



MTO 27.1 Examples: Beavers, Ravel's Sound: Timbre and Orchestration in His Late Works

(Note: audio, video, and other interactive examples are only available online)
<https://mtosmt.org/issues/mto.21.27.1/mto.21.27.1.beavers.html>

Example 1. Ravel's Late Orchestral Compositions

Date	Composition	Type	Timbre technique
1922	<i>Pictures at an Exhibition</i>	Mussorgsky piano piece (1874) arranged for orchestra	Color instruments evoke imaginary place
1928	<i>Boléro</i>	Original composition	Illusory saxophones, trumpet, and organ within continuous development
1929	<i>Menuet antique</i>	Original piano piece (1895) arranged for orchestra	Color instruments evoke imaginary time; Illusory shawm and organ
1930	Concerto for the Left Hand	Original composition	Illusory harps and color instruments evoke dream within dialogic development
1931	Concerto in G Major	Original composition	Piano's transformations create transcendence within the recapitulation

Example 2. The SPC Model (Johnson 2011)

Classification	Instruments		
Color	<i>Piccolo+</i> <i>Oboe d'amore</i> <i>E♭ clarinet</i> Bass clarinet English horn Contrabassoon <i>Saxophones</i>	<i>Horn+</i> Cornet <i>Piccolo trumpet</i>	<i>Celesta</i> <i>Percussion</i> Harp <i>Piano</i>
Power	Piccolo	Horn Trumpet Trombone Tuba	Timpani <i>Snare drum*</i>
Standard	Flute Oboe Clarinet Bassoon	Violin Viola Cello Bass	

*Instruments in italics are my additions.

+The piccolo and horn appear in both power and color instruments because they serve a dual function dependent on the orchestral gesture, range, and dynamics.

~The horn can follow the core woodwinds, brass choir, or function as a solo/soli instrument

Example 3. "Promenade," Power Instruments

Power instruments

Piano

Horn in F I. II

Horn in F III. IV

Trumpet in C

Tuba

f

f

f

f

Example 4. "Promenade," Transcription with Antiphonal Response

Mussorgsky, "Promenade," Piano Score
(no dynamics or articulations)



Standard instrument

Color instrument in same
auditory stream as
standard instruments

Ravel, "Promenade," Orchestration
(with added dynamics and articulations)

Reh. 3 + 1

An orchestration of Mussorgsky's "Promenade" by Maurice Ravel. The score is for a full orchestra and includes dynamics and articulations. The instruments are color-coded: green for standard instruments (Flute, Piccolo, 2 Oboes/English Horn, Clarinet, Bass Clarinet, Bassoon, Contrabassoon, Violin I & II, Viola, Cello, Bass) and blue for color instruments (Percussion, Harp, Piano). The score is divided into two main sections, each with a green background. The first section is marked with *mf* and the second with *p*. The score includes various articulations such as *pizz.* (pizzicato) and *arco* (arco). The score is written in 3/8 time and features a complex melodic line in the right hand and a rich harmonic accompaniment in the left hand.

Flute
Piccolo
2 Oboes
English Horn
Clarinet
Bass Clarinet
Bassoon
Contrabassoon
Violin I & II
Viola
Cello
Bass

Example 5. Beginning of “Gnomus” with Magical Effect

Event 1 Event 2

Event 1 Event 2

Vivo meno Vivo

2 Clarinets

Bass Clarinet

2 Bassoons

Contrabassoon

Horn in F

Viola

Cello

Bass

$S > P$ $S > C$

Magical
effect

Timbral
transformation

Example 6. Orchestration of Two Streams in “Gnomus”

8

Stream 2: Mostly **S** with some **C** effects

Stream 1: Muted Tuba > Muted Trumpet

The orchestral score for "Gnomus" is presented in a multi-staff format. The instruments listed on the left are: Flute, Oboe, Clarinet in Bb, Bass Clarinet, Bassoon, Contrabassoon, Trumpet in C, Tuba, Timpani, Xylophone, Violin, Viola, Cello, and Double Bass. The score is divided into two main streams of music, highlighted with colored boxes and annotations:

- Stream 1 (Blue):** This stream is primarily composed of the Muted Tuba and Muted Trumpet. It features a series of notes that are circled in blue, with arrows indicating the flow of the music. The notation includes dynamic markings such as *mp* (mezzo-piano) and *mf* (mezzo-forte).
- Stream 2 (Green):** This stream is played by various woodwinds and strings. It includes parts for the Flute, Oboe, Clarinet in Bb, Bass Clarinet, Bassoon, Contrabassoon, Violin, Viola, Cello, and Double Bass. The notation includes dynamic markings such as *mf* (mezzo-forte) and *ff* (fortissimo).

Additional annotations include "Mute in Corno Inglese" for the Clarinet in Bb and "1. C. con sord." (1. C. con sord.) for the Trumpet in C. The score is written in a 3/4 time signature.

Example 7. More Color Effects and Instruments in “Gnomus”

9

Piano

Stream 2: **C** instruments (celesta, harp) and effects (harp harmonics, violin pizz.)

Stream 1: **C** instrument (bass clarinet) and effects (magic effect circled in score and arco sulla tastiera)

9

Bass Clarinet

Horn in F

Celesta

Harp

Violin I

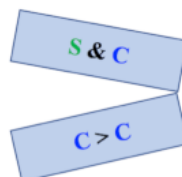
Violin II

Viola

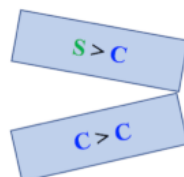
Cello

Bass

First phrase
Reh. 8
(mm. 19–27)



Second phrase
Reh. 9
(mm. 29–37)



Example 8a. Menuet antique, Piano

m. 1

Piano

f

motive α f

m. 10

ff

α

Similar register

Example 8b. Menuet antique, Piano Events

Event 1

m. 10

Stream 2

très décidé

Stream 1

α > Antecedent

P > S

Event 2

Consequent

S

Event 3

Prolongation

C

Illusory celesta/harp

avec la sourdine

SP → C

Example 8c. Menuet antique, Orchestra Events

Event 1

Stream 2

Bass Clarinet

mp

Stream 1

α

Introduction

C

"Renaissance" Shawm

Event 2

Bassoons

α

Antecedent

C

"Baroque" Imitative

Event 3

Bassoon

α

Consequent

C

"Classical" Bel canto

Event 4

Violins I & II arco

Harp Div

pizz

Div. Viola arco

Cello

Bass arco

pizz

Prolongation

C

"Ancient" Illusory Harp

Example 9a. *Menuet antique*, End of A to Pastoral Section, Piano

en élargissant m. 47

Piano

The musical score is for a piano piece in 3/4 time with a key signature of two sharps (F# and C#). The tempo/mood is 'en élargissant' (rushing). The dynamic is 'ff' (fortissimo). The score shows a transition from a complex rhythmic pattern in section A to a simpler, more pastoral pattern in section B. A green box highlights a half note in the bass staff, which is part of a half note chord (F#4 and C#5) in measure 47. The score shows a transition from a complex rhythmic pattern in section A to a simpler, more pastoral pattern in section B.

Example 9b. *Menuet antique*, End of A to Pastoral Section, Orchestra

m. 47

The score is for the end of section A and the beginning of the Pastoral section of 'Menuet antique'. It features a full orchestra. The key signature is three sharps (F#, C#, G#) and the time signature is 3/4. The score is divided into measures 45, 46, 47, and 48. A blue oval highlights the transition from measure 47 to 48, showing the woodwinds and strings. A green box highlights the woodwind and string parts in measure 48. A red box highlights the Horn in F part in measure 47. A blue arrow points from the Horn in F part to the woodwind section.

Flute Piccolo

Oboe

Clarinet in A

Bassoon

Contrabassoon

Horn in F

Trumpet

Trombone

Trombone Tuba

Timpani

Harp

Violin I

Violin II

Viola

Cello

Bass

P > C > S

Example 10. *Menuet antique*, Organ Sound at the End

Piano



Flute Piccolo

Oboe

Clarinet

Bass Clarinet

Bassoon

Contrabassoon

Horn in F

Trumpet

Trombone

Trombone Tuba

Timpani

Harp

Violin I

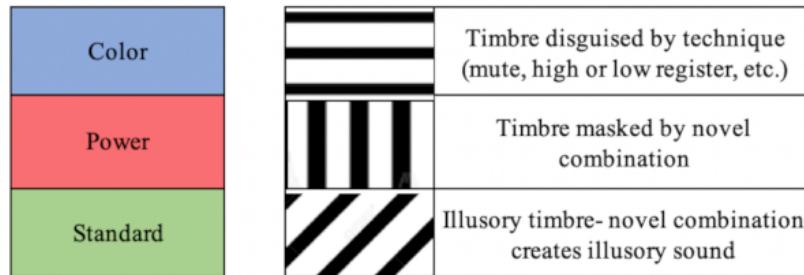
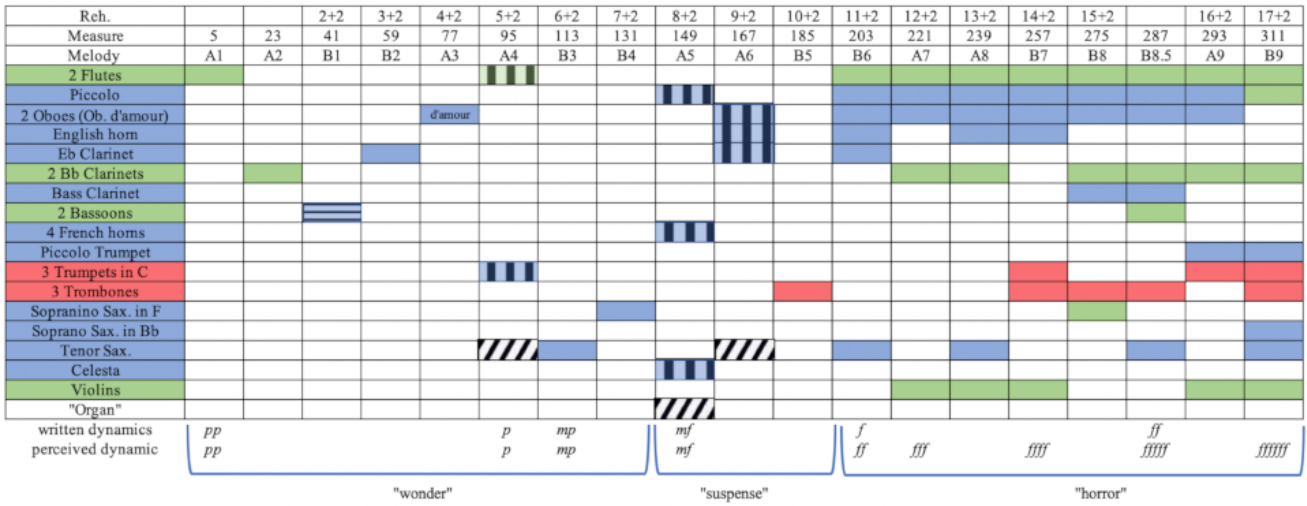
Violin II

Viola

Cello

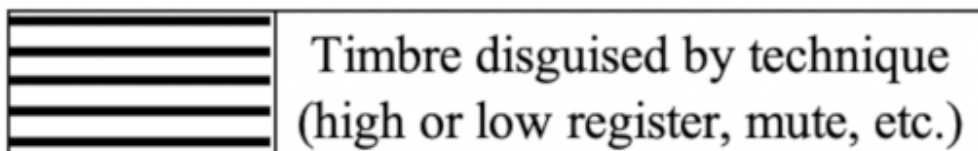
Bass

Example 11. SPC Groupings in *Boléro*



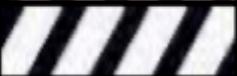


Example 12. Parallel Timbres in *Boléro*



Rehearsal number	2+2	3+2	6+2	7+2
Measure	41	59	113	131
Melody	B1	B2	B3	B4
E♭ Clarinet		High		
High Bassoon	Low			
Sopranino to Soprano Sax.				High
Tenor Sax.			Low	





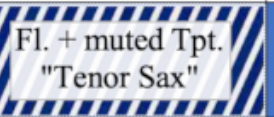

Example 13. Illusory Saxophone in *Boléro*

Rehearsal number	5+2
Measure	95
Melody	A4
Flute	
Muted Trumpet	
Illusory Tenor Sax.	

p
mf

	Timbre masked by novel combination
	Illusory timbre- novel combination creates illusory sound




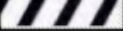
Example 14. Illusory to Real Sounds in *Boléro*

2+2	3+2	5+2	6+2	7+2
41	59	95	113	131
B1	B2	A4	B3	B4
 Bassoon "Tenor Sax"	 Eb Clarinet "Soprano Sax"	 Fl. + muted Tpt. "Tenor Sax"	Tenor Sax	Soprano Sax
Illusory				Real

Example 15. Illusory Organ in *Boléro*

Fused Piccolos, French horn, Celesta =
“Phantasmagoric Instrument” (Bregman 1990)
Like an organ stop (Kennan and Grantham 2002)
Illusory Organ

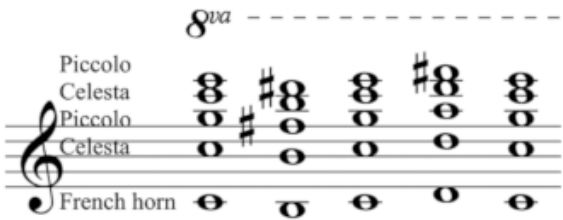
Harmonic series in *Boléro*,
m. 149



Rehearsal number	8+2
Measure	149
Melody	A5
2 Piccolos	
French horn	
Celesta	
"Organ"	

pp
mf
p

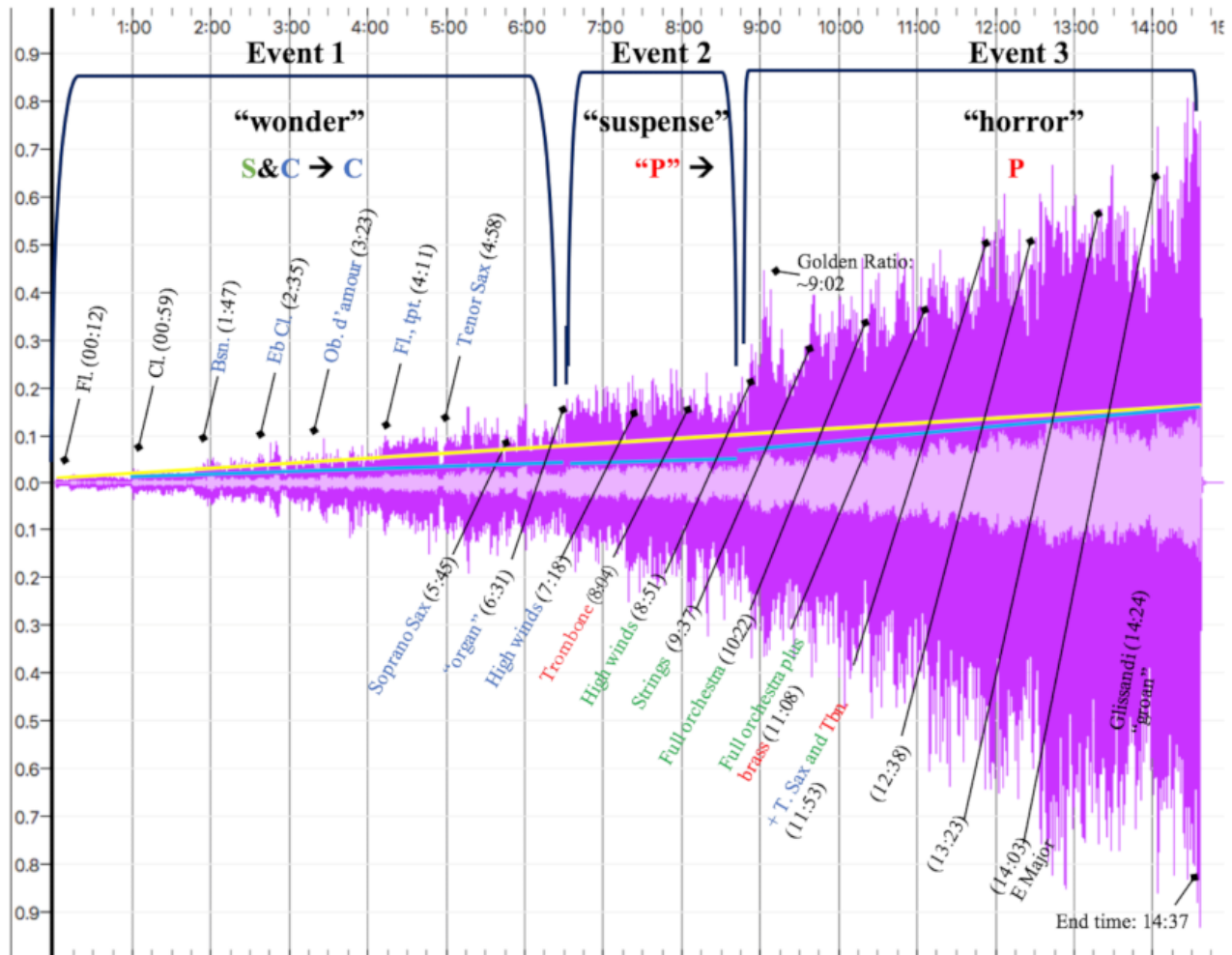
8^{va} -----

Piccolo
Celesta
Piccolo
Celesta
French horn



	Timbre masked by novel combination
	Illusory timbre- novel combination creates illusory sound

Example 16. Waveform of *Boléro*



Dark shade of the waveform displays the highest amplitude
 Lighter shade at the center of the waveform reveals the Root Mean Square (RMS)
 Yellow line connects the peaks from the beginning to the end in one continuous crescendo
 Blue line connects beginning peaks within each section of form

Example 17. Bassoon's Dies irae (DI) in Concerto for the Left Hand

28 Head/tail motive of DI

Bsn. *p espress.*

Alto

Vlle.

29

Bsn.

Alto

Vlle.

The musical score is presented in three systems. The first system, labeled '28', shows the Bassoon (Bsn.) part with a 'p espress.' marking and a 'Head/tail motive of DI' annotation. The second system, labeled '29', shows the continuation of the Bassoon part and the accompaniment for the Alto and Violoncello. The third system, labeled '30', shows the continuation of the Bassoon part and the accompaniment for the Alto and Violoncello. The Bassoon part is in 2/4 time and features a series of eighth and sixteenth notes. The Alto and Violoncello parts are in 2/4 time and feature a series of eighth and sixteenth notes. The Bassoon part is marked 'p espress.' and the Alto and Violoncello parts are marked 'p'.

Example 18. Timbral Transformation in Concerto for the Left Hand, Scherzo

S > **P** > **C**

Metric grouping of trills:

metric grouping of trills: 1 1 1 1 2 1 1

25

Flute

Clarinet in A

Horn

Harp

Piano

Violin I

Violin II

Viola

Cello

Piccolo

Magical effect

Harp > Illusory Harp

Example 19. Auditory Scenes in Concerto for the Left Hand

	Reh.	24 + 8	25	27	28	30 + 1	31	32	33	34 + 1	35	36	37	38
	Meas.	238	246	269	277	304	314	324	336	345	356	365	373	382
	4 auditory streams	trills initiate shift		A		B	A	B	A	B	B			B
Scenes	Themes	1. "Dream" accompaniment	illusory harp in piano, high winds with melody			illusory harp in strings		illusory harp in winds		piano arpeggios				Fl., Bb Cl., harp, pno.
		2. Scherzo (B)			piano			piano		high picc.	piano		Tpt.	horns
		3. Dies irae (A)		high bsn.		muted trombone		illusory muted tpt.	real muted trumpet	divisi violins	high winds, divisi violins	FL, Ob., C. a., Eb Cl., Bb. Cl., vlns.		Picc., Ob., Tpt., violins,
		4. "March" accompaniment			cellos	violas, cellos, bass + snare	cellos and basses	violas, cellos, bass + woodblock	violas, cellos, bass + w. bl & triangle	Bb Cl., Bass Cl., Bsn., Cello + w. bl. & Snare	Horns, bsn., pno, basses + w. bl. & Snare	B. Cl., Bsn., Cbsn., Tbn., Tba., pno., violas, cellos, basses, + w. bl., timb.		Cl. b., Bsn., Cbsn., Horns, Trb., Tba., Vla., Cello, Ch., +Trgl., Snare, Timb., Cymb.
		dynamic marking		pp		p		mp	mf		f			ff

Reh. 34+1

1. Scherzo

2. Dies irae

3. March

4. Dream

m. 345

Piccolo

Trumpet in C

Triangle

Wood Block

Piano

Violin I

Violin II

Viola

Cello

Bass

Con sord.

+ W. Bl.

div. in 4

div. in 4

pizz.

pizz.

pizz.

Illusory harps in strings, winds, and piano.

Example 20. Illusory Harp in the Concerto for the Left Hand

[illegible]

Example 21. Illusory to Real Trumpet in the Concerto for the Left Hand

33 **Illusory Muted Trumpet**

Oboe
English Horn

Clarinet
Bass Clarinet

Wood Block

Viola

Cello

Bass

mp

34+1

Piccolo

p

Real Muted Trumpet

Trumpet in C

mf

Con sord.

+ W. BL.

Triangle
Wood Block

Piano

mf

Violin I

div. in 4

mp

Violin II

div. in 4

mp

Viola

pizz.

Cello

pizz.

Bass

pizz.

Example 22. Opening Motives in the Concerto for the Left Hand

Motive A

Motive B

Motive A: Contrabassoon, Lento, *mp*. The notation shows a melodic line in bass clef, 3/4 time, starting with a half note and followed by eighth notes.

Motive B: Horn in F, *p*. The notation shows a melodic line in treble clef, 3/4 time, starting with a half note and followed by eighth notes.

Example 23. The First Marked Moment in the Concerto for the Left Hand

Motive A (cont.) Contrabassoon

Motive B Horns

Deceptive slide to motive B

Continuation of E minor – shift to C major – $C^{6/5}$

Slide back to key of motive A, now E major

“stall”

The score shows two systems of music. The first system (measures 6-10) features Motive A (Contrabassoon) and Motive B (Horns). A blue box highlights a measure in Motive A, and a red box highlights a measure in Motive B. A blue circle connects the two boxes, labeled 'Deceptive slide to motive B'. The second system (measures 11-15) continues the motifs. A red box highlights a measure in Motive B, and a blue box highlights a measure in Motive A. A blue circle connects the two boxes, labeled 'Slide back to key of motive A, now E major'. A bracket labeled '“stall”' spans measures 11-14. A black box highlights a measure in Motive A, and a blue circle highlights a measure in Motive B.



Color instrument

Power instrument



“magical”
effect

harmonic
event

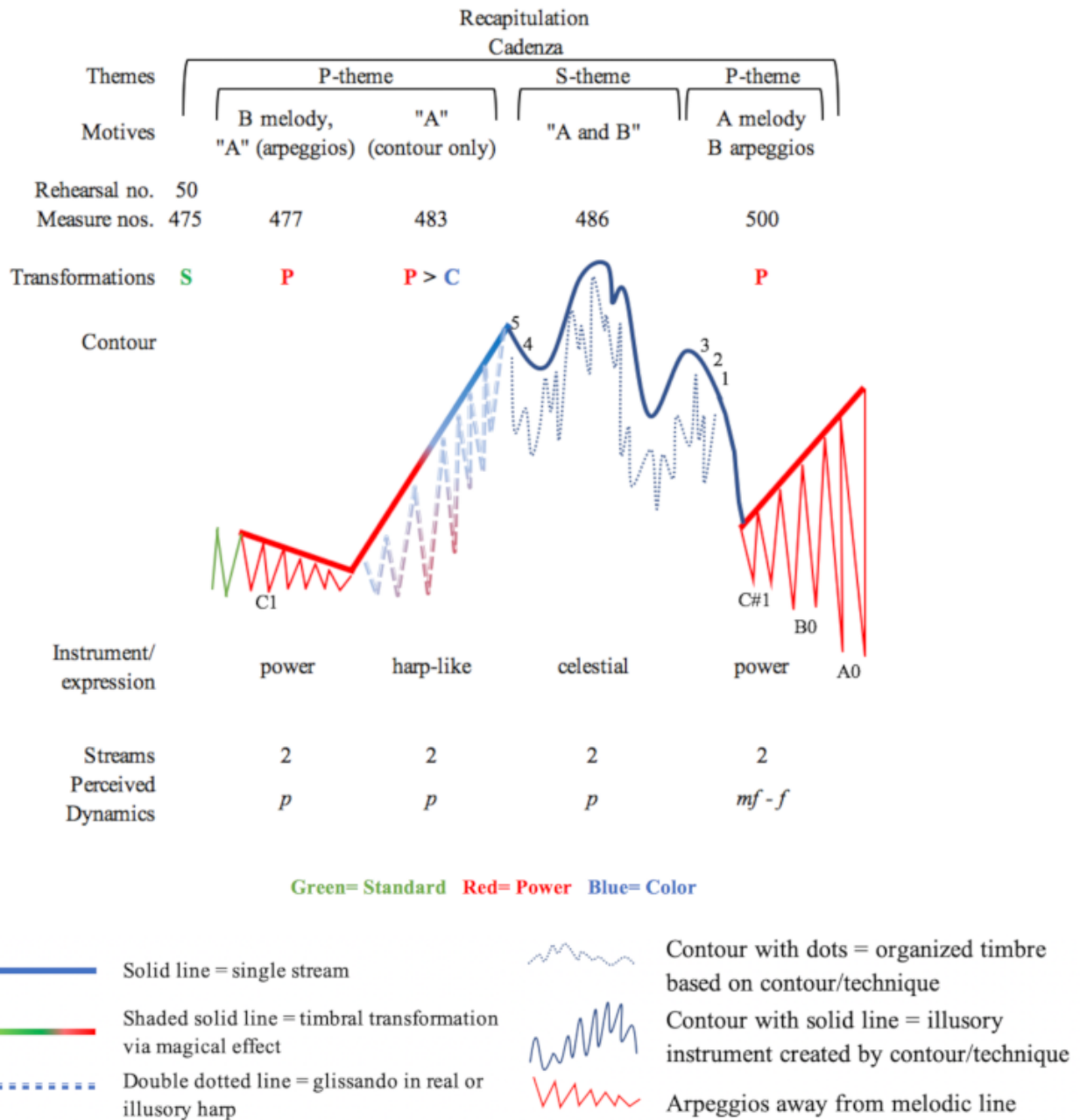
Example 24. Contour and SPC transformations in the Concerto for the Left Hand, Exposition

		Exposition					
		P-theme					S-theme
Motives and Themes		A	B	A	A	B	// melody and accompaniment
Rehearsal number			1	2		3	8+4
Transformations			C > P	P > C > S		S/P	S
Contour							
Instrument		Contrabassoon > Horns		Cbn. & D.B. > b. cl. & Vcl. > C.a. & Vla. > A Cl. & picc.		Strings and High Winds/ Brass	Piano
Streams		1	1	1		2	2
Dynamics		<i>p</i>	<i>p</i>	<i>pp</i> < <i>f</i>		<i>f</i> <	<i>mf</i>
Expression							Più lento <i>expressivo</i>
Pitches		E1-Bb2	Bb3&2-G3&2	E1-F#6		A6/Bb4	~C#5/ F#2-C#4

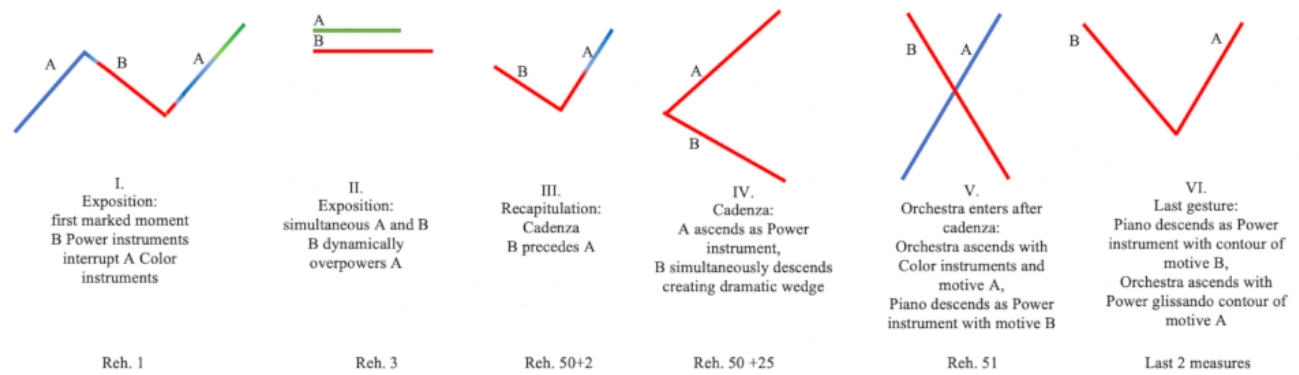
Green= Standard Red= Power Blue= Color

-  Solid line = single stream
-  Shaded solid line= timbral transformation via magical effect

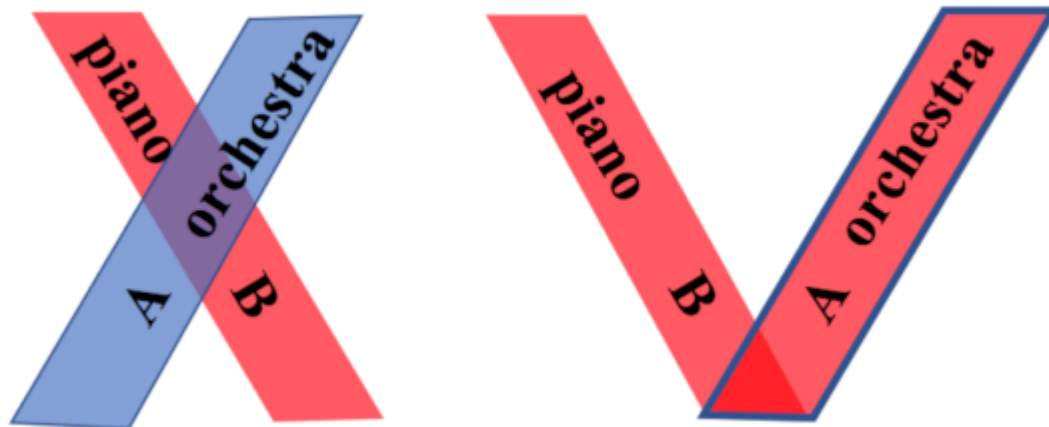
Example 25. Concerto for the Left Hand, Cadenza



Example 26. Instrumental Grouping and Contour Shapes of Motives A and B



Example 27. Contour and SPC Groupings of Concerto's Ending (Reh. 50 to End), Enlarged Section V and VI from Example 26

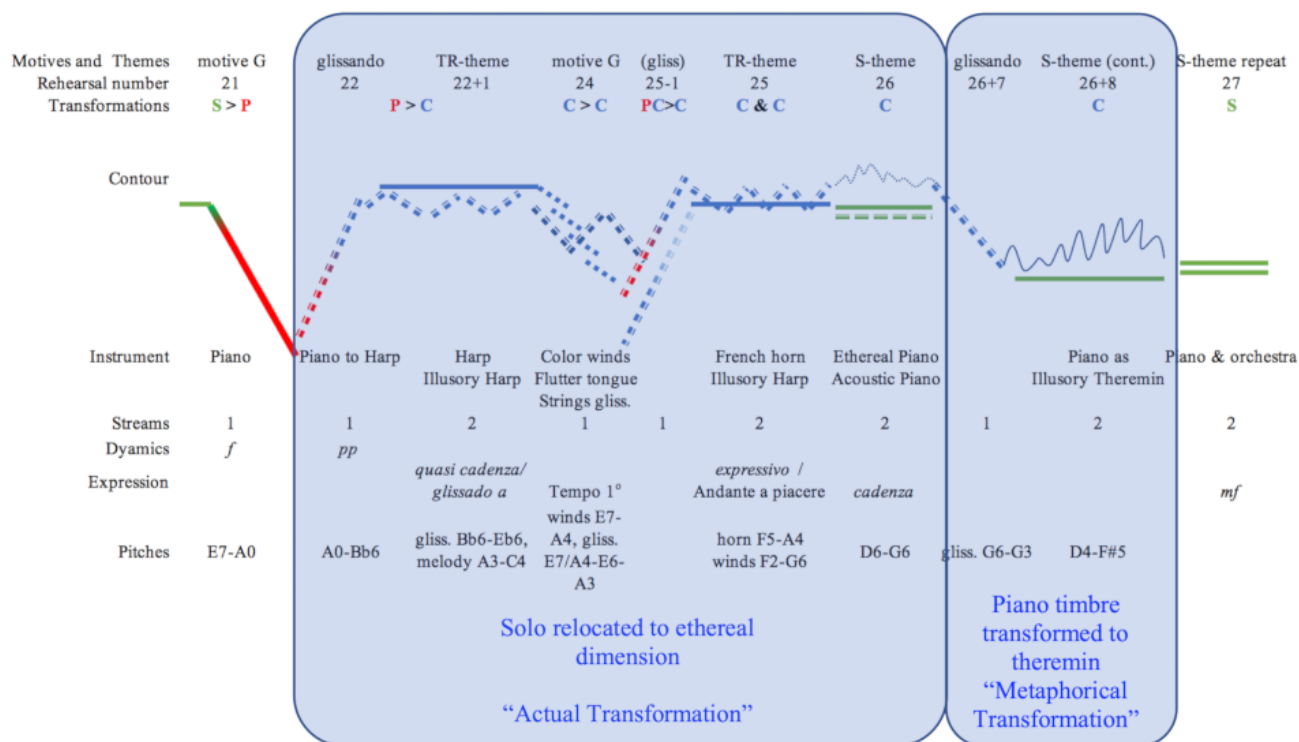


Example 28. Form of Concerto in G Major (adapted tables from Beavers 2020)

P		TR					S								
		[1]		[2	2.2]									
R1		S1						R2							
Orchestra and piano		- piano					Piano	"G"	Piano	"G"	Piano	Piano	Orchestra and piano		
Key areas:		GM		B-Dorian		F#M/m					EM				
Stylistic references:		Music box/ carnival music		Marching band		Orchestra		Spanish guitar/jazz/"Gershwin"					"Real piano" with stylized jazz elements	Piano with Orchestral repeat	
Rehearsal nos.:		2		3		4		5		6		7		9	

P	TR					S	Coda			
	1	[22.2]				[cadenza]	(Dvlp and P)			
R3	S3					R4				
Orchestra and piano	Piano	"G"	Harp	Ethereal orch.	Harp	"G"	Fr. hom	Ethereal Piano to theremin	Orchestra and piano	
GM	BbM	AM/m					GM			
Tutti: Orchestra overpowers piano's recap of P-theme		Piano ("jazz piano") builds like moving into solo recapitulation		Timbral transformation			Remains in ethereal orchestra		Timbral transformation	Tutti
18	19	20	21	22	24	25	26	29		

Example 29. Contour and SPC transformations in the Concerto in G Major, Recapitulation



Green= Standard Red= Power Blue= Color

Solid line = single stream

Shaded solid line = timbral transformation via magical effect

Double dotted line = glissando in real or illusory harp

Single dotted line = organized timbre with extended technique



Contour with dots = organized timbre based on contour/technique



Contour with solid line = illusory instrument created by contour/technique



Arpeggios away from melodic line

Example 30. Locations on the stage (with credit to Jackie Landgraf)

