12	not found	not going to be found	304
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata22-1.krn&format=kern	1804	Beethoven	Sonata	1	8	finally not found	not found 0	154
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/String Quartets/Beethoven String Quartet No. 7 Op. 59 No. 1 Mvt. 1.xml	1806	Beethoven	Chamber Music	2	51	not found	100	400
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/String Quartets/Beethoven String Quartet No. 8 Op. 59 No. 2 Mvt. 1.xml	1806	Beethoven	Chamber Music	2	19	261	not found at all	261
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Symphonies/Beethoven Symphony 4 Mvt. 1.mxl	1806	Beethoven	Symphony	4	50	198	10	512
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/String Quartets/Beethoven String Quartet No. 9 Op. 59 No. 3 Mvt. 1.xml	1808	Beethoven	Chamber Music	2	30	110	-1	270
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Symphonies/Beethoven Symphony 5 Mvt .1.mxl	1808	Beethoven	Symphony	4	14	not found	55	140
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 24 Op. 78 Mvt. 1.xml	1809	Beethoven	Sonata	1	finally not found	not found	not going to be found	3
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 25 Op. 79 Mvt. 1.xml	1809	Beethoven	Sonata	1	finally not found	not found	not found 0	2
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata24-1.krn&format=kern	1809	Beethoven	Sonata	1	12	39	not found at all	108
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata25-1.krn&format=kern	1809	Beethoven	Sonata	1	finally not found	50	121	206

/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/String Quartets/Beethoven String Quartet No. 11 Op. 95 Mvt. 1.xml	1810	Beethoven	Chamber Music	2	23	not found	not going to be found	151
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Schubert/Chamber Music/Schubert String Quartet No. 1 Mvt. 1.mxl	1812	Schubert	Chamber Music	2	25	75	not found at all	219
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Schubert/Chamber Music/Schubert String Quartet No. 10 Op. 125 No. 1 Mvt. 1.xml	1813	Schubert	Chamber Music	2	44	113	140	255
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 27 Op. 90 Mvt. 1.xml	1814	Beethoven	Sonata	1	finally not found	finally not found	not found 0	
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata27-1.krn&format=kern	1814	Beethoven	Sonata	1	15	finally not found	not found 0	245
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Cello Sonatas/Beethoven Cello Sonata Op 102 No 2 Mvt. 1.mxl	1815	Beethoven	Sonata	1	16	481	not found at all	481
http://kern.ccarh.org/cgi-bin/ksdata?location=users/craig/classical/beethoven/piano/sonata&file=sonata28-1.krn&format=kern	1816	Beethoven	Sonata	1	20	finally not found	not found 0	102
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 29 Mvt. 1.mxl	1818	Beethoven	Sonata	1	34	125	not found at all	411
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Schubert/Chamber Music/Schubert String Quartet No. 12 D. 703 Mvt. 1.xml	1820	Schubert	Chamber Music	2	finally not found	1	-1	203
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Piano Sonatas/Beethoven Piano Sonata No. 32 Mvt. 1.mxl	1822	Beethoven	Sonata	1	19	69	not found at all	158
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/Symphonies/Beethoven Symphony 9 Mvt. 1.mxl	1824	Beethoven	Symphony	4	55	not found	not going to be found	547
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Schubert/Chamber Music/Schubert String Quartet No. 14 Mvt. 1.mxl	1824	Schubert	Chamber Music	2	finally not found	finally not found	not found 0	481
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/String Quartets/Beethoven String Quartet No. 13 Op. 130 Mvt. 1.xml	1825	Beethoven	Chamber Music	2	4	finally not found	not found at all	107
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/String Quartets/Beethoven String Quartet No. 14 Op. 131 Mvt. 2.xml	1826	Beethoven	Chamber Music	2	46	not found	not going to be found	199
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/String Quartets/Beethoven String Quartet No. 14 Op. 131 Mvt. 7.xml	1826	Beethoven	Chamber Music	2	33	not found	not going to be found	388
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Beethoven/String Quartets/Beethoven String Quartet No. 16 Op. 135 Mvt. 1.xml	1826	Beethoven	Chamber Music	2	finally not found	not found	not going to be found	194
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Schubert/Symphonies/Schubert Symphony No. 9 Mvt. 1.mxl	1826	Schubert	Symphony	4	finally not found	253	not found at all	684
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Schumann/Chamber Music/Schumann String Quartet No. 1 Op. 41 No. 1 Mvt. 1.xm	1842	Schumann	Chamber Music	2	37	150	not found at all	374
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Brahms/Chamber Music/Brahms Sextet No. 1 Mvt. 1.mxl	1860	Brahms	Chamber Music	2	finally not found	140	not found at all	398
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Brahms/Chamber Music/Brahms Sextet No. 2 Mvt. 1.mxl	1865	Brahms	Chamber Music	2	finally not found	230	not found at all	620
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Brahms/Chamber Music/Brahms String Quartet No. 1 Op. 51 No. 1 Mvt. 1.xml	1873	Brahms	Chamber Music	2	21	82	not found at all	263
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Brahms/Symphonies/Brahms Symphony No. 1 Mvt. 1.mxl	1876	Brahms	Symphony	4	51	190	not found at all	513
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Brahms/Symphonies/Brahms Symphony No. 2 Mvt. 1.mxl	1877	Brahms	Symphony	4	79	186	not found at all	531
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Brahms/Concertos/Brahms Violin Concerto Op. 77 Mvt. 1.mxl	1878	Brahms	Concerto	3	77	finally not found	not found 0	573
/Users//Desktop/Cambridge/Third Year/Dissertation/Corpus for Dissertation/Corpus of Sonata Movements/Brahms/Concertos/Brahms Piano Concerto No. 2 Mvt. 1.mxl	1881	Brahms	Concerto	3	56	not found	not going to be found	376