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MTO 28.3 Examples: McAdams, Goodchild, and Soden, A Taxonomy of Orchestral Grouping Effects Derived from Principles of Auditory Perception

(Note: audio, video, and other interactive examples are only available online)

<https://mtosmt.org/issues/mto.22.28.3/mto.22.28.3.mcadams.html>

Example 1. Auditory grouping gives rise to events from which perceptual properties are extracted, which then acquire musical functions within a given sonic context

Auditory grouping mechanisms

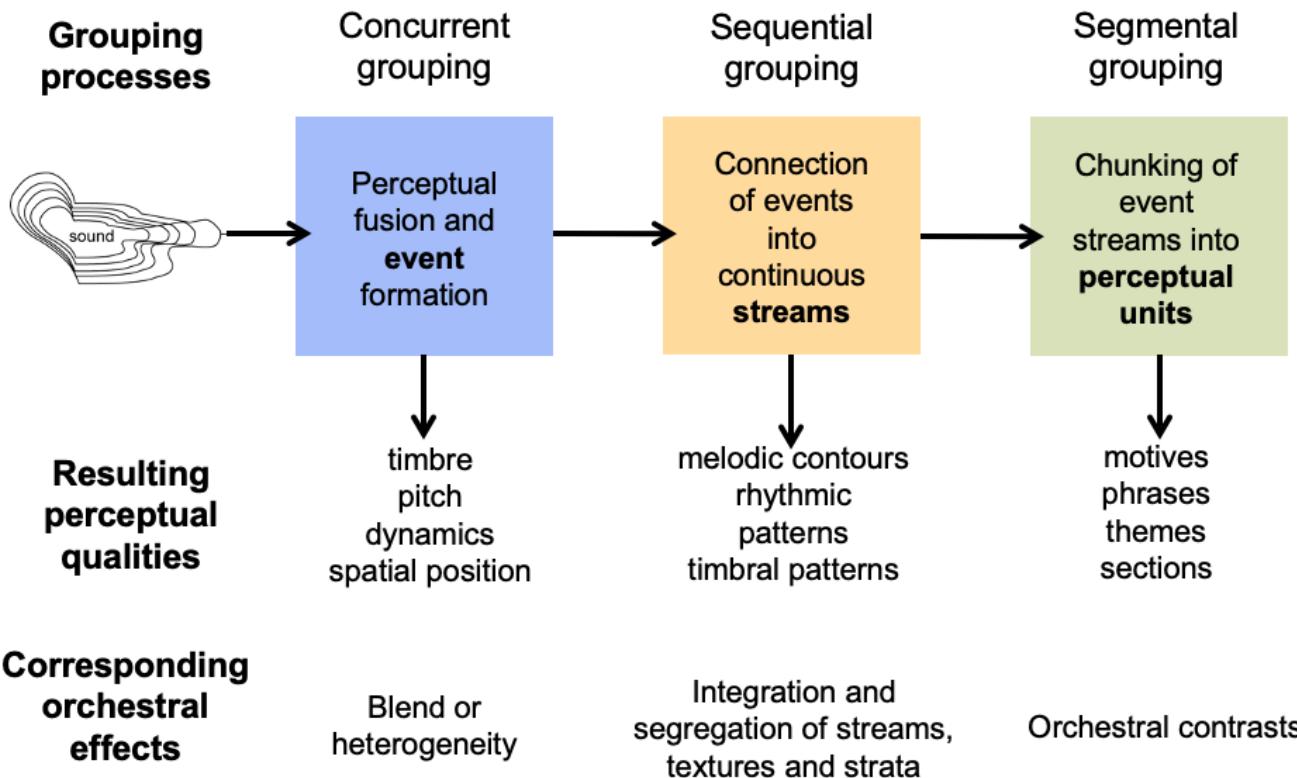


Perceptual properties

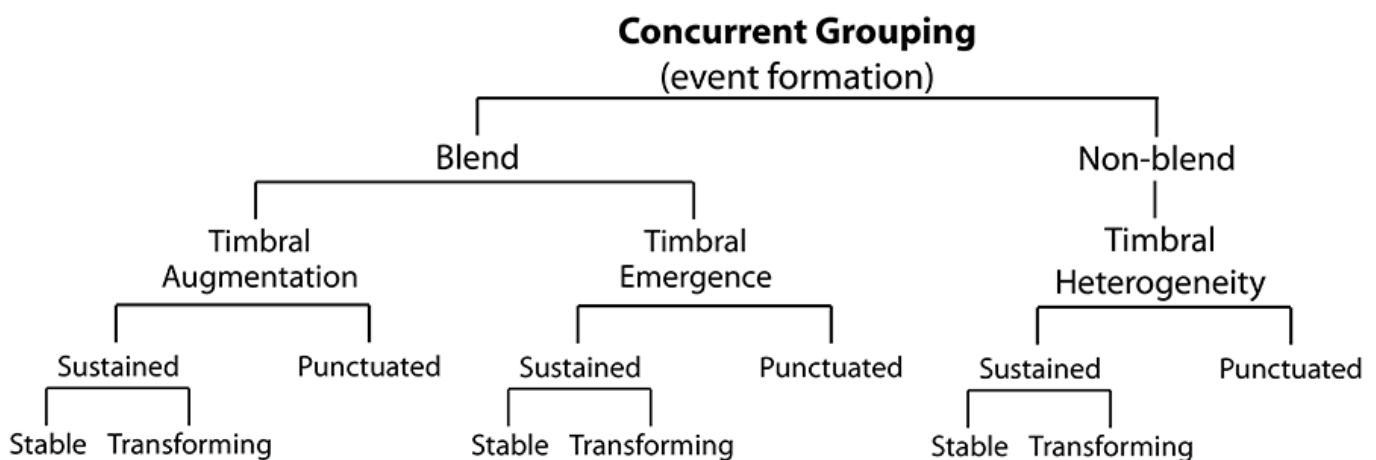


Musical function of perceptual properties

Example 2. Auditory grouping processes and the resulting perceptual qualities and corresponding orchestral effects. [Adapted from Goodchild and McAdams 2021, Fig. 1]



Example 3. Taxonomy of concurrent auditory grouping phenomena



Example 4. Timbral augmentation (sustained, stable): Debussy, *La Mer*, i, mm. 122–31

Example 5. Timbral augmentation (sustained, transforming): Wagner, *Parsifal*, Overture, mm. 20–25

Score in C

Ob. 2,3

Eh.

Cl. in B \flat 1

Vln. 1

Vln. 2

Bsn. 1

20

a 2

Embellishing

Dominating

Example 6. Timbral augmentation (punctuated):
Sibelius, Symphony no. 5, op. 82, iii, mm. 474–482

Score in C

Un pochettino stretto

Fl. 1
Fl. 2
Ob. 1
Ob. 2
Cl. in B \flat 1
Cl. in B \flat 2
Bsn 1
Bsn 2
Hn in F 1
Hn in F 2
Hn in F 3
Hn in F 4
Tpt in B \flat 1
Tpt in B \flat 2
Tpt in B \flat 3
Tbn 1
Tbn 2
Tbn 3
Timp.
Vln I
Vln II
Vla
Vc.
Cb. I

Example 7. Timbral emergence (sustained, stable): Debussy, *La Mer*, i, mm. 6–17

Example 8. Timbral emergence (sustained, transforming): Schoenberg, *Five Pieces for Orchestra* op. 16, iii, mm. 1–11

Example 9. Timbral emergence (punctuated): Berlioz, *Symphonie fantastique*, iv, m. 17

Score in C

d = 72

Cl. 1,2 in C

Bsn 1,2

Hn 1,2 in B \flat

Hn 3,4 in E \flat

Tpt. 1,2 in B \flat

Cnt. in B \flat

A. Tbn

Tbn 2,3

Timp. 1

Timp. 2

Vln. 1

Vln. 2

Vla

Vc.

Cb.

Example 10. Timbral heterogeneity (sustained, stable): Debussy, *La Mer*, iii, mm. 183–186.

Note that the glockenspiel sounds two octaves higher than written.

The rest of the orchestra is not shown.

Score in C

183 **Animé et tumultueux** ($\text{d} = 96$)

Eh.

Hn in F 1

Glock.

pp

pp doux et expressif

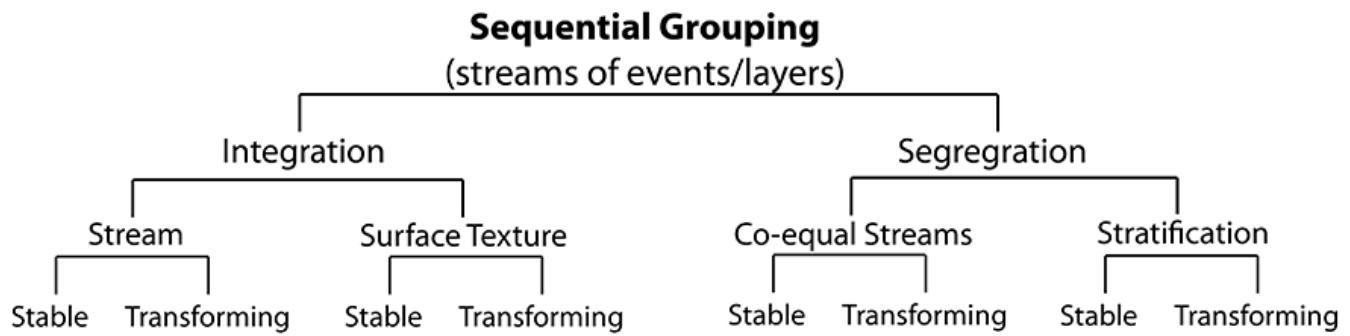
pp

Blend

Non-blend

Example 11. Timbral heterogeneity (punctuated):
Tchaikovsky, *Nutcracker Suite*, op. 71a, i, mm. 181–182

Example 12. Taxonomy of sequential auditory grouping phenomena



Example 13. Stream integration (stable). Ravel's orchestration of Mussorgsky's *Pictures at an Exhibition*, vi ("Samuel Goldberg and Schmuyl"), mm. 1–8, Score in C

Andante

English Horn

Bass Clarinet in A 1

Clarinet in A 2

Bass Clarinet in A

Bassoon 1

Bassoon 2

Violin I

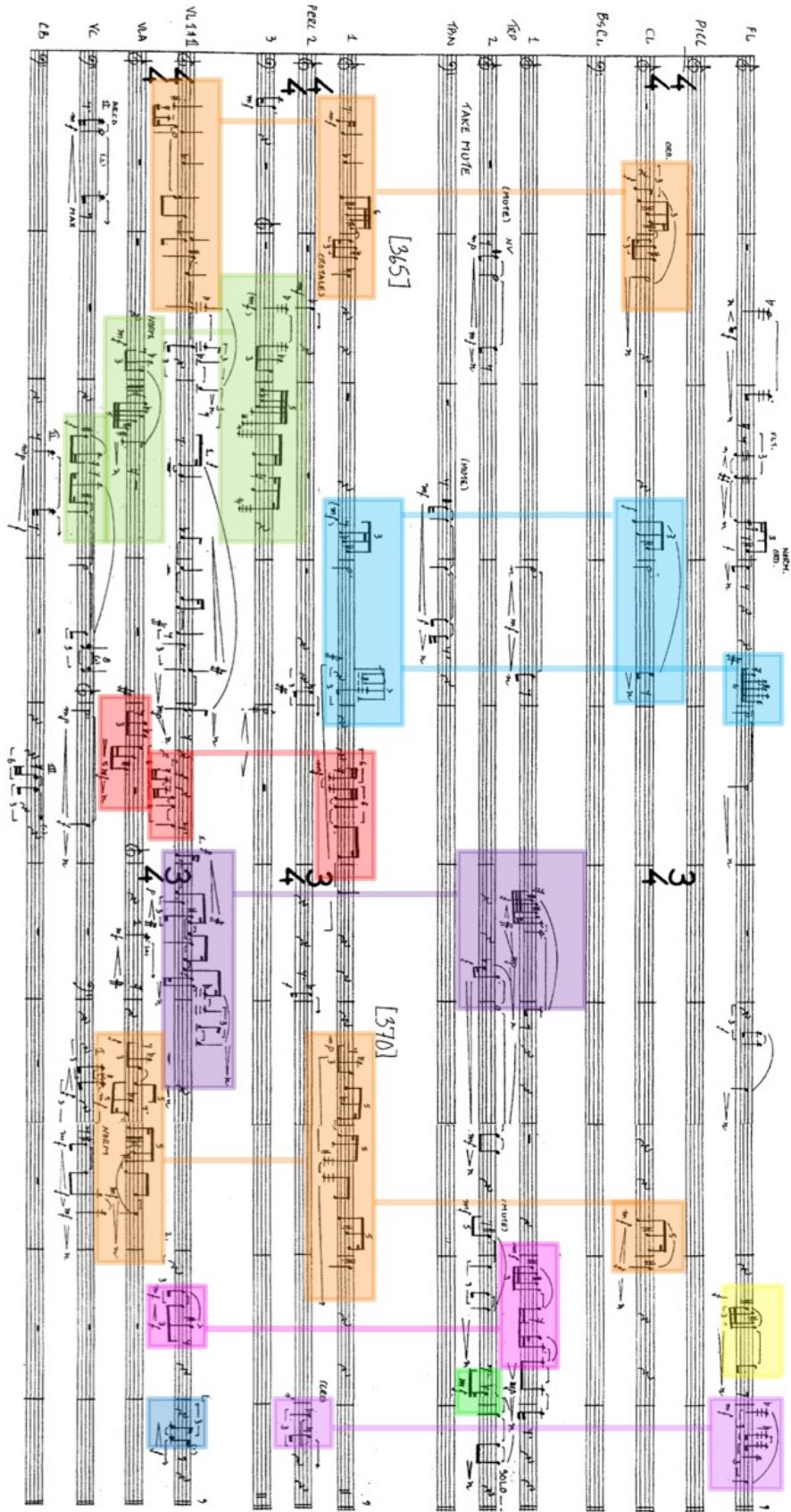
Violin II

Viola

Violoncello

Contrebass

Example 14. Stream integration (transforming): Reynolds, The Angel of Death, S section, mm. 364–373; [From Touizrar and McAdams 2019]



Example 15. Surface texture (stable): Smetana, Die Moldau, mm. 185–194

Score in C

L'istesso tempo

Fl. 1, 2 *p* (sustained)

Cl. 1, 2 in B_b *p* (sustained)

ppp on degante

Surface texture

185

Example 16. Surface texture (transforming): Smetana, *The Bartered Bride*, Overture, mm. 89–99

Example 17. Stream segregation (stable) of co-equal single-instrument lines: Vaughan Williams, *The Lark Ascending*, mm. 88–94

Score in C

Allegretto Tranquillo
(quasi Andante)

88 solo

Ob.

J **Tranquillo**

Stream 2

Allegretto Tranquillo

Solo Vln.

J **Tranquillo**

Solo Vln. (p) 6 6

Vln. 1 pp

Vln. 2 pizz. arco pp

Vla pizz. arco pp

Vc. pizz. arco pp

Stream 1

Score in C

Allegretto Tranquillo
(quasi Andante)

88 solo

Ob.

J **Tranquillo**

Stream 2

Allegretto Tranquillo

Solo Vln.

J **Tranquillo**

Solo Vln. (p) 6 6

Vln. 1 pp

Vln. 2 pizz. arco pp

Vla pizz. arco pp

Vc. pizz. arco pp

Stream 1

Example 18. Stream segregation (stable) of blended streams: Borodin, *In the Steppes of Central Asia*, mm. 210–218

Score in C

F Allegretto con moto $\text{♩} = 92$

Fl. 1,2 *mf*

Ob. 1 *mf*

Eh. *mf*

Cl. 1,2 in A *mf*

Bsn 1,2 *mf*

Hn. 1,3 in F *mf*

Hn. 2,4 in F *mf*

Tpt 1,2 in F *p*

Timp. 1 *p*

F Allegretto con moto $\text{♩} = 92$

Vln. 1 *mf*

Vln. 2 *mf*

Vla pizz. *mf*

Vc. pizz. *mf*

Cb. *mf*

Stream 2

Stream 1

Example 19. Stream segregation (transforming) of blended streams: Stravinsky, *Quatre Etudes, iv (Madrid)*, mm. 93–94

Score in C

93 94

Picc. *ff* 3:2

Fl. 1.2 *ff* 3:2

Ob. 1.2. *ff* 3:2

Ob. 3. *ff* 3:2

Cl. 1 (E♭) *ff* 3:2

Cl. 2.3. (A) *ff* 3:2

Bsn. 1.2. *sfz*

Stream 1

Hn. 1.2. *mf*

Hn. 3.4. *mf* 3. 4. *mf* *sfz*

Tpt. 1.2. *p* *sfz*

Tpt. 3.4. *p* *sfz*

Stream 2

VI. I VI. II *a 2* *p* *sfz*

Vla. *f*

Vc. *f*

Db. *f*

Example 20. Stratification (stable) with three layers: Mahler, Symphony no. 1, ii, mm. 26–31

Score in C

26 $\text{d} = 66$

The score is divided into three horizontal layers by blue lines. The top layer, labeled 'MG', contains Flute 1.2, Oboe 1.2, and Clarinet in A 1.2. The middle layer, labeled 'FG', contains Violin 1, Violin 2, and Cello. The bottom layer, labeled 'BG', contains Cello and Double Bass. The score shows a stable stratification with each layer playing a continuous eighth-note pattern. The MG layer uses a 3/4 time signature, while the FG and BG layers use a 2/4 time signature. Dynamics are indicated by 'f' (fortissimo) for the MG and FG layers, and 'p' (pianissimo) for the BG layer. Measure numbers 26 are shown at the top of each staff.

Fl. 1.2

Ob. 1.2

Cl. in A 1.2

Vln. 1

Vln. 2

Vla

Vc.

Cb.

MG

FG

BG

Example 21. Stratification (transforming) in three layers:
 Borodin, *In the Steppes of Central Asia*, mm. 27–42]

Score in C

The musical score is divided into three vertical sections, each representing a layer of stratification:

- MG (Mezzo-Gesang):** The leftmost section, containing the first two staves. It includes parts for **Vcl** (Violoncello) and **Vln** (Violin). The **Vcl** part uses **pizz.** (pizzicato) and **p.** (piano). The **Vln** part uses **pizz.** and **pp** (pianissimo).
- BG (Basis-Gesang):** The middle section, containing the third staff. It includes parts for **Vln** (Violin) and **Ob.** (Oboe). The **Vln** part uses **pizz.** and **pp**. The **Ob.** part uses **p.** and **pp**.
- FG (Fremde Gesang):** The rightmost section, containing the fourth staff. It includes parts for **Hn. 3/4 in F** (Horn 3/4 in F), **Cl. 1/2 in A** (Clarinet 1/2 in A), and **Ob.** (Oboe). The **Hn. 3/4 in F** part uses **p.** and **pp**. The **Cl. 1/2 in A** part uses **p.** and **pp**. The **Ob.** part uses **p.** and **pp**.

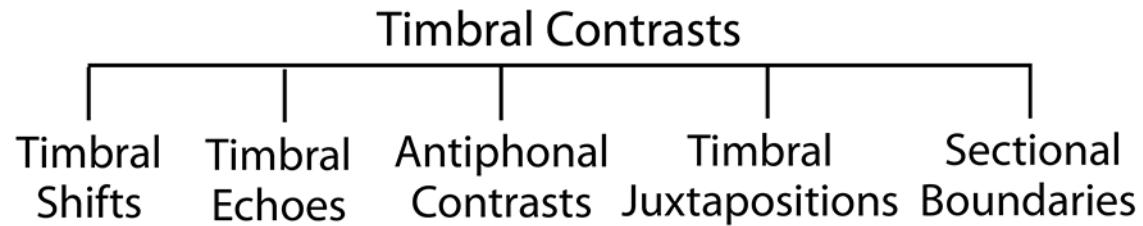
The score consists of 16 measures. Measures 1-16 are indicated by vertical dashed lines on the left. Measures 11-16 are grouped by a bracket on the right. Measures 11-16 are highlighted with a large blue rectangular box.

Measure numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.

Section labels: MG, BG, FG.

Example 22. Taxonomy of sequential auditory grouping phenomena

Segmental Grouping (units)



Example 23. Timbral shifts: Schubert, Symphony no. 9 in C major, i, mm. 594–602]

Score in C

The musical score consists of ten staves representing different instruments: Flute 1,2; Oboe 1,2; Clarinet 1,2 in C; Bassoon 1,2; Bass Trombone; Trombone 2; Horn 1,2 in C; Violin 1; Violin 2; Viola; Cello; and Double Bass. The score is in common time (indicated by '2/4'). The key signature is C major. The dynamics are marked with 'p' (pianissimo) and 'f' (fortissimo). The tempo is indicated as 'P i moto'.

Blue boxes highlight specific musical segments:

- Box 1:** Surrounds the first measure of the Flute 1,2 and Oboe 1,2 staves. It shows a transition from a sustained note to a rhythmic pattern of eighth and sixteenth notes.
- Box 2:** Surrounds the first measure of the Bass Trombone and Trombone 2 staves. It shows a transition from a sustained note to a rhythmic pattern of eighth and sixteenth notes.
- Box 3:** Surrounds the first measure of the Horn 1,2 in C staff. It shows a transition from a sustained note to a rhythmic pattern of eighth and sixteenth notes.
- Box 4:** Surrounds the first measure of the Violin 1 staff. It shows a transition from a sustained note to a rhythmic pattern of eighth and sixteenth notes.
- Box 5:** Surrounds the first measure of the Violin 2 staff. It shows a transition from a sustained note to a rhythmic pattern of eighth and sixteenth notes.
- Box 6:** Surrounds the first measure of the Viola staff. It shows a transition from a sustained note to a rhythmic pattern of eighth and sixteenth notes.
- Box 7:** Surrounds the first measure of the Cello staff. It shows a transition from a sustained note to a rhythmic pattern of eighth and sixteenth notes.
- Box 8:** Surrounds the first measure of the Double Bass staff. It shows a transition from a sustained note to a rhythmic pattern of eighth and sixteenth notes.

Curved arrows point from Box 1 to Box 2, from Box 2 to Box 3, from Box 3 to Box 4, and from Box 4 to Box 5, illustrating a descending melodic line across the staves.

Example 24. Timbral echo: Sibelius, Symphony no. 2 in D major, ii, mm. 120–128

Score in C

88 *Andante con moto ed energico*

Flute 1 I. Solo

Trumpet in F 1 I. Solo

Example 25. Antiphonal contrast: Haydn, Symphony no. 100 in G major (Military), ii, mm. 61–64

Score in C

61 *Allegretto*

Fl. 1 solo

Ob. 1

Ob. 2

Cl. in C 1

Cl. in C 2

Bsn. 1

Bsn. 2

Vln. 1

Vln. 2

Vla

Vc.

Cb.

Example 26. Timbral juxtapositions: Sibelius, Symphony no. 2, ii, mm. 67–75

Example 27. Sectional boundaries: Dolan's (2013b) orchestral graph of Haydn, Symphony no. 100, ii. Colors represent different instruments and the line thickness corresponds to notated dynamics. The instruments are arranged with strings at the bottom followed by woodwinds, brass, and percussion. The horizontal bracket over the second panel indicates the measures included in **Audio example 22** (mm. 49–70) (from Dolan 2013b, used with permission) [simulation from OrchPlayMusic Library]

