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 F⁵ 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)
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 <-,+>:

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

\[ \text{Evidence for two-measure grouping: thematic repetition, descending fourths in the bass, dynamic contrast, slurring, long notes} \]

\[ \text{Evidence for four-measure grouping: registral shift of first melodic note, textural break in melody, introduction of novel harmony} \]

\[ \text{Evidence for eight-measure grouping: absence of V}^4 \text{ half cadence in measure 4} \]

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

\[ \text{Evidence for two-measure grouping: crescendo/decrecendo pairing, ascending fourths in the bass} \]

\[ \text{Evidence for four-measure grouping: thematic repetition, repetition of $\frac{\dot{4}}{\dot{3}} \cdot $ in the bass} \]

\[ \text{Evidence for eight-measure grouping: melodic lead-in at the end of measure 24} \]

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

\[ \text{Evidence for two-measure grouping: long notes} \]

\[ \text{Evidence for four-measure grouping: reversal of melodic contour} \]

\[ \text{Evidence for eight-measure grouping: absence of thematic repetition, tonal plan (I, V\textsuperscript{7} -- V\textsuperscript{7}, I), tonic pedal in bass, slurring} \]
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 \( A^1 \rightarrow A^2 \rightarrow B^1 \rightarrow B^2 \rightarrow C^1 \rightarrow C^2 \rightarrow B^3 \rightarrow B^4 \). 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


b. Durational contour of Ts'ong Fou (2005)

c. Durational contour of György Ferenczy (1956)
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, pedal

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)

Main Theme Return
(measures 65–76)

Example 18. Durational contour of Ignacy Paderewski (1930), op. 63, no. 3
Example 19. Durational contour of Roberto Poli (2003), op. 63, no. 3