Article

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Concluding Registral Strategies in Movements of Beethoven Piano Sonatas*

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Roger Kamien

Abstract

This essay discusses various ways in which Beethoven exploits registral connections among high tones to maintain tension until the very end of eight piano sonata movements. *Within* the codas of seven piano sonata movements, one or more high tones of a V7 (and its inversions) or V9 chord are left hanging, due to an immediate downward shift of register (Opp. 2/3/1, 14/2/I, 28/II, 53/I, 31/2/I, 78/2). Beethoven delays resolution until near the end of the coda, where these hanging high tones move by step to the tonic at the same register. The second registral procedure begins shortly *before* the codas of two movements (Opp. 14/1/I, 54/I). The sixth scale degree, supported by a II6 chord, is left hanging in its high register by a downward leap of two octaves to the leading tone Near the end of each of the movements the leading tone appears in the same high register as the previous sixth scale degree, and resolves upward to the tonic scale degree four bars from the end.

There is reason to believe that Beethoven's techniques for maintaining registral tension until the end of a movement were inspired by brief keyboard works by Bach, since in many brief keyboard pieces by Bach, musical tension is sustained up to the end because the ^1 supported by a tonic chord appears only in the very last bar.

Keywords

Beethoven, piano sonatas, register, registral strategies, musical tension, registral tension

This article discusses two registral strategies employed by Beethoven near the end of eight piano sonata movements to sustain musical tension until the very last bar or bars. Each strategy utilizes one or more high, unstable tones left hanging in their register, but the locations, scale degrees, and harmonic contexts of these tones differ. This study considers the possibility that Beethoven's concluding registral strategies were influenced by registral procedures in the keyboard music of Johann Sebastian Bach.

Beethoven's imaginative use of register has attracted the attention of music historians and theorists. Barry Cooper observes that "one of the most notable features of his style in general is how he often manipulates different registers for expressive purposes. No previous composer had exploited register as a compositional parameter to anything like the same extent."[1] More consistently than Mozart or Haydn, Beethoven coordinates expansion of register with other modes of intensification such as crescendo and rhythmic acceleration. The opening of Beethoven's String Quartet in F Major, Op. 59, No. 1, for example, reaches an initial climax through a crescendo coupled with an expansion from one to four octaves.

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[1] Barry Cooper, *Inside Beethoven's String Quartets: History, Interpretation, Performance* (Cambridge, MA: Harvard University Press, 2008), 108.

For Lewis Lockwood this opening illustrates Beethoven's "dramatization of register."[2] For William Kinderman the opening's registral expansion is 'one of the new artistic dimensions of the "Razumovsky Quartets"[3] Ernst Oster has pointed out that "in some works, particularly piano works, register assumes a significance as great as that of harmonic and contrapuntal texture or the unfoldment of thematic–motivic relationships."[4]

Heinrich Schenker was a pioneer in the study of register in music. His essay "On Organicism in Sonata Form" includes a discussion of the relationship between "widely separated high points" in the first movement of Beethoven's Piano Sonata in E major, Op. 109.[5] In *Free Composition* he defined a principle of tonal music which he named obligatory register (*Obligate Lage)*:

> No matter how far the composing out [of the tonal structure] may depart from the basic register in ascending or ascending linear progressions, arpeggiations, or couplings, it nevertheless retains an urge to return to that register. Such departure and return creates content, displays the instrument, and lends coherence to the whole ... in the upper voice it is usually the register of the first tone of the fundamental line which is later confirmed as the true register.[6]

Exemplifying the principle of obligatory register are Bach's revised versions of the C major and C minor preludes from *The Well-Tempered Clavier*, Book 1. In earlier versions of these preludes, which appear in *Clavier-Büchlein for Wilhelm Friedemann Bach*, the endings are in a lower register than the openings. In addition, the early version of the C-major prelude ends with ^3 rather than ^1 in the top voice.[7] In the final versions, each ending is in the register of the opening with ^1 in the final bar. Schenker's foreground reduction of the C-minor prelude shows ^3 (m. 5), ^2 (m. 28), and ^1(m. 38) in the same register with ^1 in the concluding bar (Example 1).

First Registral Strategy

Within the codas of six piano sonata movements, one or more high tones of a V7 (or its inversions) or V9 chord are left hanging due to an immediate downward shift of register (Opp. 2/3/1, 14/2/I, 28/II, 53/I, 31/2/I, 78/II).[8] The unresolved high tone or tones are highlighted by syncopation, duration, repetition, dynamics, pause, or texture. Beethoven delays resolution until the

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[2] *Beethoven* (Oxford: Oxford University Press, 2000), pp. 28. See also pp. 34, 84, 106, 291. Other recent discussions of register in Beethoven's music include William Kinderman, *Beethoven* (Oxford: Oxford University Press, 1995), pp. 100, 239-240, 279-281; Malcolm Miller, "Peak Experience: High Register and Structure in the "Razumovsky Quartets, Op. 59, "*The String Quartets of Beethoven* (Urbana and Chicago: University of Illinois Press, 2006) pp. 60-88, Bathia Churgin, *Transcendent Mastery: Studies in the Music of Beethoven* (Hillsdale, NY: Pendragon Press, 2008) pp. 11, 45, 111, 194, 344.

[3] William Kinderman, *The String Quartets of Beethoven* (Chicago: University of Illinois Press, 2006), Introduction, p.4.

[4] Ernst Oster, "Register and the Large-Scale Connection," in *Readings in Schenkerian Analysis and Other Approaches*, ed. Maury Yeston (New Haven: Yale University Press, 1977), 71.

[5] Heinrich Schenker, "On Organicism in Sonata Form," *The Masterwork in Music*, vol II, ed. William Drabkin (Cambridge: Cambridge University Press, 1996), 28.

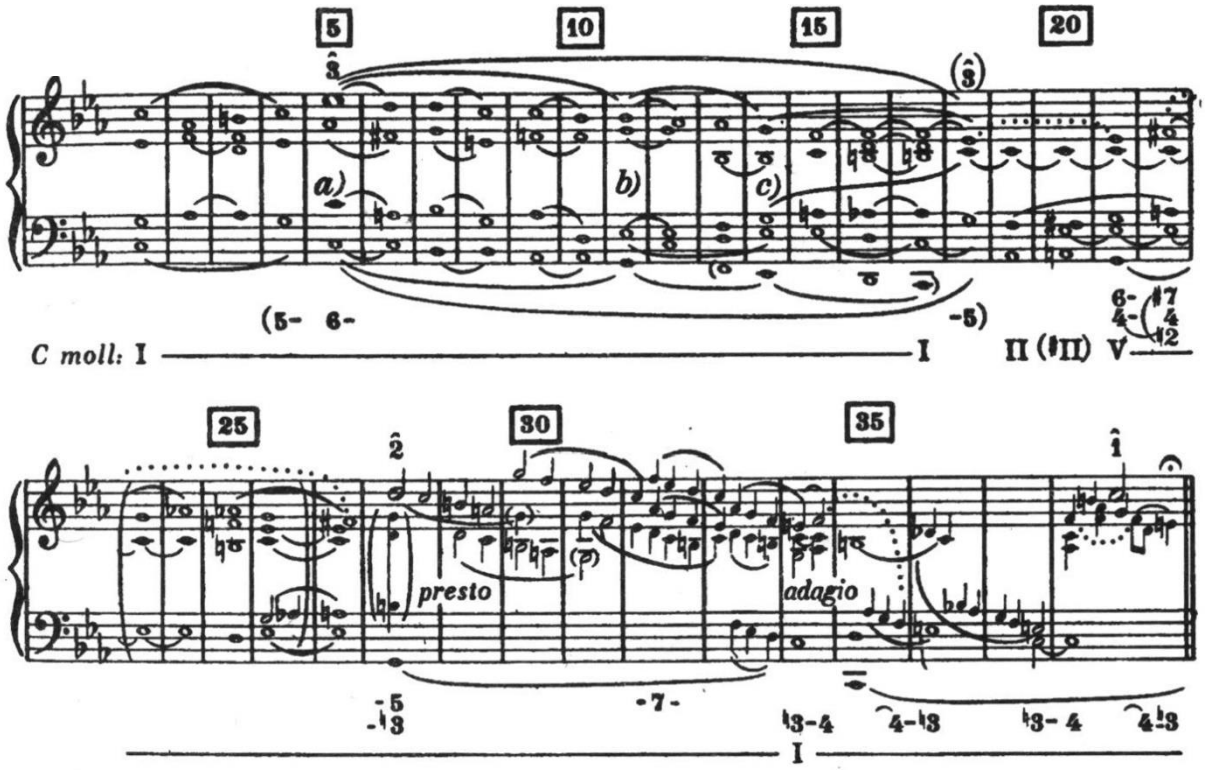
[6] Heinrich Schenker, *Free Composition*, trans. and ed. Ernst Oster (New York: Longman Inc., 1979), 107.

[7] Johann Sebastian Bach, *Clavier-Büchlein for Wilhelm Friedmann Bach*, ed. Wolfgang Plath, (Kassel: Barenreiter, 1962), 19-21.

[8] Registral tension in the coda of Beethoven's Sonata in B-flat major, Op. 106, first movement, is created by a powerful and questioning V7 chord with the leading tone a^2 in the top voice (mm. 384-385). Unlike the examples studied in this paper, the thematic material following the V7 (mm. 386-390) begins in a *higher not lower* register with a varied return of mm. 1-4. Schenker understood the a natural^2 (m. 384) as resolving to the b flat^2 (m. 404) of the right-hand tonic chord in the penultimate bar of the movement (m. 404). This relationship is shown by parentheses in mm. 385 and 403 of an unpublished voice-leading reduction by Schenker in the handwriting of his student Angi Elias dating from late 1924, indicated as OC 65/14 (Ernst Oster Collection, Music Division, New York Library for the Performing Arts, New York, U.S.A.). See Example 2.2 in the DVD accompanying Nicholas Marston, *Heinrich Schenker and Beethoven's 'Hammerklavier Sonata* (Farnham: Ashgate Publishing Limited, 2013).

movement's concluding bar when these hanging high tone or tones move by step to one or more tones of the tonic triad at the same register. Often one or more of the high tones which had been left hanging reappears in the original register then resolving by step to the tonic chord.

Example 1. Schenker's voice-leading reduction of Bach C-minor prelude.[9]



Second Registral Strategy

The second registral procedure begins shortly *before* the codas of two movements (Opp.14/1/I, 54/I). The registral procedure in Op. 14/1/I was first described by Carl Schachter.[10] The sixth scale degree, supported by a II6 chord, is left hanging in its high register by a downward leap of two octaves to the leading tone Near the end of each of the movements the leading tone returns in the same high register as the previous sixth scale degree, and resolves upward to the tonic scale degree four bars from the end of the movement.

Beethoven employs these registral procedures in both fast and slow movements of piano sonatas composed from 1795 (Op. 2/3) through 1809 (Op. 78). These movements are in sonata form, sonata form without development, ternary form and rondo form. We first study examples in which the initial high tone or tones, supported by a V7 or its inversions, are introduced within the coda and reappear in the same register to resolve to the final tonic. Since this study considers the relationship of the coda to earlier sections of the movement, readers should have the appropriate scores at hand.

[9] Heinrich Schenker, "The Organic Nature of Fugue," *The Masterwork in Music*, vol. II, ed. William Drabkin (Cambridge: Cambridge University Press, 1996), 48, Fig.1.

[10] Carl Schachter, "Beethoven's Sketches for the First Movement of His Piano Sonata, Op. 14, No. 1: "A Study in Design," *Journal of Music Theory*, 26, No 1 (1982), 14-15.

Examples of First Registral Strategy

Sonata in C Major, Op. 2, No. 3 (1795), Allegro

The concerto-like opening movement is in sonata form (exposition: mm. 1-90; development: mm. 91-138; recapitulation: mm. 139-217); coda: mm. 218-257. Its coda, which includes an unbarred quasi-cadenza (mm. 232), is the only one of our examples ending with a transposition of the last bars of the exposition (mm. 85-90 and mm.252-257).

The ending segment of the coda (mm. 233-248) continues the syncopated emphasis of the second beat begun in the opening theme (mm. 2 and 4) and of the second and fourth beats initiated in the development (mm. 113-128). The *pp* deceptive cadence of mm. 245-248 is "corrected" by a *ff* arrival at the tonic in m. 252.

The registral and harmonic tension of the high four-note V7 chord and its highest tone b^2 (m. 251, fourth beat) is unresolved by the following passage of rapid broken octaves in the tonic (mm. 252-256) that ends in the obligatory register. Tension resolves only at the very end of the movement (mm. 256-257) with a perfect V7-I cadence in which the b^2 resolves to c^3 and the high right- hand V7 chord is thickened to five notes instead of four.

Sonata in G Major, Op. 14, No. 2 (1798), Allegro

The cheerful and gracious Allegro is in sonata form (exposition: mm. 1-63; development: mm. 64-124; recapitulation: mm. 125-187; coda: mm.188-200). We begin with a brief look at motives in the exposition, development, and recapitulation which are transformed in the coda.

The coda is largely derived from the opening theme (mm. 1-8), an eight-bar sentence: (2 [1+1] +2 [1+1] +4). Its first four bars are based on a six-note upbeat motive consisting of five sixteenth notes and a dotted eighth (see music). Initially the downbeat seems to fall on the second eighth of m. 1 because only an unaccompanied sixteenth note marks the notated downbeat. The second eighth is emphasized by a dotted eighth note in the melody introduced by a sixteenth-note upbeat figure and by the entrance of an accompaniment figure which initiates a four-bar tonic pedal. Only in m. 5 is the notated downbeat clarified by a high dotted eighth (a^2) and a new bass tone (f#) on the second sixteenth. The c^3 of this sixteenth-note upbeat figure (m. 4) is transferred down an octave through a scalar progression and descends a ninth below to b^1 (m. 6). Similar transfers of register appear throughout the movement.

Particularly relevant to the coda is the opening of the second theme in the recapitulation (mm. 153-56). Here as well, the initial tones of its first two phrases, d^3 (m. 153) and c^3 (m. 157) transfer down an octave through a scalar progression resolving a ninth below. The c^3 in m. 157 descends to b^1 m. 160, but the resolution of c^3 to b^2 is delayed to m. 164.

The recapitulation concludes in a low register with b in the top voice (m. 174). Given the prevalence of registral shifts throughout the movement, one might expect a return to a higher register in the coda. The first melodic phrase of the coda, four bars in length (mm. 188-191), combines varied motives from the opening theme (mm. 1-4 and 5-6) over a tonic pedal. Beethoven reduces the opening upbeat motive from six to four tones and emphasizes the downbeats of mm.188-89 with quarter notes tied to a sixteenth, clarifying the meter and making the beginning of the coda more eloquent than the opening of the first theme.

The second phrase of the coda, six bars in length (mm. 192-197), expands and varies the first phrase. The "extra" bars (mm. 195-196) metrically expand m. 194. A crescendo beginning in the first bar of the second phrase (m. 192) leads to a *forte* c^3 on the downbeat of m.194, supported by V4/3 over a tonic pedal. The dissonant c^3 is prolonged three measures (mm.194-196) through a rapid downward scale resolving initially to b (m.197). This descent has been prepared by second theme in the recapitulation, which includes the scale-wise descent from c^3

(m. 157) to b^2 a ninth below. The long scale-wise descent from c^3 to c^1 -b (mm.194-197) is immediately followed an octave higher by c^2 - b^1 supported by V7-I (mm.197-98). The registral tension of the c^3 (m. 194) is sustained until the very end of the movement (mm. 199-200), when c^3 --now supported by a V7—reappears and resolves to b^2 supported by the high octave g^1- g^2. This movement is the only one of our examples ending with the third degree of the tonic chord in the top voice.

Sonata in D major, Op. 28 (1801), Andante

Czerny described the Andante as being "like a simple narrative, a ballad of former times" and reported that Beethoven was fond of playing it.[11] The Andante is in ternary form: A (mm. 1-22) - B (mm. 23-38) - A' (mm. 39-82) - Coda (mm. 83-99). Its climactic coda integrates varied musical ideas from A (mm. 83-88) and B (mm.89-99), darkening their emotional effect.[12] In section A, in D minor, a staccato, pizzicato-like bass accompanies a songlike, legato melody (mm. 1-7). Joking in mood and in D major, Section B develops a motive that juxtaposes a repeated chord in dotted rhythm with an unaccompanied figure in triplet sixteenths beginning with an ascending half step.

In the coda, thematic material from the opening of A is now chordal in texture, without staccato sixteenth notes in the left hand. Thematic material from the opening of B is in minor, rather than major, and increases in volume from *p* to *f*). Now the unaccompanied triplet-sixteenth figures of B begin with upward leaps (mm. 89-91) rather than upward half steps. Beethoven connects A and B by bridging mm. 83-91 with an ascending scale in the top voice: d^1 (m. 84-85) -e^1 (mm. 85-89) -f^1 (m. 90) -g^1 (m. 91). In addition, the opening upward leap of the fifth d^1- a^1 in m. 83 motivates the pervasive upward skips in mm. 89-99.

In the coda, high tones, *p*, of the arpeggiated diminished-seventh figure in triplet 16^{th} notes (g^2-e^3-$c\#^3$-b flat^2, mm. 91-92) are highlighted by repetition and by appearing without accompaniment. After a dramatic four-octave registral descent (mm. 91-95) and ascent (mm. 95-97), three of the tones, g^2, $c\#^3$ and e^3, return in the same register and resolve to the upper sixth f^2-d^3 of the bleak, widely-spaced *pp* tonic chord. The dissonant tones g^2 and $c\#^3$ are emphasized by appearing as a dyad on the downbeat of the penultimate bar (m. 98) in relatively long notes, over the hollow low fifth D-A. Heightening the poignancy of this ending is the dissonant tone e^2, delayed until the metrically weak fourth eighth-note, and stressed by its *sf* and by its expressive turn figure.

The link between the $c\#^3$ of m 92 and the penultimate bar seems to have been particularly important for Beethoven. In the autograph he rejected an early version of this passage (Beethovenhaus Ms. 61), transcribed in Example 2, in which the repetition of the diminished-seventh figure continues downward through the b flat^2 in m. 93. This earlier version diverts attention from the $c\#^3$ by placing it within a descending arpeggiation. Beethoven's final version sustains the tension of the leading tone and prepares for the closing bars of the movement.

Example 2. First version of mm. 92-93 (transcription from Beethoven's autograph).[13]

[11] Carl Czerny, *On the Proper Performance of All Beethoven's Works for the Piano*, ed. Paul Badura-Skoda (Vienna: Universal Edition, 1970), 51, 61.

[12] Martha Frohlich, "Ideas of Closure, Derivation, and Rhythm in the Sketches for the Andante of Beethoven's 'Pastorale' Sonata, Op. 28," *The Journal of Musicology* 16/3 (1998), 348-357.

[13] Martha Frohlich, *Ludwig van Beethoven, Piano Sonata Op. 28: Facsimile of the Autograph the Sketches, and the First Edition with Transcription and Commentary*, ed. Martha Frohlich (Bonn: Beethoven-Haus, 1996), 31.

Sonata in D Minor, Op. 31, No. 2 (1801-1802), Adagio

The lyrical middle movement is a sonata form without development: Exposition: first theme (mm. 1-17); transition (mm. 17-30); second theme (mm. 31-38); retransition (mm. 59-72); Recapitulation: first theme (mm. 43-59; transition: mm. 59-72); second theme (mm. 73-80); coda: mm. 80-103).

Central to our discussion of the coda is the consequent phrase of the first theme of the exposition (mm. 9-17), which includes two high ascending third progressions c^3-d^3-eb^3 in dotted rhythm and decorated with an expressive turn, the first (m. 12) supported by a V9, the second (m. 14) by a V7 (see music). As we'll see, the dissonant eb^3, the highest tone of these thirds, is *not* resolved to d^3 until the very end of the movement (m. 103).

The coda, retrospective in mood, divides into three overlapping subsections (mm. 80-89, 89-98, 98-103). The first subsection, on a tonic pedal point, begins as a transposition of the retransition. Its opening phrase rises to a poignant climax on the widely-spaced ninth Bb1 -c-flat ^{2} (m. 84). The second subsection is a radical re-composition of the consequent phrase of the first theme (mm. 89-98). The first bar of the consequent phrase of the first theme (m. 9) is replaced by a repeated measure (mm. 89-90) that is introductory in character. The first segment of the melodic line (mm.91-92), is placed in the middle voice, an octave lower than at its initial appearance (compare m. 91 and m. 10). The melody continues with an extraordinary downward leap of two octaves and a fifth to conclude in splendid isolation in the bass register (mm. 91-92). Like the ascending third progressions c^3-d^3-eb^3 in mm. 12 and 14, those in mm. 93 and 95, are immediately followed by registral descents. In the coda, however, the ascending third progressions c^3-d^3-eb^3 (mm. 93 and 95), are additionally highlighted by appearing without accompaniment, and the third in m. 95 is emphasized by a swift introductory ascending scale (m. 94). The concluding subsection of the coda, on a tonic pedal point, like the first subsection, begins with a registral descent that recalls the motion from c flat^2 to g^1 in the first subsection (mm. 98-99 and 84-85).

In the last bar of the Adagio (m. 103), the high descending third progression d^3-c^3-b flat^2, in dotted rhythm, finally resolves the tension of the ascending third progressions c^3- d^3-e flat^3 in mm. 93 and 95. The shared dotted rhythm of the ascending third progression and final descending third progression reinforces the registral connection between them.

Sonata in C Major, Op. 53 (Waldstein; 1803-1804), Allegro con brio

Like Op. 2/3/I, also in C major, this opening Allegro con brio is a brilliant, extended sonata-form movement with concerto-like features (exposition: mm. 1-85; development: mm. 86-155; recapitulation: mm.156-248; coda: mm. 249-302).

The coda concludes with varied returns of the chorale-like second theme (mm. 284 -295) and pulsating opening theme (mm. 295-302) introduced in the exposition (see music mm. 1-13, for the opening theme and mm. 35-42, for the relevant part of the second theme). The conclusion of the coda begins with the poignant final return of the chorale-like second theme in C major, now with its phrases shifted among different registers, responding to the registral shifts in the preceding cadenza-like passage (mm. 282-283). The appearance of the second theme's penultimate bar in different octaves makes the concluding return of the opening theme sound decisively final.

Registral tension is created in the penultimate bar of the second theme by the leading tone b^2—supported by V7—highlighted by a crescendo, *subito piano* and fermata (m. 290). The penultimate bar of this theme does not lead to a close either in m. 290 or in m. 292, when it repeats an octave lower with a-flat^1 instead of a-natural. Only on the third appearance of this bar, an octave

lower still and emphasized by *ritardando,* does the leading tone b resolve to c^1 (mm. 294-295). The registral tension of the *piano* b^2 (m. 290) resolves only with the triumphant c^3 of the abridged first theme's concluding *ff* tonic chord (m. 302). The upward leap from g^2 to c^3 in the last two bars provides a definitive answer to the questioning rising third progression g^2 -a^2 -b^2 in m. 290.

Sonata in F# Major, Op. 78 (1809), Allegro vivace

This second movement finale, described by Carl Czerny as "humorous, merry and facetious," is an unusual form of rondo.[14] Relevant to our discussion of the coda is the opening theme, A (mm. 1-12), and the immediately following theme B (mm. 12-22). The main theme (see music) consists of three rhythmically similar four-bar phrases separated by rests (mm. 1-12). Each of the phrases divides into two-bar subphrases—question and answer—that also are separated by a rest. The subphrase of the first two phrases contrast in dynamics: *forte-piano,* whereas the third phrase is *pianissimo.*

The questioning opening motive begins with an augmented-sixth chord resolving to V with the ascending half-step $b\#^1$-$c\#^2$ in the top voice, the only such opening chord progression in the piano sonatas. Though the tonic is implied by the progression V-V4/2-I6 in mm. 1-2, a root position tonic chord arrives only at the end of the theme (m. 12). In theme B (mm. 12-22) continuous eighth notes in the left-hand support continuous sixteenth-note pairs in the right hand (mm.12-22). This theme brings a change in texture as well as an upward and downward expansion of register. Such rapid registral shifts pervade the entire movement.

The final tonic return of theme A (mm. 150-161) merges with the beginning of the coda (mm. 160-183). The subphrases of theme A shift from high to very low registers, as in mm. 89-99. In mm. 150-157, for the first time, the second, fourth, and final answering subphrases (mm. 152-153, 156-157 and 160-161). are played legato rather than staccato. Instead of leading to theme B, the penultimate bar of theme A leads to a tonic cadence and mm. 160-161 function simultaneously as the end of the recapitulation and the beginning of the coda. These answering two bars form a motive that is developed with new *sf* syncopations on $c\#^3$ (mm.168-171) leading to two chords lengthened by fermatas in mm. 175-176.

Beethoven exploits the registral and harmonic connection between high tones in the last seven bars of the coda (mm. 177-183). In a mysterious improvisatory passage prolonging V7 (mm. 174-177), two *pp* dotted half-note chords (mm. 175-176) bring an ascent from $c\#^2$ to $d\#^2$. The following V7 arpeggios sweeping upward (m. 177) continue the ascent with the pitch-class E# in three different registers, $e\#^1$, $e\#^2$, and $e\#^3$. The concluding $e\#^3$, dramatized by the following rest, is left hanging in its register by a sudden downward shift of register. The harmonic and registral tension of this passage resolves in mm. 178-183, a six-bar closing unit with sixteenth-note pairs derived from theme B. In this closing unit the tonic and octave ascent $f\#^1$ (m. 178-79)-$f\#^2$ (mm. 180-81)-$f\#^3$ (mm. 183) resolve the immediately preceding V7 and octave ascent $e\#^1$- $e\#^2$-$e\#^3$ (m. 177). The $e\#^3$ of m. 177 resolves only at the very end of the movement (mm.182-183) with a perfect V7-I cadence in which $e\#^3$ ascends scale-wise to $f\#^3$, completing the ascent $c\#^2$ (m. 175)-$d\#^2$ (m. 176)-$e\#^3$ (m. 177)-$f\#^3$ (m. 183).

Amazingly, two rhythmically compressed presentations of the rising fourth C#-D#-E#-F# appear in the lower voices (mm. 178-183). The initial pitches of the rondo theme, B#-C#, notated here as C natural-C#, introduce these ascents of a fourth. Thus, the questioning opening gesture of the rondo theme is brilliantly transformed into an answering concluding gesture.

[14] Czerny, *On the Proper Performance*, 61.

Examples of Second Registral Strategy

This study concludes with a discussion of two movements in which a high scale degree ^6 supported by II6 appears shortly *before* the coda. This high unstable tone creates registral tension that resolves four bars from the end of the coda. In each movement, the opening theme features an ascending fourth. Shortly before the coda of each movement an accented chromatic passing tone introduces the high scale degree ^6.

Sonata in E Major, Op. 14, No. 1 (1798), Allegro

The Sonata in E Major, Op. 14, No. 1 is the only piano sonata that Beethoven transcribed for string quartet. Its opening movement, in sonata-form (exposition: mm. 1-60; development: mm. 60bis-90; recapitulation: mm. 91- 147 merging with coda: mm.148-162), is permeated by an upward fourth motive which appears both as an upward skip (m.1), filled in with passing tones (m. 4 right hand and mm. 1-4, tenor voice; see music) and as pitch classes B-D#-E (mm. 134-35 and 141.

As Carl Schachter has shown, Beethoven uses an extraordinarily expanded form of this fourth motive as a bridge between the endings of the recapitulation and coda.[15] When the opening of the chromatic version b^2-$b\#^2$-$c\#^3$ of the motive reappears at the end of the recapitulation (mm. 145-146), the octave $c\#^3$-$c\#^2$, appearing on the second beat of m. 146, supported by a II6, and followed by a half-note rest, is left hanging, owing to a sudden downward leap of more than two octaves to $d\#^1$ (m. 147). The registral tension is heightened by the *ff* and *sf* dissonant chromatic passing tone $b\#^2$ leading to the $c\#^3$. Near the end of the coda the $c\#^3$ connects in register to $d\#^3$–e^3 (mm. 158-159), completing the fourth motive b^1 (m. 145)-$c\#^2$ - (m.146)- $d\#^3$–e^3 (mm. 158-159). The $d\#^3$-e^3 is repeated twice, with a decrescendo from *p* to *pp* (mm. 159-61) as the movement fades away.

Sonata in F Major, Op. 54 (1804), In Tempo d'un Menuetto

The opening movement, *In Tempo d'un Menuetto*, alternates between two highly contrasting sections A (minuet) and B (trio): A (mm. 1-24) B (mm. 25-69) A' (mm. 70-93) B' (mm. 94-105) A" (extended, mm. 106-127) Coda (mm. 137-154). The A section consists of a repeated four-bar phrase (a, mm. 1-8) followed by a repeated eight- bar phrase (b, mm. 9-24; see music). Both phrases a and b begin with a motive that repeats in two higher octaves. Relevant to the coda are the upbeat rising fourths in mm. 1-2 and 5-6 and the accented chromatic passing tone C# decorating D of phrase b, which functions as a neighboring tone to the following C natural in following mm. 9-10, 11-12, and 14-15.

Towards the end of the expanded return of A, with its cadenza-like chain of trills, the d^3 in m. 133 decorated by a trill starting with $c\#^3$ and supported by a II6 chord, is left hanging by the abrupt downward leap of two octaves (mm. 133-134). The registral tension of the d^3 is resolved by the ascending half step e^3-f^3 near the end of the coda (mm. 148-151). This ascending half step completes the ascending fourth progression c^2 (m. 131)-d^3 (m. 133)-e^3-f^3 (mm. 148-149).

The accented $c\#^3$ (m. 133) introducing the trill derives from the ascending half steps C#-D in different registers in the opening A (mm. 9, 11, 13), and most immediately from the measured trill $c\#^3$-d^3 in A" (m. 126). The *ff* e^3 in the coda (mm. 148-149) is introduced as the top voice of the diminished-seventh chord g^2-b $flat^2$-d $flat^3$-e^3 supported by a tonic pedal. The d $flat^3$ of this diminished seventh enharmonically transforms the $c\#^3$ in m. 133, moving down to c^3 instead of ascending to d^3. The descent d $flat^3$ -c^3 is also prepared by the repeated high neighbor note figure d $flat^3$ -b $natural^2$ -c^3 at the end of section B (mm. 63-66).

[15] Schachter, "Beethoven's Sketches" [1-21].

Conclusion

The registral strategies for sustaining musical tension to the very end of a movement may reflect the influence of Bach's music, a lifelong preoccupation of Beethoven. From an early age, Beethoven played Bach preludes and fugues. In 1783, Christian Gottlob Neefe, Beethoven's teacher in Bonn, sent a communication to Carl Friedrich Cramer's *Magazin der Musik* in which he describes his young student's exceptional musical abilities: "He plays the clavier very skillfully and with power, reads at sight very well, and—to put in a nutshell—he plays chiefly *The Well-Tempered Clavier* of Sebastian Bach, which Herr Neefe has put into his hands."[16] During his early years in Vienna, Beethoven heard works by Bach at concerts of "old" music in the home of Baron Gottfried van Swieten, one of his important patrons. While working on the Piano Sonata in B-flat major Op. 106 (1817-18), which ends with a gigantic fugue, Beethoven copied *Contrapunctu*s 4 from Bach's *Art of the Fugue* in the Boldrini pocket sketchbook.[17] William Kinderman has aptly observed that "If Beethoven's interest in Bach ultimately centered on counterpoint and fugue, his Bachian affinities are also reflected in aspects of his rhythm, figuration, musical character, and formal procedures, as is most clearly seen in some of his piano sonatas."[18] To these Bachian affinities I would add the use of register to sustain tension until the end of a composition. In many brief keyboard pieces by Bach, musical tension is sustained up to the end because the ^1 supported by a tonic chord appears only in the very last bar.[19] In the Beethoven piano sonata movements studied in this essay, one or more high tones of a V7 (and its inversions), V9, or II6 chord are left hanging because of an immediate downward shift of register. These hanging tones create registral tension until near the end of the coda, where they move by step to the tonic at the same register.

To summarize: this study has shown various ways in which Beethoven exploits registral connections among high tones to maintain tension until the very end of eight piano sonata movements. *Within* the codas of seven piano sonata movements, one or more high tones of a V7 (and its inversions) or V9 chord are left hanging, due to an immediate downward shift of register (Opp. 2/3/1, 14/2/I, 28/II, 53/I, 31/2/I, 78/2). The unresolved high tone or tones are highlighted by syncopation, duration, repetition, dynamics, pause, or texture. Beethoven delays resolution until near the end of the coda, where these hanging high tones move by step to the tonic at the same register. Often the high tone or tones which had been left hanging reappears in the original register then resolving by step to the tonic chord.

The second registral procedure begins shortly *before* the codas of two movements (Opp. 14/1/I, 54/I). The sixth scale degree, supported by a II6 chord, is left hanging in its high register by a downward leap of two octaves to the leading tone Near the end of each of the movements the leading tone appears in the same high register as the previous sixth scale degree, and resolves upward to the tonic scale degree four bars from the end.

There is reason to think that Beethoven's techniques for maintaining registral tension until the end of a movement were inspired by brief keyboard works by J. S. Bach.

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[16] Alexander Thayer, *Thayer's Life of Beethoven*, ed. Elliot Forbes, vol. 1 (Princeton: Princeton University Press, 1964), 66.

[17] Douglas Johnson, Alan Tyson, and Robert Winter, *The Beethoven Sketchbooks* (Berkley: University of California Press, 1985), 350.

[18] William Kinderman, "Bachian Affinities in Beethoven," in *Bach Perspectives, Vol. 3, Creative Responses to Bach from Mozart to Hindemith*, ed. Michael Marissen (Lincoln: University of Nebraska Press, 1998), 83.

[19] Examples from *The Well-Tempered Clavier*, Vol. 1 include the Preludes in C major, C minor, C# major, C# minor, D major, D minor, Eb minor and the Fugues in C# minor, Eb major, D# minor and Bb major.