



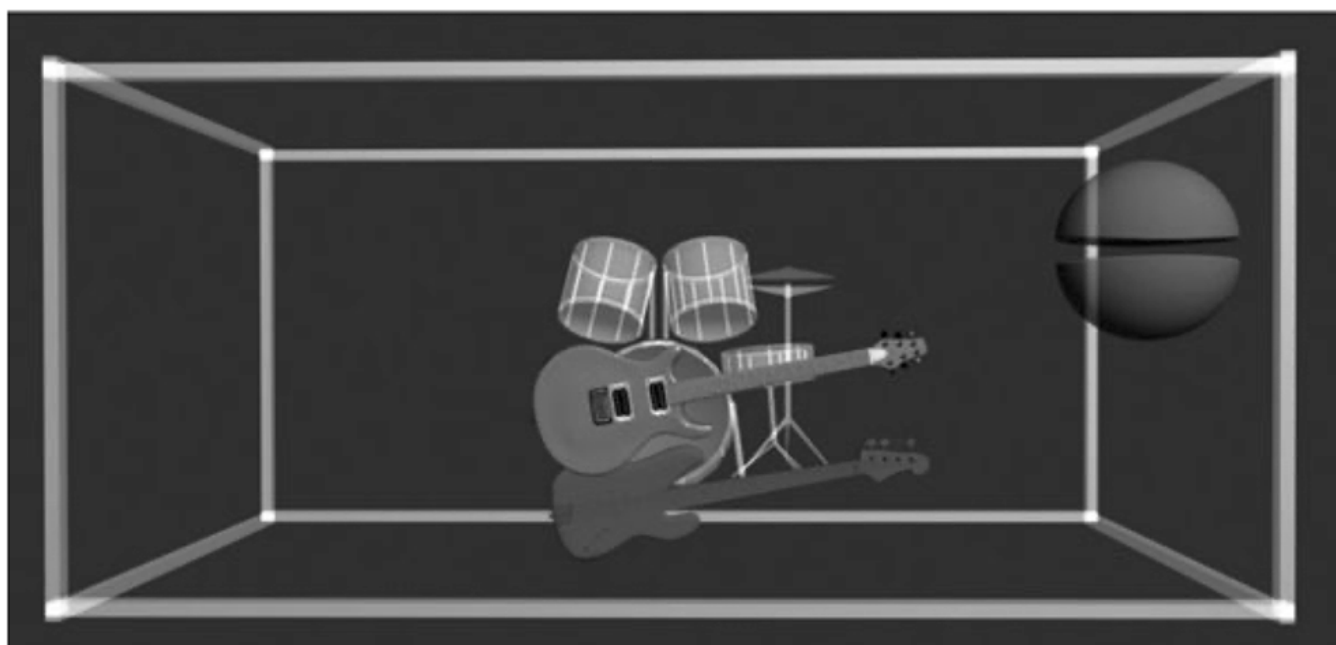
A JOURNAL OF THE SOCIETY FOR MUSIC THEORY

MTO 28.4 Examples: Duguay, Analyzing Vocal Placement in Recorded Virtual Space

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

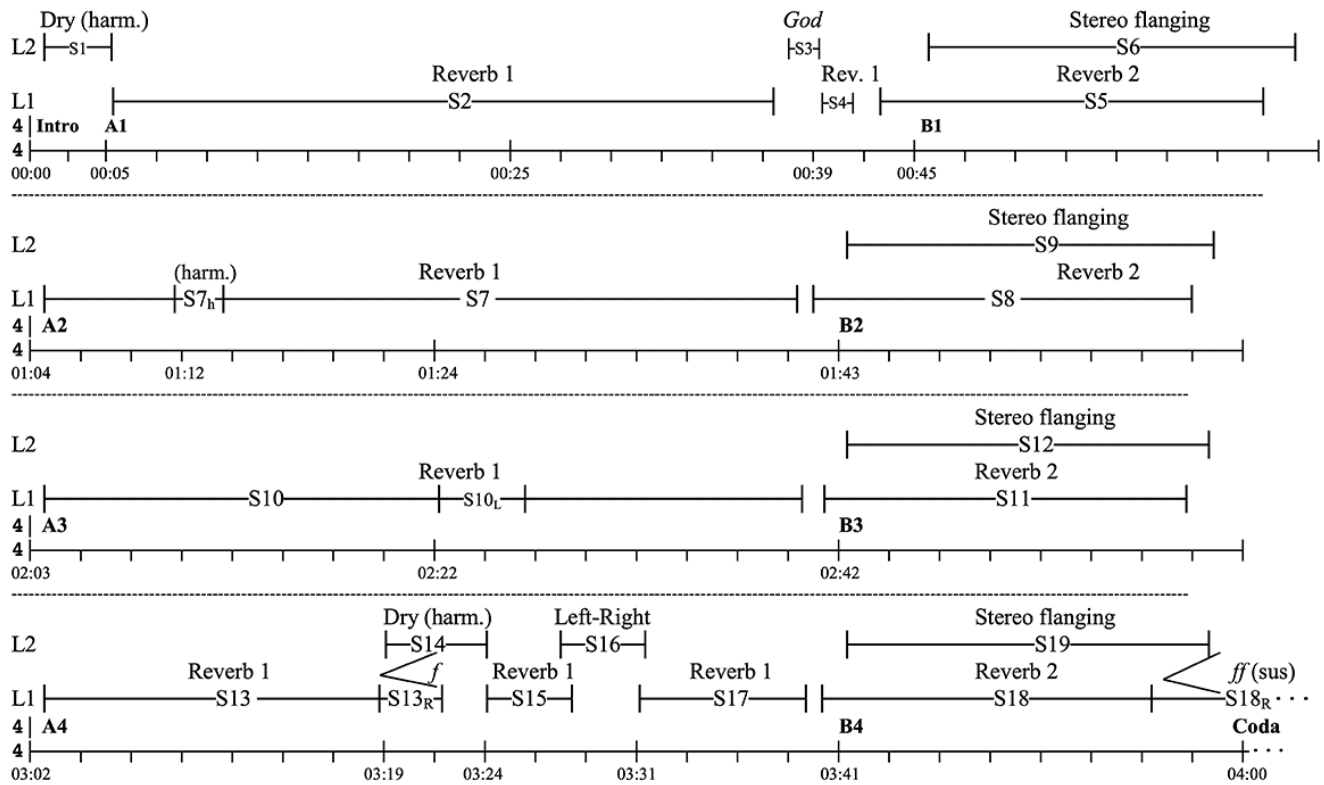
<https://www.mtosmt.org/issues/mto.22.28.4/mto.22.28.4.duguay.php>

Example 1. Example 1. Dockwray and Moore's (2010, 192) sound-box representation of "Purple Haze" by The Jimi Hendrix Experience (1967)

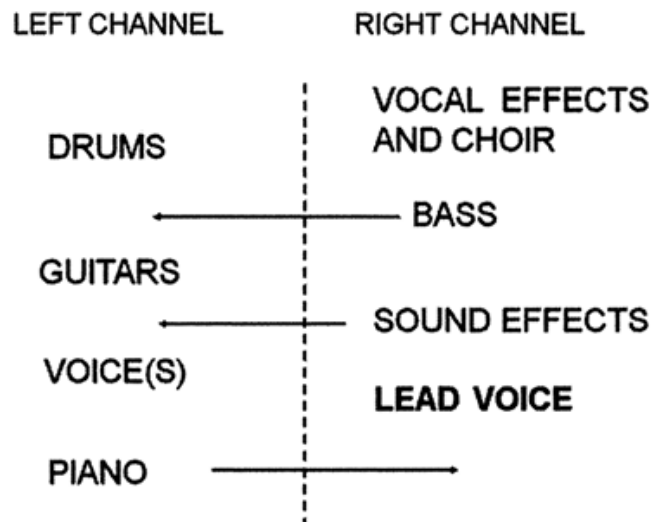


Example 2. Lacasse’s (2000, 224) representation of vocal staging in “Front Row” by Alanis Morissette (1998)

Figure 5.4-1: Alanis Morissette’s ‘Front Row’ (1998)



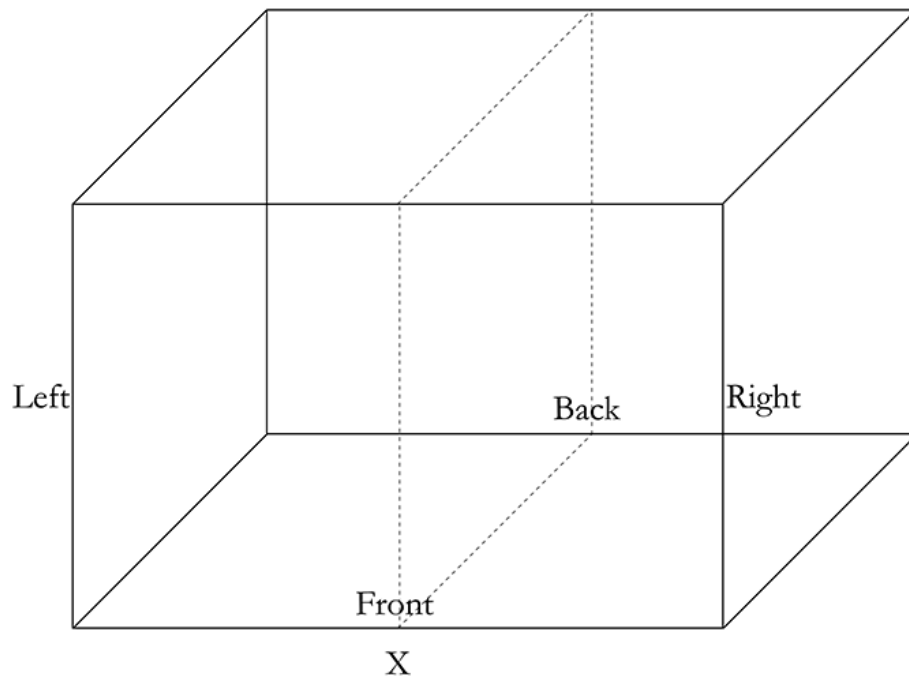
Example 3. Camilleri’s (2010, 208) representation of the stereo field in “Lovely Rita” by The Beatles (1967)



Example 4. Comparison of eight methods for analyzing virtual space

	Lateral Placement	Frequency /Pitch	Saturation/ Timbre	Echo/ Delay	Reverb-eration	Microphone technique	Volume/Amplitude/ Loudness/Intensity
Danielsen (1993)	X	X	X				X
Lacasse (2000)	X			X	X		X
Doyle (2005)				X	X	X	
Camilleri (2010)	X		X		X		
Dockwray and Moore(2010)	X	X		X	X		X
Moore, Schmidt, and Dockwray (2011)	X	X				X	X
Heidemann (2014)	X					X	
Malawey (2020)	X		X	X	X	X	

Example 5. The virtual space

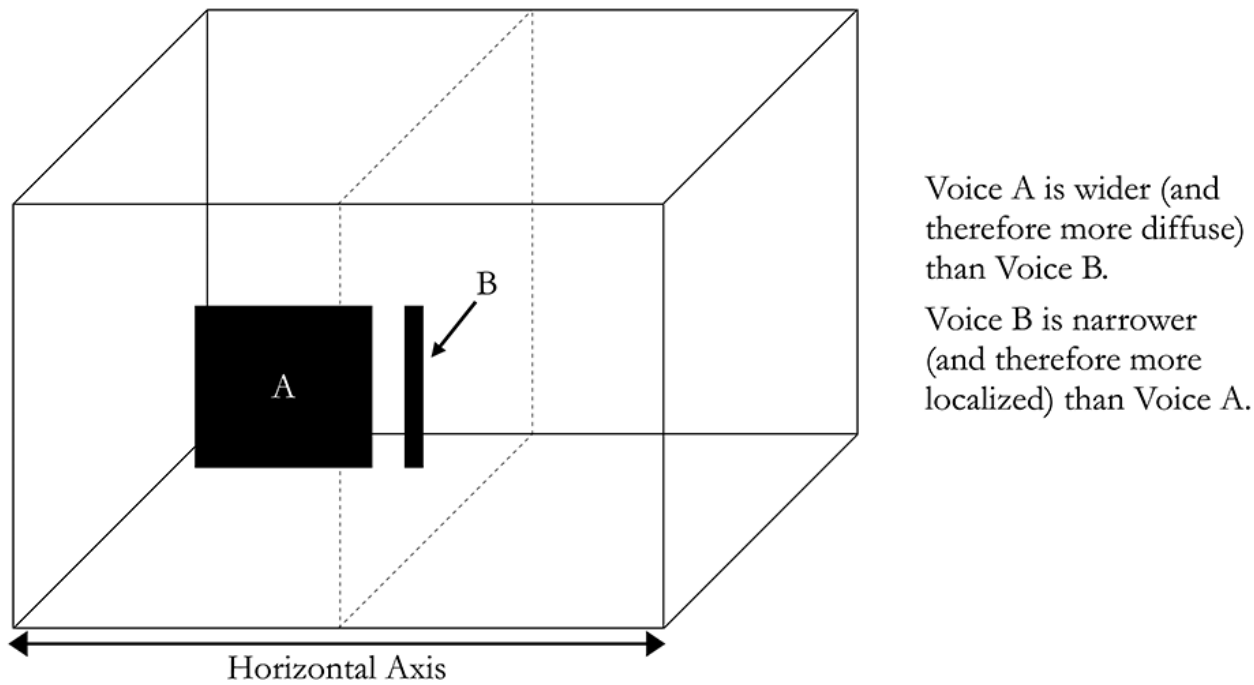


The X indicates the implied listening position. When analyzing vocal placement, I situate myself as a listener who is facing the virtual space as though it were a staged performance.

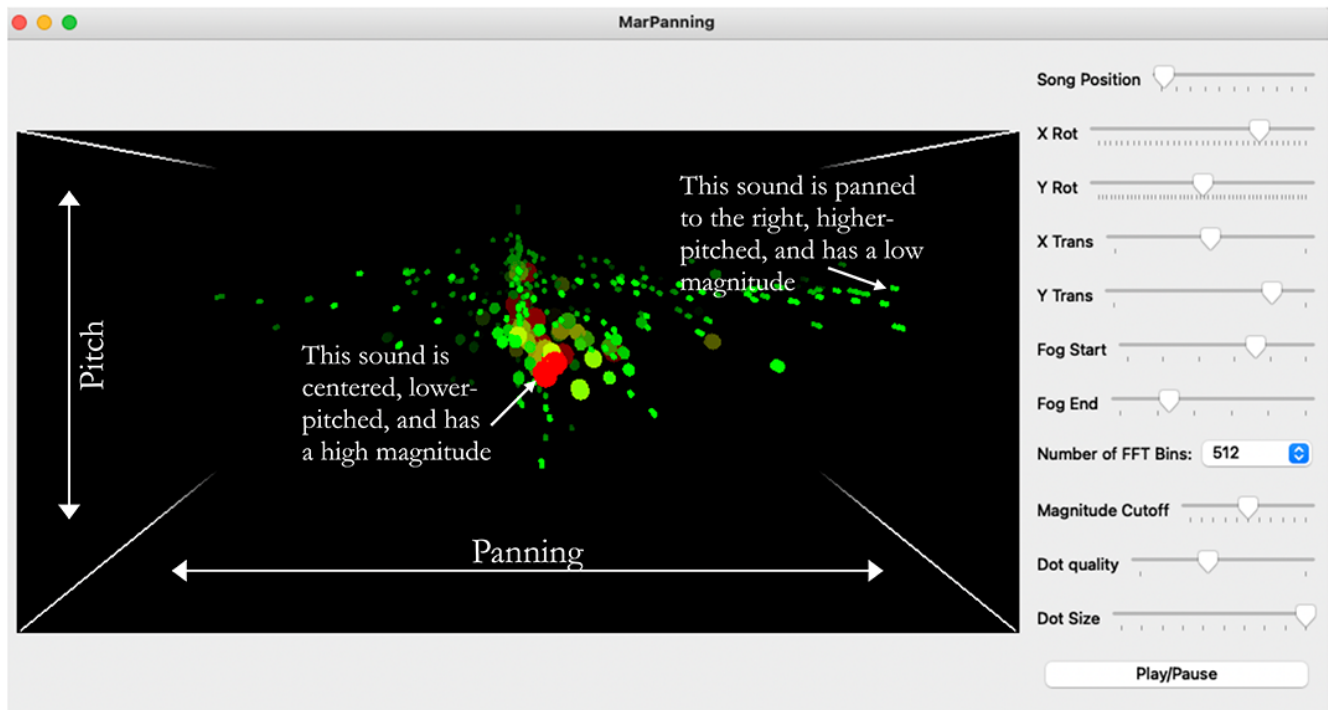
Example 6. Overview of methodology for analyzing vocal placement in virtual space

Parameter	Analytical method	Scale
Width	Aural analysis and audio feature extraction	5-point scale (W1, W2, W3, W4, W5)
Pitch Range	Audio feature extraction	Expressed as a frequency range (ex. C3–G4 or 130.8 Hz–381.9 Hz)
Prominence	Audio feature extraction	Expressed as a percentage
Environment	Aural analysis	5-point scale (E1, E2, E3, E4, E5)
Layering	Aural analysis	5-point scale (L1, L2, L3, L4, L5)

Example 7. Displaying the width of a voice on the horizontal axis

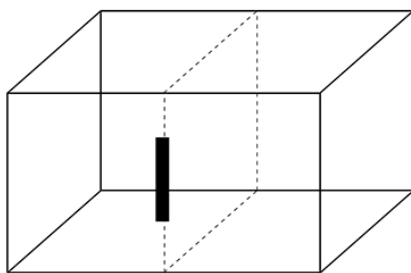


Example 8. MarPanning's user interface

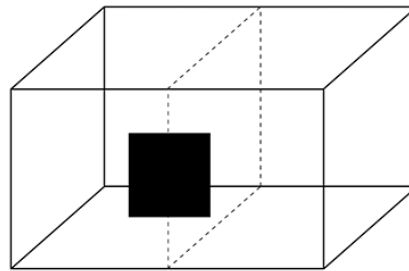


Example 9. Five-point scale for categorizing a voice's width in virtual space

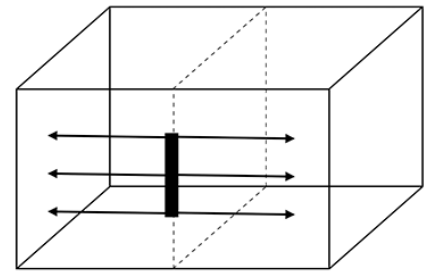
Narrow  Diffuse	W1	The voice occupies a narrow position in the center of the stereo stage.	"Lemon," N*E*R*D & Rihanna Rihanna, Verse, 01:44–02:11
	W2	The voice occupies a slightly more diffuse position in the center of the stereo stage.	"Only," Nicki Minaj ft. Drake, Lil Wayne & Chris Brown Drake, Verse, 01:45–2:49
	W3	The voice occupies a narrow position in the center of the stereo stage, and some of its components (echo, reverberation, and/or additional vocal tracks) are panned toward the sides. These wider components have a lower amplitude than the main voice.	"Bartier Cardi," Cardi B ft. 21 Savage Cardi B, Chorus, 00:14–00:41
	W4	The voice occupies a slightly more diffuse position in the center of the stereo stage, and some of its components (echo, reverberation, and/or additional vocal tracks) are panned toward the sides. These wider components have a lower amplitude than the main voice.	"Love Galore," SZA ft. Travis Scott SZA, Chorus, 00:14–00:29
	W5	The voice and its associated components (echo, reverberation, and/or additional vocal tracks) are panned across the stereo stage. There is no sense that the vocals are primarily located at the center of the virtual space.	"Close," Nick Jonas ft. Tove Lo Nick Jonas, Chorus, 00:52–01:23



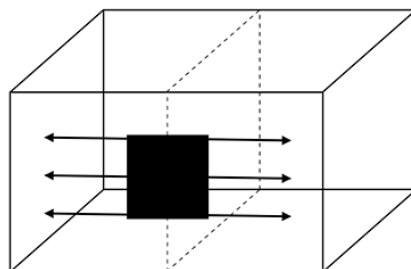
W1



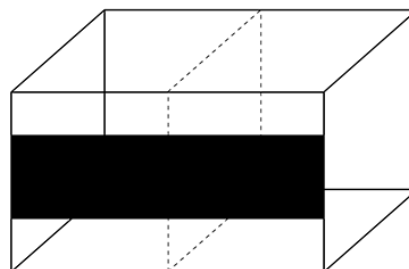
W2



W3

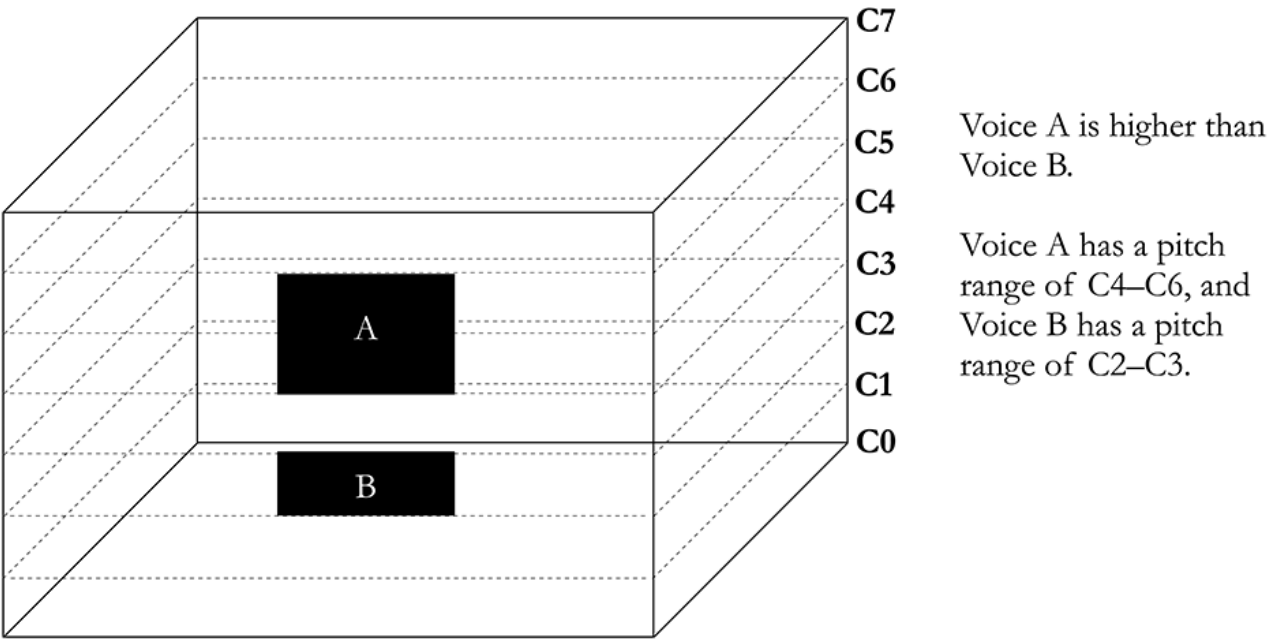


W4

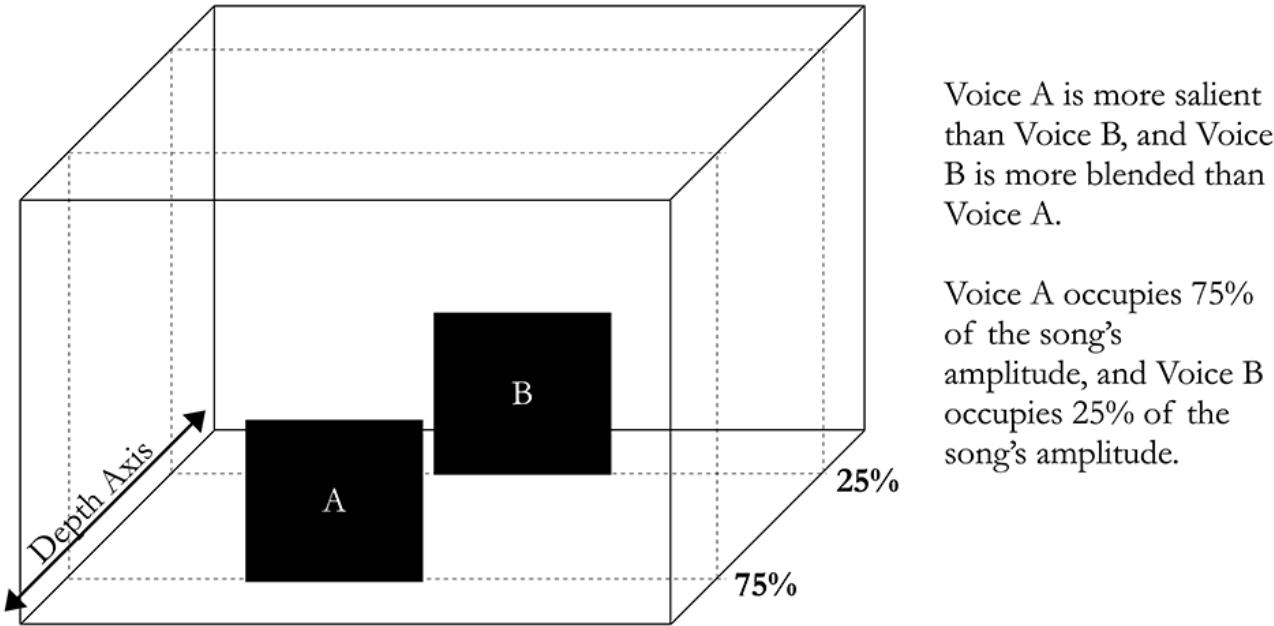


W5

Example 10. Displaying the pitch range of the voice on the vertical axis



Example 11. Displaying the prominence of a voice on the depth axis



Example 12. Nested environments within the virtual space

Brøvig-Hanssen & Danielsen (2013, 78)

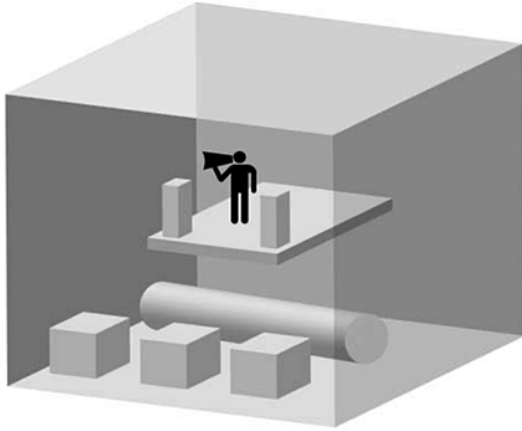
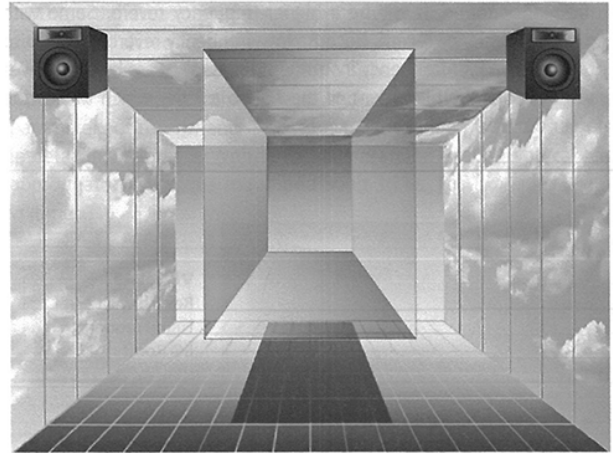


Figure 3. Spatial simultaneity in Portishead's 'Half Day Closing'; three small rooms, a tunnel, and a sound stage are heard as situated within the all-encompassing environment.

Gibson (2005, 55)



Example 13. Five-point scale for categorizing a voice’s environment in virtual space

Flat  Reverberant	E1	The voice’s environment sounds flat. There might be minimal ambiance added the voice, but there is no audible echo or reverberation at the end of the phrase.	“Like I’m Gonna Lose You,” Meghan Trainor ft. John Legend Meghan Trainor, Verse, 00:00–00:31
	E2	The <i>last word or syllable</i> of each musical phrase is repeated through echo or reverberation. The effect is mainly rhythmical, in that this repeated word fills a pause in the vocal line.	“No Limit,” G-Easy ft. A\$AP Rocky & Cardi B A\$AP Rocky, Chorus, 00:10–00:28
	E3	The vocal line is repeated in one clear layer of echo. This added layer may be dry or slightly reverberant and has a lower amplitude than the main voice.	“Somebody,” Natalie La Rose ft. Jeremih Jeremih, Chorus, 00:02–00:19
	E4	The main voice is accompanied by a noticeable amount of reverberation.	“Him & I,” G-Easy and Halsey Halsey, Chorus, 00:00–00:22
	E5	The main voice is accompanied by two or more layers of echo. The echo layers may be noticeably reverberant, similar in amplitude to the main voice, and difficult to differentiate from one another.	“The Monster,” Eminem ft. Rihanna Rihanna, Chorus, 00:00–00:18

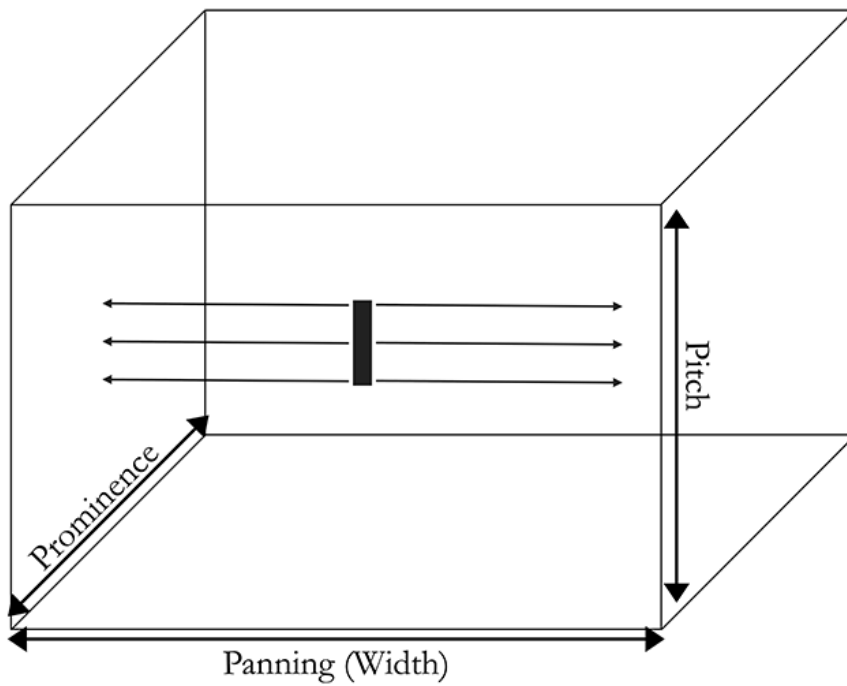


Example 14. Five-point scale for categorizing a voice’s layering in virtual space

Single  Layered	L1	The voice is presented as solo. Occasionally, a few words may be doubled for emphasis.	“Work,” Rihanna ft. Drake Drake, Verse, 02:13–02:24
	L2	The voice is presented as solo, but additional vocal layers are added at the ends of musical phrases for emphasis.	“Girls Like You,” Maroon 5 ft. Cardi B Cardi B, Verse, 02:54–03:15
	L3	The voice is accompanied by one or two layers. Layers might provide minimal harmonies or double the voice. The layers have a noticeably lower amplitude than the main voice.	“Airplanes,” B.o.B Featuring Hayley Williams Hayley Williams, Chorus, 00:09–00:30
	L4	The voice is accompanied by two or more layers. These layers are close copies of the main voice, sharing the same pitch and amplitude.	“Feel This Moment,” Pitbull ft. Christina Aguilera Pitbull, Verse, 01:12–01:24
	L5	The voice is accompanied by two or more layers. These layers add harmonies to the main voice, creating a thick and multi-voiced texture.	“Cheap Thrills,” Sia ft. Sean Paul Sia, Chorus, 00:33–01:06



Example 15. Rihanna’s vocal placement in the first chorus of “Love the Way You Lie,” 0:00–0:25

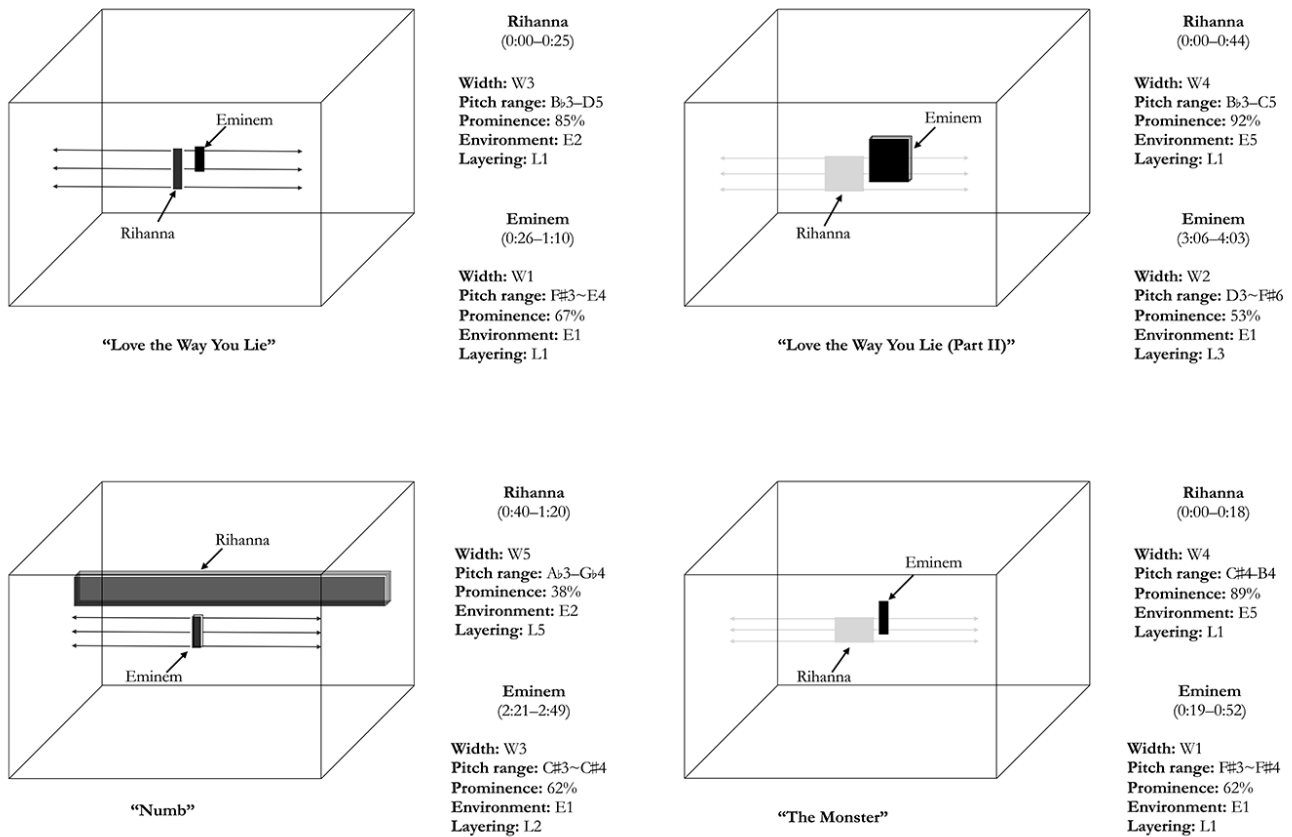


Width: W3
Pitch range: B $\flat$ 3–D5
Prominence: 85%
Environment: E2
Layering: L1

Example 16. Formal structure of Eminem and Rihanna’s four collaborations

Song	Chorus	Verse 1	Chorus	Verse 2	Chorus	Bridge	Verse 3	Chorus
Love the Way You Lie (E ft. R)	Rihanna	Eminem	Rihanna	Eminem	Rihanna		Eminem	Rihanna
Love the Way You Lie (Part II) (R ft. E)		Rihanna	Rihanna	Rihanna	Rihanna	Rihanna	Eminem	Rihanna
Numb (R ft. E)		Rihanna	Rihanna	Rihanna	Rihanna		Eminem	Rihanna
The Monster (E ft. R)	Rihanna	Eminem	Rihanna	Eminem	Rihanna		Eminem	Rihanna

Example 17. Vocal placement in Eminem and Rihanna's four collaborations



Example 18. Vocal placement data in Eminem and Rihanna's four collaborations

Song	Section	Time	Width	Pitch Range	Prominence	Environment	Layering
Love the Way You Lie (E ft. R)	Rihanna First chorus	0:00–0:25	W3	B $\flat$ 3–D5	85 %	E2	L1
	Eminem Verse 1	0:26–1:10	W1	F $\sharp$ 3–E4	67 %	E1	L1
Love the Way You Lie (Part II) (R ft. E)	Rihanna First verse	0:00–0:44	W4	B $\flat$ 3–C5	92 %	E5	L1
	Rihanna First chorus	0:45–1:20	W4	G3–D5	47 %	E2	L3
	Eminem Verse 3	3:06–4:03	W2	D3~F $\sharp$ 6	53 %	E1	L3
Numb (R ft. E)	Rihanna Chorus	0:40–1:20	W5	A $\flat$ 3–G $\flat$ 4	38 %	E2	L5
	Eminem Verse 3	2:21–2:49	W3	C $\sharp$ 3–C $\sharp$ 4	62 %	E1	L2
The Monster (E ft. R)	Rihanna First chorus	0:00–0:18	W4	C $\sharp$ 4–B4	89 %	E5	L1
	Eminem Verse 1	0:19–0:52	W1	F $\sharp$ 3~F $\sharp$ 4	62 %	E1	L1

Example 19. Personnel on Eminem and Rihanna’s four collaborations

Song	Year	Album	Recorded at	Recording	Mixing	Production
Love the Way You Lie (E ft. R)	2010	<i>Recovery</i>	Effigy Studios (Ferndale, MI, USA); Sun Studios (Dublin, Ireland)	Marcos Tovar	Alex da Kid, Mike Strange, Eminem	Alex da Kid, Makeba Riddick
Love the Way You Lie (Part II) (R ft. E)	2010	<i>Loud</i>	Westlake Recording Studios (Los Angeles, CA, USA); Effigy Studios (Ferndale, MI, USA)	Alex da Kid, Kuk Harrell, Josh Gudwin, Bobby Campbell	Manny Marroquin, Erik Madrid, Christian Plata	Alex da Kid
Numb (R ft. E)	2012	<i>Unapologetic</i>	Westlake Recording Studios (Los Angeles, CA, USA); Metropolis Studios (London, UK)	Marcos Tovar, Kuk Harrell, Xavier Stephenson	Manny Maroquin	Oak Felder “Ronald Flippa” Colson Andrew “Pop” Wansel
The Monster (E ft. R)	2013	<i>The Marshall Mathers LP 2</i>	Effigy Studios (Ferndale, MI, USA) Record One (Los Angeles, CA, USA)	Tony Campana, Joe Strange, Mike Strange	Dr. Dre, Mauricio Iragorri, RJ Colston	Aaron “Aalias” Kleinstub, Bryan “Frequency” Fryzel