

**MTO 18.1 Examples: Ohriner, Grouping Hierarchy and Trajectories of Pacing**

(Note: audio, video, and other interactive examples are only available online)  
<http://www.mtosmt.org/issues/mto.12.18.1/mto.12.18.1.ohriner.php>

**Example 1a.** Frédéric Chopin, Mazurka in C major, op. 24, no. 2, measures 21–28, score excerpt

**Example 1b.** Frédéric Chopin, Mazurka in C major, op. 24, no. 2, measures 21–28, segmentation wrought by Lerdahl and Jackendoff’s Grouping Preference Rule (GPR) 2b, which addresses attack-point proximity

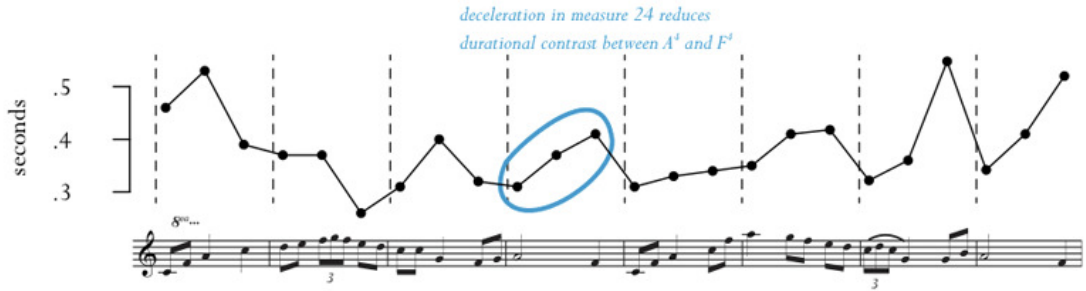
**Example 1c.** Frédéric Chopin, Mazurka in C major, op. 24, no. 2, measures 21–28, segmentation wrought by a combination of GPRs 6 and 1

GPR 6 addresses parallelism, suggesting the downbeats of measures 21 and 25 are both beginnings.  
 GRP 1 retrospectively associates the  $F^5$  at the end of measure 24 with the previous material to avoid a one-note group

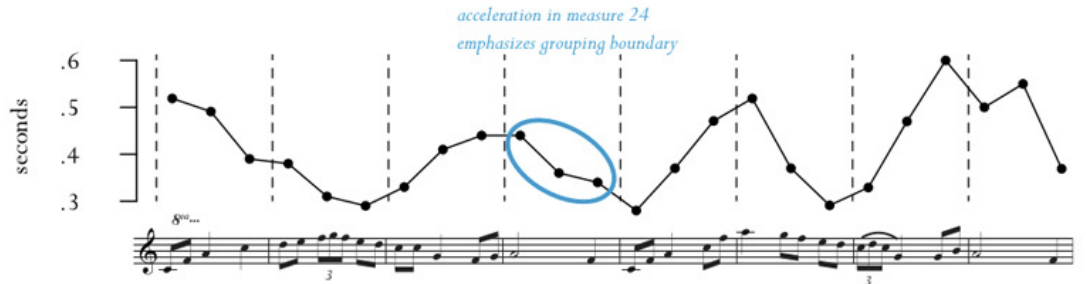
**Example 2.** Durational contours of Chopin, Mazurka in C major, op. 24, no. 2, measures 21–28, in recorded performances

Points represent durations of each beat; higher points represent longer duration and thus slower tempo

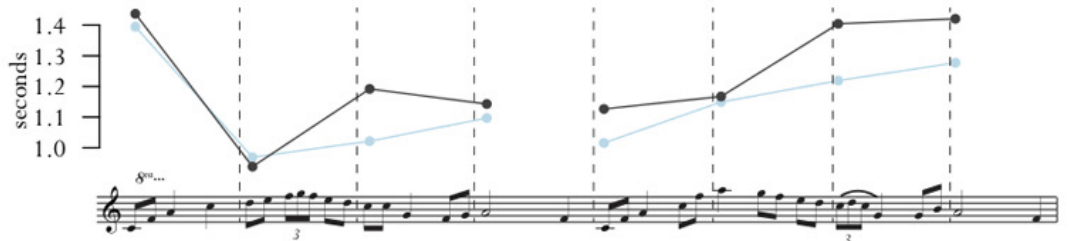
a. Frederic Chiu (1999)



b. Vladimir Ashkenazy (1977)



**Example 3.** Durational contours of Chiu (light blue line) and Ashkenazy (gray line); each point represents the duration of a measure, not a beat



**Example 4.** Temporal segmentation of op. 24, no. 2, measures 21–28 in the renditions of Ashkenazy (top) and Chiu (bottom)

Vladimir Ashkenazy

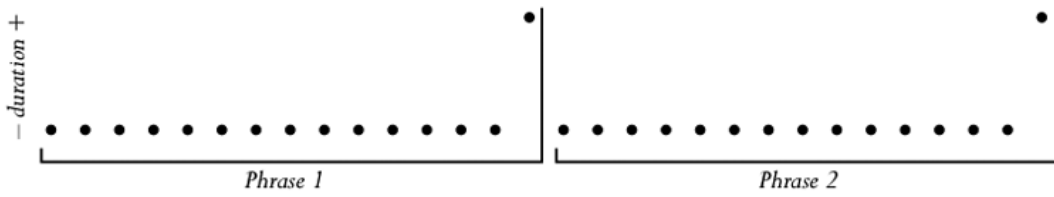


Frederic Chiu

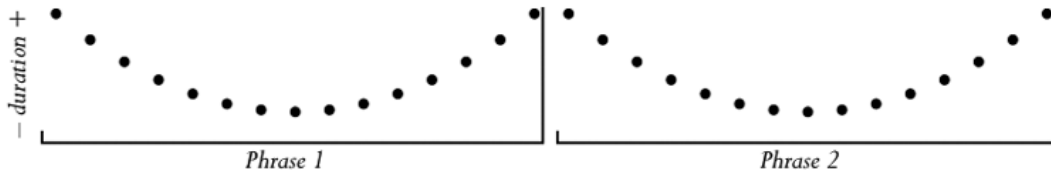


**Example 5.** Structural communication through phrase final lengthening

a. Points represent durations of beats in two hypothetical phrases

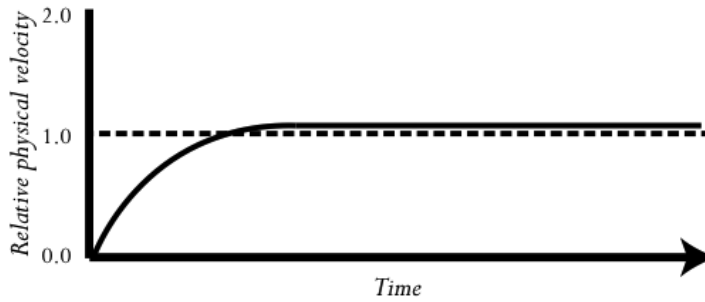


b. With parabolic durational contours



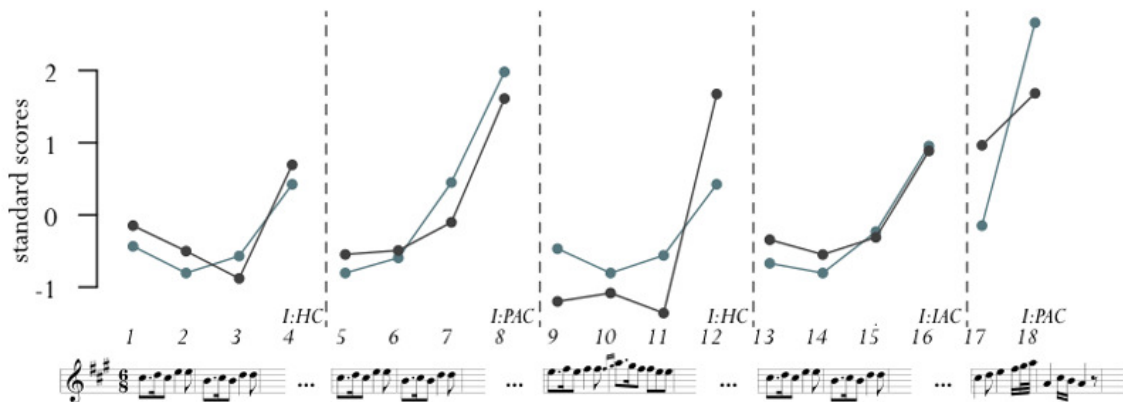
**Example 6.** Actually and perceptually constant velocities

The solid line, a non-constant velocity, is perceptually constant while the constant dashed line is not (reprint, Runeson 1974, 12)



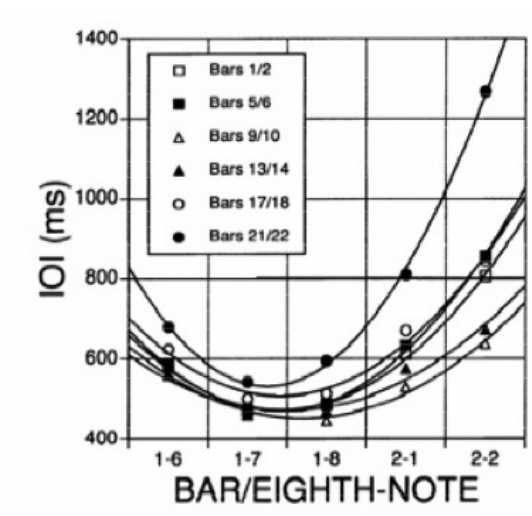
**Example 7.** Todd's model of timing (by measure) in the theme of the first movement of Mozart's Sonata in A major, K. 331

The blue line represents Todd's model. The gray line is an averaged durational contour derived from twenty-three recorded performances of the theme collected by the author ( $r = .78, p < .001$ ). Each phrase reflects group-final lengthening; I will call such phrases GFL-reflective



**Example 8a.** “Timing patterns of six instances of the same melodic gesture in “Träumerei”

The data points are the geometric average durations of twenty-eight performances, with quadratic functions fitted to them  
The abscissa labels refer to bars one and two” (reprint, Repp 1992a, 227)

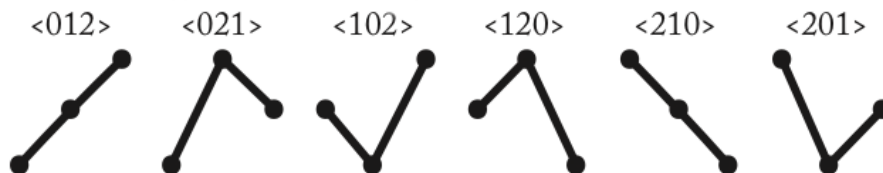


**Example 8b.** Instances of the five-note melodic gesture in Schumann’s “Träumerei”

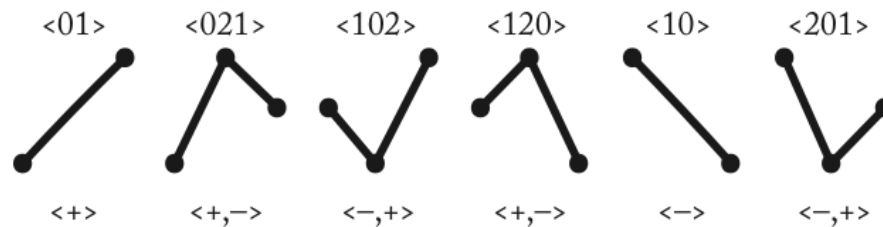


**Example 9.** Contour segments

a. Contour segments of cardinality three



b. Cardinality-three csegs reduced through Morris's contour reduction algorithm, with Friemann's contour adjacency series (CAS) indicated below



c. Contour segments with CASs of <+> or <-,+> (in black)

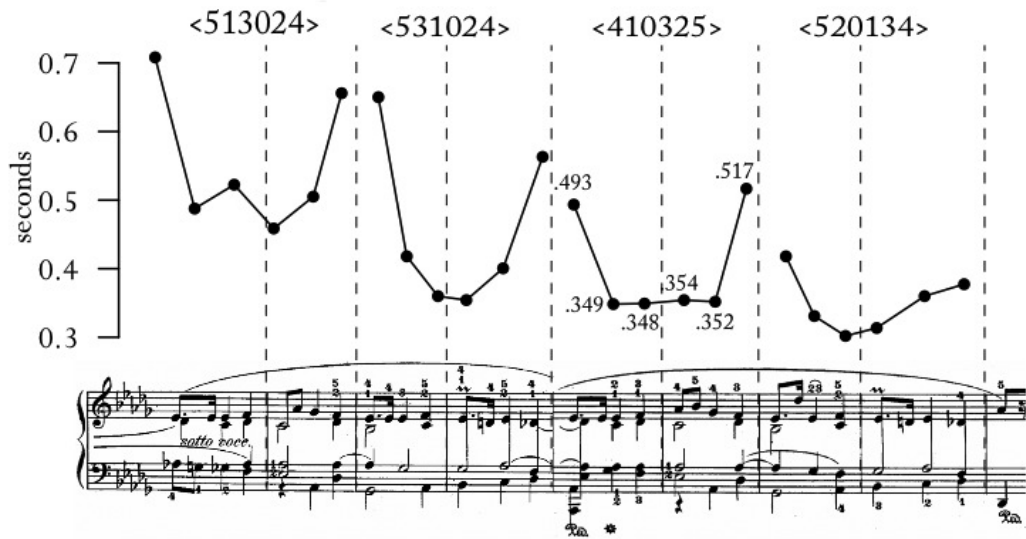


**Table 1.** Contour segments of cardinalities two through eight that reduce to csegs with adjacency series of <+> or <-,+>:

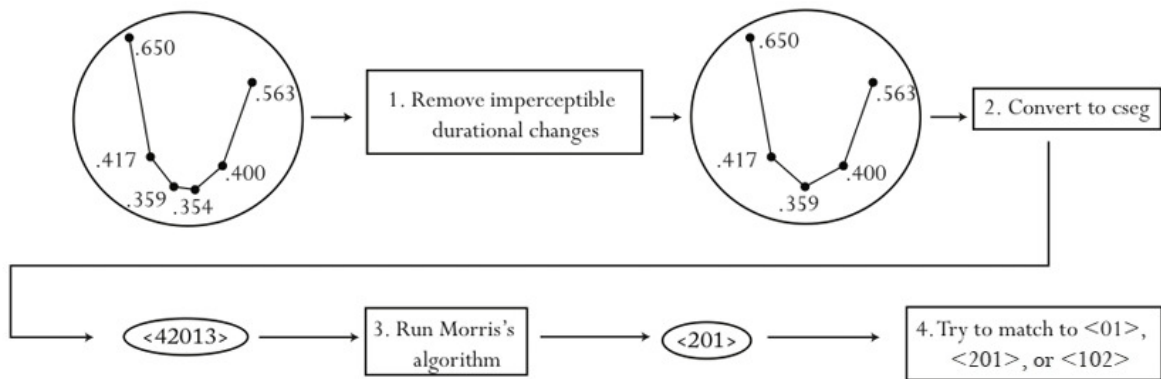
<u>Cardinality (n)</u>	<u>Number of Permutations (n!)</u>	<u>Permutations with CASs of &lt;+&gt; or &lt;-,+&gt; (<math>2^{(n-1)}-1</math>)</u>
2	2	1 (50%)
3	6	3 (50%)
4	24	7 (29%)
5	120	15 (13%)
6	720	31 (4%)
7	5040	63 (1%)
8	40320	127 (.3%)

**Example 10.** Durational contour of Stanislav Bunin's rendition of the Mazurka in C-sharp minor, op. 63, no. 3, measures 33–40

Contour segments of each two-measure group given above; measured durations of each beat in the third two-measure group also given



**Example 11.** A method for determining whether a performed phrase is GFL-reflective at some level of time-span organization



**Example 12.** Selected eight-measure phrases from Chopin's output. Evidence for segmentation at various levels of time-span reduction given below

a. Mazurka in B minor, op. 30, no. 2, measures 1–8

b: i      V<sup>7</sup>      i      v      VI      III      ii<sub>5</sub><sup>6</sup>      V<sup>7</sup>      i

**Evidence for two-measure grouping:** thematic repetition, descending fourths in the bass, dynamic contrast, slurring, long notes

**Evidence for four-measure grouping:** registral shift of first melodic note, textural break in melody, introduction of novel harmony.

**Evidence for eight-measure grouping:** absence of V<sup>#</sup> half cadence in measure 4

b. Mazurka in C major, op. 24, no. 2, measures 21–28

I      \*      II<sub>5</sub>      \*      V      \*      I      \*      I      \*      II<sub>5</sub>      \*      V      \*      I      \*      a tempo

**Evidence for two-measure grouping:** crescendo/decrescendo pairing, ascending fourths in the bass

**Evidence for four-measure grouping:** thematic repetition, repetition of  $\hat{1}-\hat{4}-\hat{5}-\hat{8}$  in the bass

**Evidence for eight-measure grouping:** melodic lead-in at the end of measure 24

c. Nocturne in B-flat minor, op. 9, no. 1, measures 20–23

Db: I      (ct<sup>o7</sup>)      V<sup>7</sup>      I

**Evidence for two-measure grouping:** long notes

**Evidence for four-measure grouping:** reversal of melodic contour

**Evidence for eight-measure grouping:** absence of thematic repetition, tonal plan (I, V<sup>7</sup>—V<sup>7</sup>, I), tonic pedal in bass, slurring



**Example 13.** GFL-reflectivity in performances of the three excerpts given in Example 12. The lowest layer (green boxes) refers to four successive two-measure groups; the middle layer (teal boxes) refers to two successive four-measure groups; the highest layer (royal blue boxes) refers to eight-measure groups. Within each layer, the larger box indicates GFL-reflectivity





**Example 14.** Mazurka in B minor, op. 30, no. 2, abbreviated score. Themes are arranged linearly as  $A^1-A^2-B^1-B^2-C^1-C^2-B^3-B^4$ . Evidence for segmentation at various levels of time-span reduction is given below

a. Theme A, measures 1–8 and 9–16

**Evidence for two-measure grouping:** thematic repetition, descending fourths in the bass, repetition of  $B^2$  in measure 3, dynamic contrast, slurring, long notes

**Evidence for four-measure grouping:** registral shift of first melodic tone

**Evidence for eight-measure grouping:** no HC in measure 4

b. Theme B, measures 17–24, 25–32, 49–56, and 57–64

**Evidence for two-measure grouping:** repeating 10–8 linear intervallic pattern

**Evidence for four-measure grouping:** minimal

**Evidence for eight-measure grouping:** unbroken melodic contour, no long notes, eight-measure crescendo, rising third sequence in F-sharp minor, slurring

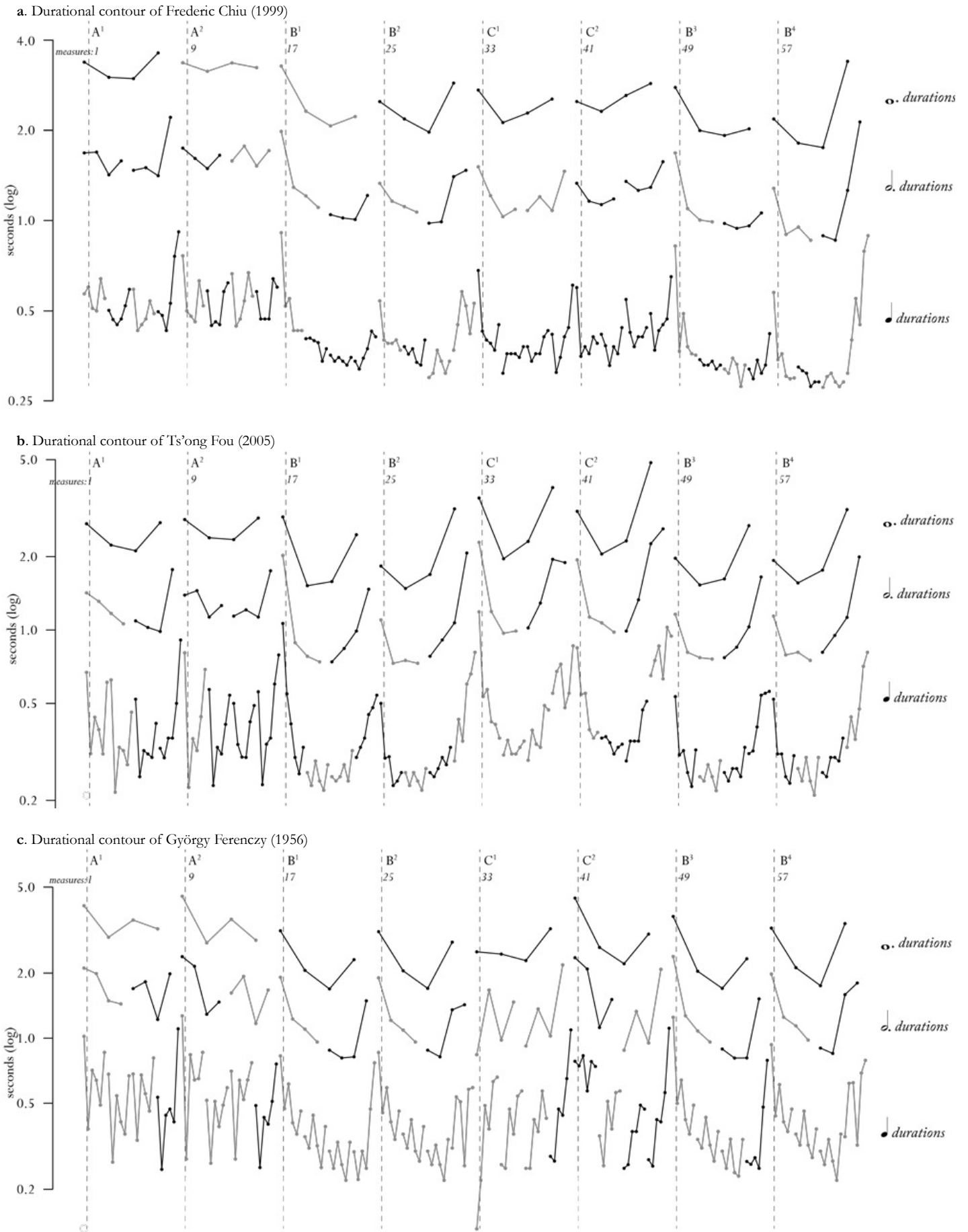
c. Theme C, measures 33–40 and 41–48

**Evidence for two-measure grouping:** fifth- and fourth-related harmonies, thematic repetition, long notes, slurring

**Evidence for four-measure grouping:** minimal

**Evidence for eight-measure grouping:** continuous tonal motion toward A-major PAC, lack of dynamic contrast

**Example 15.** Durational contours of the Mazurka in B minor, op. 30, no. 2, with GFL-reflective groups in black



**Example 16.** Mazurka in C-sharp minor, op. 63, no. 3, abbreviated score and evidence for segmentation at various levels of time-span organization

a. Theme A, measures 1–8 and 9–16

**Evidence for two-measure grouping:** rests at ends of measures 2 and 4, thematic repetition, slurring (in measures 1–4)

**Evidence for four-measure grouping:** double neighbor around C-sharp in bass (measures 1–4), slurring (in measures 4–8)

**Evidence for eight-measure grouping:** sentence construction

b. Theme B, measures 17–24 and 25–32

**Evidence for two-measure grouping:** shifts in register

**Evidence for four-measure grouping:** thematic repetition,

**Evidence for eight-measure grouping:** minimal

c. Theme C, measures 33–40 and 41–48

**Evidence for two-measure grouping:** arrival on D-flat major triad at the end of even-numbered measures, repetition of rhythmic pattern

**Evidence for four-measure grouping:** thematic repetition, contrapuntal cadences in measures 1 and 4, pedaling

**Evidence for eight-measure grouping:** slur

Example 17. Mazurka in C-sharp minor, op. 63, no. 3, formal diagram




### Main Theme

(measures 1–32)

### Contrasting Middle

(measures 33–48)


  

<p><b>Theme A</b> sentence construction</p>  <p>A<sup>1</sup>, measures 1–8      1<sup>st</sup> time: i:PAC          A<sup>2</sup>, measures 9–16      2<sup>nd</sup> time: III:PAC</p>	<p><b>Theme B</b> parallel construction</p>  <p>B<sup>1</sup>, measures 17–24      1<sup>st</sup> time: v:PAC          B<sup>2</sup>, measures 25–32      2<sup>nd</sup> time: i:PAC</p>	<p><b>Theme C</b> four-measure phrases</p>  <p>C<sup>1</sup>, measures 33–40      1<sup>st</sup> time: I:PAC      2<sup>nd</sup> time: I:PAC          C<sup>2</sup>, measures 41–48      1<sup>st</sup> time: IV:PAC      2<sup>nd</sup> time: [sequence]</p>
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### Main Theme Return

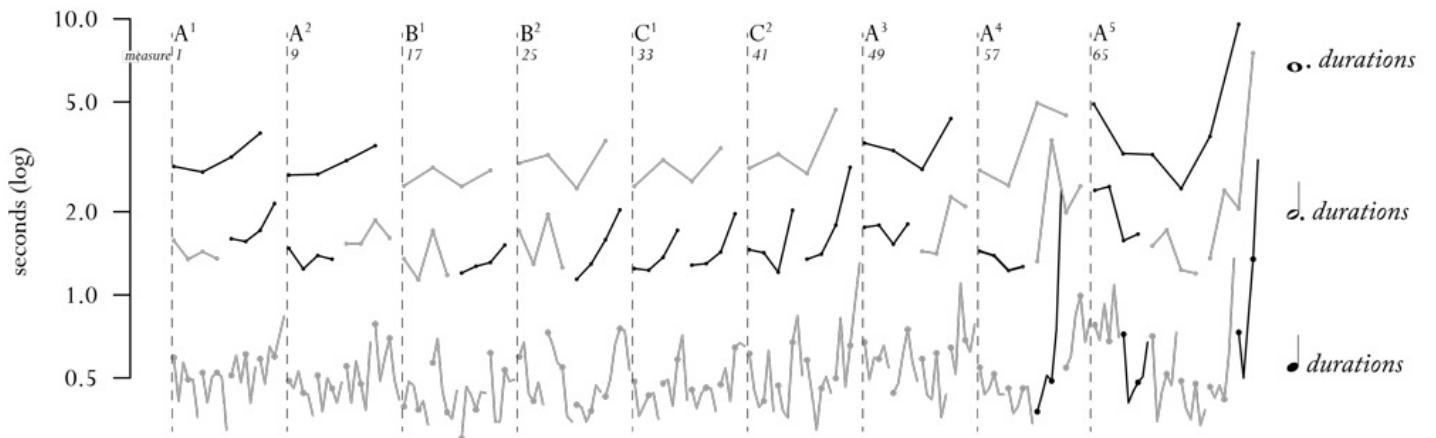
(measures 65–76)

sentence construction



measures 49–56      1<sup>st</sup> time: i:PAC  
 measures 57–64      2<sup>nd</sup> time: i:PAC\*  
 measures 65–76      [i:PAC in 4<sup>th</sup> and 12<sup>th</sup> measures]\*  
 \* = uses ending material from Theme B

Example 18. Durational contour of Ignacy Paderewski (1930), op. 63, no.3



Example 19. Durational contour of Roberto Poli (2003), op. 63, no. 3

