

RHYTHMIC VARIABILITY IN LANGUAGE AND MUSIC OF LATINO AND LATINO-INSPIRED COMPOSERS

JOSEF HANSON

University of Massachusetts-Boston

RECENTLY, RESEARCHERS HAVE INVESTIGATED THE influence of composers' native speech prosody on the variability of rhythmic patterns found in their music. The *normalized pairwise variability index* (nPVI) provides a relative criterion for comparing the contrastiveness of successive durations in language and music. This study extends prior research by assessing rhythmic relationships in Latino-inspired and traditional Western art music written by six composers whose native languages are either stress-timed (Copland, Glinka, Liszt) or syllable-timed (Ponce, Villa-Lobos, Albéniz). After analysis of 529 musical themes representing 52 works, results suggest that Latino and Western prosodic associations transcend the vernacular. With the exception of Glinka, non-Latino composers typically used more contrastive rhythmic patterns in their standard repertoire and drastically decreased rhythmic contrastiveness in their evocative Latino music. Similarly, Latino composers employed greater rhythmic contrast in their Western-styled works and less contrast in their vernacular Latino music. This empirical evidence indicates that, consciously or subconsciously, composers may alter the rhythmic variability of their "exotic" music to conform to the prosody of a corresponding nonnative language.

Received: May 24, 2016, accepted August 16, 2016.

Key words: speech rhythm, musical rhythm, nPVI, Latino, prosody

LATINO AND HISPANIC AESTHETICS HAVE inspired generations of artists, especially musicians. From roughly 1850 to 1950, Latino nationalist composers produced evocative works to celebrate the heritage and unique cultural contributions of their countries. Examples include Manuel de Falla's piano suite *Cuatro piezas españolas* (1908) and Carlos Chávez's ballet *El fuego nuevo* (1921). Composers in other areas of the world borrowed from Latino tradition to immerse their audiences in the exotic flavors of far-

off lands. Successful works written in this vein include Rimsky-Korsakoff's *Capriccio Espagnole* (1887) and, perhaps the most famous example, Bizet's opera *Carmen* (1875). Although Latin flavor might be imparted through the manipulation of melody, timbre, or form, rhythm serves as the essential ingredient. In their works, Non-Latino composers seeking a Latino sound emphasized idiomatic rhythms such as syncopation and hemiola indicative of *huapango* or *danzón* style. Regarding another prominent example, Copland's *El Salón México* (1936), Murchison (2012) observes the following: "No doubt, Copland was attracted to Mexican folk music partly because of (ostinato) rhythms, which strongly resemble the additive rhythms of jazz and the shifting meters of Stravinsky" (pp. 202-203).

An old musicological adage suggests that perceptible similarities exist between a composer's native language and structural aspects of his or her music (Abraham, 1974). Patel and Daniele (2003) tested this assertion by applying a measure of intervocalic contrastiveness, the *normalized pairwise variability index* (nPVI), to music. The nPVI (Grabe & Low, 2002) gauges the variability of successive vowel durations; a normalization procedure accounts for fluctuations in speaking rate/tempo. The resulting index indicates the amount of durational variability within utterances or musical passages. Languages with lower nPVI levels exhibit more uniform vowel durations; historically, these have been labeled "syllable-timed" languages because of uniformity in durations between syllable onsets. Examples of syllable-timed languages include Spanish, French, and Italian. Higher nPVI languages tend to contain a higher level of vowel reduction, and are dubbed "stress-timed" since only the stressed syllables are spoken at regular intervals. English, German, and Russian are a few examples of stress-timed languages. After using the nPVI to assess durational differences in British and French instrumental music, Patel and Daniele discovered significant differences in the same direction as the stress-timed/syllable-timed language continuum. That is, British music produced higher nPVIs, and French music scored lower.

Researchers have demonstrated increasing interest in exploring the language-music connection via the nPVI.

Huron and Ollen (2003) extended the work of Patel and Daniele by including composers from other countries besides France and Great Britain, and successfully replicated Patel and Daniele's findings within this expanded international corpus. Numerous scholarly tangents developed out of this early musical nPVI research, including incorporation of the pitch domain (Patel, Iversen, & Rosenberg, 2006), comparison of within-language dialects (McGowan & Levitt, 2011), and forays into popular music (Sadakata, Desain, Honing, Patel, & Iversen, 2004), art song (VanHandel & Song, 2010), and folk and children's music (Hannon, Lévêque, Nave, & Trehub, 2016). Researchers have also studied listener perceptions of pairwise rhythmic variability (Hannon, 2009), linguistic foundations of idiomatic rhythmic figures (Temperley & Temperley, 2011), refinements to nPVI analysis procedures (London & Jones, 2011), emotional communication via rhythmic contrast (Poon & Schutz, 2015; Quinto, Thompson, & Keating, 2013), as well as nPVI assessment of recorded performances (Raju, Asu, & Ross, 2010) and historical trends (Daniele & Patel, 2013, 2015; Hansen, Sadakata, & Pearce, 2016). Taken together, findings from these studies strongly suggest a consistent association between the contrastiveness of melodic rhythm and speech prosody in the works of composers hailing from various nations.

Further exploration of rhythm-language connections will assist in determining whether these observed effects hold true in additional nationalities and dialects, and if composers alter the rhythmic contrastiveness of "exotic" music to conform to the prosody of a corresponding nonnative language. In the present study, I aim to enhance understanding of musical-linguistic phenomena (a) in the context of the Spanish language, one of the most widely-spoken in the world, and (b) as a function of *inspiration*, when composers, consciously or subconsciously, play with what might be considered musical affectations. Thus, the purpose of this study was to determine the effect of vernacular language on Latino and Latino-inspired composers' manipulation of rhythm. I tested the following hypotheses:

- H₁: Latino-inspired musical themes will feature significantly lower rhythmic contrastiveness regardless of the vernacular language of the composer.
- H₂: Western-inspired musical themes will feature significantly higher rhythmic contrastiveness regardless of the vernacular language of the composer.

Method

Two types of composer created the music examined in this study: (a) those of Latino heritage who wrote in both nationalistic and Western styles, and (b) those from non-Latino countries who wrote a significant number of Latino-inspired works alongside traditional (Western) repertoire. I used the terms "Latino" and "Western" to denote compositions written in a composer's vernacular style, and "Latino-inspired" and "Western-inspired" to designate compositions influenced by a nonnative tradition. Favoring depth over breadth, I chose to analyze the musical themes of six exemplar composers: Aaron Copland (USA), Mikhail Glinka (Russia), Franz Liszt (Hungary), Manuel Ponce (Mexico), Heitor Villa-Lobos (Brazil), and Isaac Albéniz (Spain). Copland, Glinka, and Liszt wrote a substantial amount Latino-inspired instrumental music, yet grew up speaking stress-timed (high-nPVI) native languages.¹ Ponce, Villa-Lobos, and Albéniz represent a range of Spanish-speaking countries and generated both works evocative of their homelands and more Western-styled absolute music. While additional composers might have met these inclusion criteria, I also considered musical era, eminence, and the accessibility of repertoire when choosing the final group of six. My primary analyses compared themes within each composer's body of repertoire, not across the six composers' repertoires. Thus, conclusions drawn from this study are limited to the stylistic variation of each composer under examination and do not connote more widespread or comprehensive relationships between music and language.

As with previous nPVI studies of this nature (e.g., Daniele & Patel, 2013; Huron & Ollen, 2003; Patel & Daniele, 2003), I delimited the data corpus to instrumental music exclusively. Barlow and Morgenstern's *A Dictionary of Musical Themes* (1948/1983) served as a starting place for obtaining instrumental themes for analysis, but due to a general lack of Latino music within it, I supplemented with themes found in other digital and print repositories. This process resulted in a final collection of repertoire that accounts for nearly every evocative Latino-inspired work within each composer's catalog. Often, the title of a work indicated its inspiration, as with Copland's *El Salón México* and Albéniz's *España*; in other cases, I engaged in musicological research to investigate the composer's intent. I then balanced the collection with the same number of

¹ Liszt grew up in present day Austria and spoke German, not Hungarian.

TABLE 1. Composers and works examined in this study

Composer	Inspiration	# of Themes	Source Works
Aaron Copland (USA) (1900-1990)	Latino	30	<i>El Salón México</i> <i>Danzón Cubano</i> <i>Three Latin American Sketches</i>
	Western	32	<i>Symphony no. 2</i> <i>Billy the Kid</i> <i>Appalachian Spring</i> <i>Concerto for Piano and Orchestra</i>
Mikhail Glinka (Russia) (1804-1857)	Latino	31	<i>Jota Aragonesa</i> <i>Souvenir d'une nuit d'été à Madrid</i> <i>Las Mollares (Danza Andaluza)</i>
	Western	36	<i>Kamarinskaya</i> <i>Tarantella on a Russian Folk Song</i> <i>Symphony on Two Russian Themes</i> <i>Overture 'A Life for the Tsar'</i> <i>Rhapsodie espagnol</i>
Franz Liszt (Hungary) (1811-1886)	Latino	33	<i>La romanesca</i> <i>Grosse Konzertfantasie über spanische Weisen</i> <i>Rondeau fantastique sur un theme espagnol</i>
	Western	34	<i>Hungarian Rhapsodies nos. 1, 10, 14</i> <i>Sonata in B Minor</i> <i>Grande galop chromatique</i> <i>Intermezzi nos. 1-3</i> <i>String Trio</i> <i>Mazurka no. 1 in F Minor</i> <i>Prelude in E Major</i>
Manuel Ponce (Mexico) (1882-1948)	Western	31	<i>Estampas Nocturnas</i> <i>Balada Mexicana</i> <i>Cuatro Danzas Mexicanas</i> <i>Rapsodia Mexicana no. 2</i> <i>Piano Concerto no. 1</i> <i>String Quartets nos. 5, 6</i> <i>Bachianas Brasileiras</i> <i>Quartet for Flute, Oboe, Clarinet, and Bassoon</i>
	Latino	32	<i>Ciclo Brasileiro</i> <i>Chôros</i> <i>Guia prático</i> <i>A Prole do bebê</i>
Heitor Villa-Lobos (Brazil) (1887-1959)	Western	53	<i>Piano Sonatas nos. 3, 4, 5</i> <i>Concierto fantástico</i> <i>Les saisons</i> <i>Doce Piezas Caracteristicas</i>
	Latino	48	<i>Iberia</i> <i>Suite española</i> <i>España</i> <i>Alhambra suite</i>
Issac Albéniz (Spain) (1860-1909)	Western	85	
	Latino	84	

musical themes from Western-inspired works of similar publication year and instrumentation. Therefore, this purposive sample does not comprise the entirety of each composer's instrumental repertoire; I focused on unambiguously emblematic Latino and Latino-inspired music.

I defined a *theme* as a reoccurring melody of at least 12 notes encompassing the majority of a phrase's length, often marked by privileged placement within the context of the piece and variation or embellishment. When transcribing from scores, I used each theme's first iteration. To be included, a musical work required at least

30 themes. I made no provisions for grace notes or fermatas, as none appeared in any of the themes I examined. Since the final duration of many themes tends to be uncharacteristically long, I omitted the last note of every theme to avoid skewing nPVI calculations. Rests, while rare, presented a conundrum—do I simply omit a rest, or include it in the durational value of the note preceding it? I chose the latter approach with the belief that, rhythmically, the listener's ear does not perceive an eighth note-eighth rest combination in the same manner as a pair of eighth notes. I collected a total of 529 themes representing 52 works (see Table 1). I coded themes by hand using relative numbers to represent durational value; i.e., a quarter note equaled 1, an eighth note equaled .5, and a half note equaled 2. I entered each theme's string of numbers into the nPVI equation and used the resulting scores to calculate median nPVIs for each composer's representative collection of vernacular and inspired works. Finally, as with past musical nPVI studies (Patel & Daniele, 2003; VanHandel & Song, 2010), I conducted analyses to detect the effects of meter on rhythmic variation. I found no significant differences ($p > .05$) among the nPVI levels of themes written in simple versus compound meter.

Results

Table 2 displays nPVI data by composer. Figure 1 provides a graphic representation of the magnitude of nPVI differences between the vernacular and inspired works of each composer. Due to nonnormal distribution of data and the presence of outliers, I employed nonparametric statistical tests via SPSS. This approach aligns with data treatment procedures from previous nPVI studies in music (Huron & Ollen, 2003; Patel & Daniele, 2003; Patel et al., 2006).

The median nPVI of Western themes was significantly higher for Copland ($U = 673.0, p = .003, r = .37$), Liszt ($U = 865.0, p < .001, r = .47$), Ponce ($U = 780.0, p < .001, r = .49$), Villa-Lobos ($U = 2,021.5, p = .001, r = .31$), and Albéniz ($U = 4,984.0, p < .001, r = .34$). These differences correspond directionally to nPVI disparity in stress- versus syllable-timed speech rhythm. The most robust effect sizes occurred in the music of Ponce and Liszt. Glinka's music, the lone aberration, did not differ significantly when grouped by inspiration ($U = 449.0, p = .80$). In fact, the median nPVI of his Latino themes rated slightly higher than that of his Western-inspired themes. Generally, these results support the assertion that, in common practice era instrumental music, vernacular melodic rhythm mimics vernacular speech prosody. Further, with the exception of Glinka, the composers I examined

TABLE 2. Musical nPVI values for instrumental themes, by composer

Composer	Inspiration	Median nPVI
Copland	Latino	28.57
	Western	45.90
Glinka	Latino	37.88
	Western	30.86
Liszt	Latino	25.12
	Western	50.41
Ponce	Western	45.50
	Latino	23.51
Villa-Lobos	Western	43.12
	Latino	29.52
Albéniz	Western	42.42
	Latino	25.27

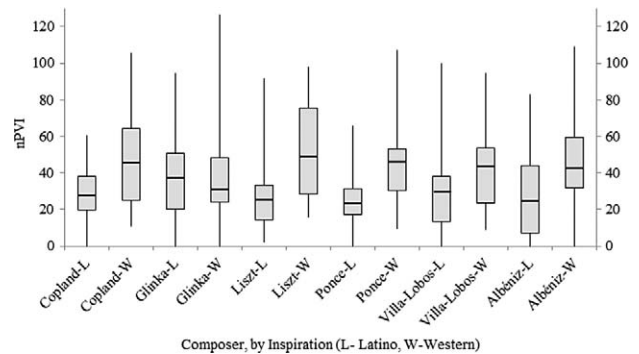


FIGURE 1. Comparison of individual composers' musical nPVI values by inspiration.

appeared to imbue their exotic-inspired works with a rhythmic “accent” that conformed to the speech prosody of the nonnative cultures they sought to represent through music. Thus, these results support both of my hypotheses.

Discussion

This study augments previous research findings by demonstrating that rhythmic variability characteristics of spoken Spanish appear to match those of Latino-inspired music. Non-Latino composers typically used more contrastive rhythmic patterns in their standard repertoire and drastically decreased rhythmic variability in their evocative Latino music. Similarly, Latino composers employed greater rhythmic contrast in their Western-styled works and less contrast in their vernacular Latino music. The five composers manifesting this phenomenon might have consciously switched their compositional approaches to achieve more or less

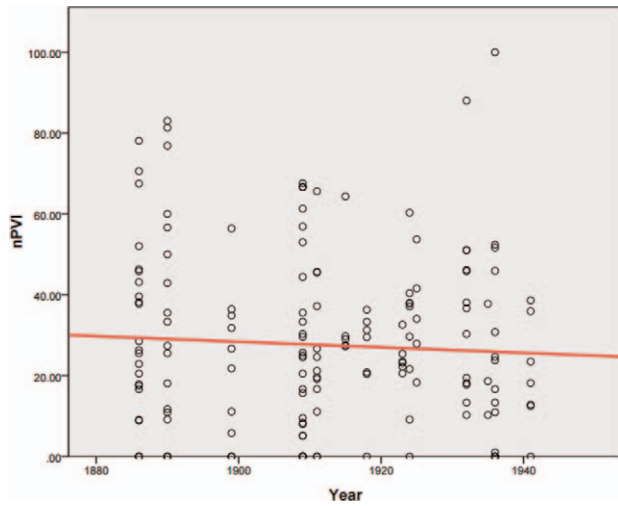


FIGURE 2. Musical nPVI values for Latino themes regressed on date of composition.

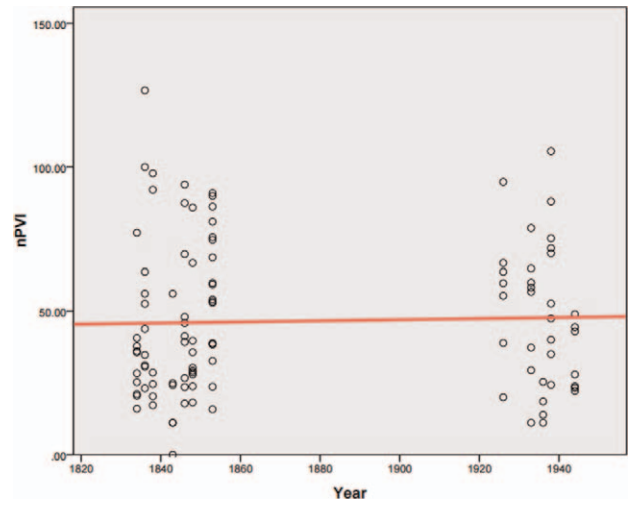


FIGURE 4. Musical nPVI values for Western themes regressed on date of composition.

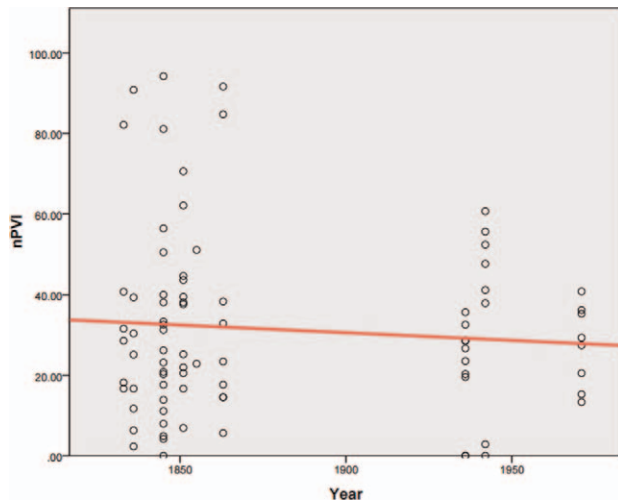


FIGURE 3. Musical nPVI values for Latino-inspired themes regressed on date of composition.

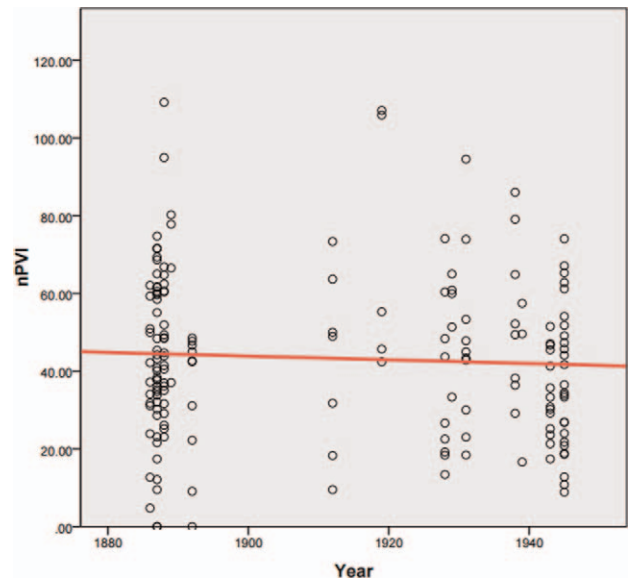


FIGURE 5. Musical nPVI values for Western-inspired themes regressed on date of composition.

rhythmic contrast, perhaps due to influential teachers, insight gleaned through travel, or other explanations. Or, in keeping with Patel et al.’s “direct route” hypothesis (2006), these composers might have drawn upon implicit prosodic knowledge to tailor musical patterns subconsciously to reflect native or nonnative cultures.

Glinka’s music did not display the strong prosodic associations found in the music of the other five composers. In fact, Glinka’s Latino themes featured more rhythmic contrast than his native Russian themes, although not at a statistically significant level. To speculate briefly as to why the pattern did not continue with

Glinka, consider his unusual musical experiences as a child. He grew up under the care of his grandmother, who apparently limited his musical exposure to peasant folk singing and occasional church songs (Campbell, 2016). Later, he received an elite education as a child of the aristocracy and may have learned multiple languages and/or musical traditions, especially low-nPVI French. In fact, Catherinian Era education in Russia emphasized French language and culture to such an extent that, according to Daniele and Patel (2013),

Francophilia may explain why Russian music features the low nPVI levels of French despite spoken Russian's higher relative contrastiveness. Other scholars (Lamas, 2003; Parakilas, 1998) argue that Glinka's Spanish-themed music lacks a marked compositional departure from his vernacular Russian style, although Hess (2001) described how some Spaniards considered Glinka's music to be "... the essence of 'Spanishness'" (p. 3). It could be that Glinka sought to demonstrate how Spanish music, or at least its spirit, could be assimilated into Western common practice style without inflecting core Western elements such as rhythm.

Daniele and Patel (2004, 2013, 2015) traced nPVI fluctuations across the common practice period and discovered associations between rhythmic variability and trends in compositional style. For instance, they attributed the consistent rise in nPVI levels of German/Austrian works between 1600 and 1900 to the waning influence of the less contrastive Italian style, which had been in vogue at earlier points in time. Although alternative explanations for these climbing nPVI levels (VanHandel, 2016) run counter to Daniele and Patel's theory of Italian influence, I thought it prudent to search for similar historical associations. Figures 2–5 display the results of regression analyses for the four thematic groupings featured in this study (Latino, Latino-inspired, Western, Western-inspired). The nearly flat regression lines suggest that date of composition had little effect on the rhythmic variability of the themes I examined.

In future studies, researchers could assess durational differences among the various dialects of Spanish to determine the extent to which discrepancies associate with music from corresponding regions. The nPVI could also be used to assess other examples of musical exoticism, such as Western composers' borrowing of Middle Eastern or Asian styles. In addition, researchers might perform targeted historical research (see Daniele & Patel, 2015) across a single Latino or Latino-inspired composer's lifetime to trace nPVI fluctuation in various career stages, and how this relates to use of exoticism or

other forms of inspiration. Development of the phrase-nPVI (VanHandel & Song, 2010) and nonlinear analytical procedures (Hansen et al., 2016) enables future researchers to conduct broader analyses of cultural prosodic borrowing within and across other music formats, especially vocal repertoire. Finally, additional investigations of within-category nPVI variability around a median would prove informative. As shown in Figure 1, results of the present study revealed a much narrower range of rhythmic patterns in Latino-inspired music, especially when written by non-Latino composers (e.g., Copland and Liszt, whose Latino-inspired nPVI distributions were less than half as diffuse as their native nPVI distributions). Future research could help determine the source of this disparity—perhaps a correlation with tempo, or non-Latino composers' use of stereotypical rhythmic idioms that verge on inauthentic in uniformity and redundancy.

This investigation contributes evidence to support the theory that rhythms employed by composers reflect their native language. Furthermore, as if assuming a foreign accent or affectation, the majority of composers profiled herein seemingly altered their treatment of rhythm to reflect the prosody of a corresponding non-native language. Findings, while limited to a sample of six exemplars, suggest that Latino and Western prosodic associations transcend the vernacular, remaining remarkably consistent regardless of composer heritage.

Author Note

The author would like to thank research assistants Benjamin Icenogle and Chelsea Hudson for their help with data collection and coding.

Correspondence concerning this article should be addressed to Josef Hanson, Department of Performing Arts, University of Massachusetts-Boston, 100 Morrissey Boulevard, Boston, MA, 02125-3393. E-mail: josef.hanson@umb.edu

References

- ABRAHAM, G. (1974). *The tradition of Western music*. Berkeley CA: University of California Press.
- BARLOW, H., & MORGENSTERN, S. (1983). *A dictionary of musical themes*. New York: Crown Publishers. (Original work published 1948)
- CAMPBELL, S. (2016). "Glinka, Mikhail Ivanovich." *Grove Music Online*. Oxford Music Online. Oxford University Press. Retrieved May 20, 2016 <http://www.oxfordmusiconline.com/subscriber/article/grove/music/11279>
- DANIELE, J. R., & PATEL, A. D. (2004). The interplay of linguistic and historical influences on musical rhythm in different cultures. In S. D. Lipscomb, R. Ashley, R. O. Gjerdingen, & P. Webster (Eds.), *Proceedings of the 8th Conference on Music Perception and Cognition* (pp. 759-762). Adelaide, Australia: Causal Productions.

- DANIELE, J. R., & PATEL, A. D. (2013). An empirical study of historical patterns in musical rhythm: Analysis of German and Italian classical music using the nPVI equation. *Music Perception*, 31, 10-18.
- DANIELE, J. R., & PATEL, A. D. (2015). Stability and change in rhythmic patterning across a composer's lifetime: A study of four famous composers using the nPVI equation. *Music Perception*, 33, 255-265.
- GRABE, E., & LOW, E. L. (2002). Durational variability in speech and the rhythm class hypothesis. In C. Gussenhoven & N. Warner (Eds.), *Laboratory Phonology 7* (pp. 515-546). Berlin: Mouton de Gruyter.
- HANNON, E. E. (2009). Perceiving speech rhythm in music: Listeners classify instrumental songs according to language of origin. *Cognition*, 111(3), 403-409.
- HANNON, E. E., LÉVÊQUE, Y., NAVE, K. M., & TREHUB, S. E. (2016). Exaggeration of language-specific rhythms in English and French children's songs. *Frontiers in Psychology*, 7, 939. DOI: 10.3389/fpsyg.2016.00939
- HANSEN, N. C., SADAKATA, M., & PEARCE, M. (2016). Nonlinear changes in the rhythm of European art music: Quantitative support for historical musicology. *Music Perception*, 33, 414-431.
- HESS, C. A. (2001). *Manuel de Falla and modernism in Spain, 1898-1936*. Chicago, IL: University of Chicago Press.
- HURON, D., & OLLEN, J. (2003). Agogic contrast in French and English themes: Further support for Patel and Daniele. *Music Perception*, 21, 267-271.
- LAMAS, R. (2003). On music and nation: The colonized consciousness of Spanish musical nationalism. *Arizona Journal of Hispanic Cultural Studies*, 7, 75-81.
- LONDON, J., & JONES, K. (2011). Rhythmic refinements to the nPVI measures. *Music Perception*, 29, 115-120.
- MCGOWAN, R. W., & LEVITT, A. G. (2011). A comparison of rhythm in English dialects and music. *Music Perception*, 28, 307-313.
- MURCHISON, G. M. (2012). *The American Stravinsky: The style and aesthetics of Copland's new American music, the early works, 1921-1938*. Ann Arbor, MI: University of Michigan Press.
- PARAKILAS, J. (1998). How Spain got a soul. In J. Bellman (Ed.), *The exotic in Western music* (pp. 137-193). Boston, MA: Northeastern University Press.
- PATEL, A. D., & DANIELE, J. R. (2003). An empirical comparison of rhythm in language and music. *Cognition*, 87, B35-B45.
- PATEL, A. D., IVERSEN, J. R., & ROSENBERG, J. C. (2006). Comparing the rhythm and melody of speech and music: The case of British English and French. *Journal of the Acoustical Society of America*, 119, 3034-3047.
- POON, M., & SCHUTZ, M. (2015). Cueing musical emotions: An empirical analysis of 24-piece sets by Bach and Chopin documents parallels with emotional speech. *Frontiers in Psychology*, 6, 1419. DOI: 10.3389/fpsyg.2015.01419
- QUINTO, L., THOMPSON, W. F., & KEATING, F. L. (2013). Emotional communication in speech and music: The role of melodic and rhythmic contrasts. *Frontiers in Psychology*, 4, 184. DOI: 10.3389/fpsyg.2013.00184
- RAJU, M., ASU, E. L., & ROSS, J. (2010). Comparison of rhythm in musical scores and performances as measured with the pairwise variability index. *Musicae Scientiae*, 14, 51-71.
- SADAKATA, M., DESAIN, P., HONING, H., PATEL, A. D., & IVERSEN, J. R. (2004). A cross-cultural study of the rhythm in English and Japanese popular music. In *Proceedings of the International Symposium of Musical Acoustics* (pp. 41-44). Nara, Japan: International Symposium on Musical Acoustics.
- TEMPERLEY, N., & TEMPERLEY, D. (2011). Music-language correlations and the "Scotch snap." *Music Perception*, 29, 51-63. DOI: 10.1525/mp.2011.29.1.51
- VANHANDEL, L. (2016). The War of the Romantics: An alternate hypothesis using nPVI for the quantitative anthropology of music. *Empirical Musicology Review*, 11, 234-242.
- VANHANDEL, L., & SONG, T. (2010). The role of meter in compositional style in 19th century French and German art song. *Journal of New Music Research*, 39, 1-11. DOI: 10.1080/09298211003642498