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An Analysis of Common Songwriting and Production Practices in 2014-2015 Billboard Hot 100 Songs

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Abstract

Over the past two decades, there have been multiple studies and analyses conducted to separate and identify the components of a hit song in popular music. Some of the research has focused on a body of work (corpus studies) while others have honed in on individual songs. This paper is a multi-factor analysis of popular music recordings that attained ranking on the Billboard Hot 100 charts over the period 2014 to 2015. The purpose of this research study is to define current practices used in modern songwriting and music production. It is the author's view that in today's commercial music market both songwriting and song production techniques share a good deal of overlap. Production and engineering techniques are becoming a much more important part of the composition in today's market, branching out from their historical role of simply reinforcing good tone or adding ear candy. Many modern hit songwriters are also producers and vice versa.

By applying statistical analysis to a number of metrics, including tempo, form, introduction length, song length, archetypes, subject matter, and repetition of title, common trends of songwriting and music production were garnered. Items such as number of weeks on the Hot 100 and the song's peak position and number of songwriters and the song's peak position showed statistically significant relationships.

Common practices identified in modern production and songwriting included, but were not limited to: 1) Writing songs about love and using the "Lover" archetype, 2) Using the song's title as the hook and repeating it multiple times, 3) Co-writing, 4) Experimenting with new song forms, and 5) Using different textures in the song's production that draw in listeners from different genres.

Keywords: music production, popular music research, songwriting analysis, Billboard Hot 100 chart, hit song techniques, music industry

Introduction

Over the past two decades, there have been multiple studies and analyses conducted to separate and identify the components of hit songs in popular music. Some of the research has focused on a body of work (corpus studies) while others have honed in on individual songs. Song components such as harmonic progressions have been analyzed by hand (De Clercq and Temperly 2011) and by computer program (Burgoyne, Fujinaga, and Wild 2011). Non-musical research areas related to the popular song, such as lyrics, have also been pursued (Bhaukaurally, Feenaz, Haydar, Didorally, and Pudaruth 2012; Dhanaraj and Logan, 2005).

This paper is a multi-factor analysis of popular music recordings that attained ranking on the Billboard Hot 100 chart over the period 2014 to 2015. The purpose of this research study was to define current practices used in modern songwriting and music production. It is the author's view that in today's commercial music market both songwriting and song production techniques share a good deal of overlap. Many songwriters are also producers and vice versa.

While no direct access such as interviews with producers or songwriters/producers took place, observing and quantifying patterns in the songs allowed for the collection of indirect evidence. Every song compiled from the modern Billboard Hot 100 chart had some underlying organization and methodology. Song tempo, form, introduction length, song length, archetypes, subject matter, and repetition of title were some of the primary elements analyzed against the Billboard chart. These metrics were particularly chosen as they could be objectively analyzed. Elements such as overall marketing efforts, song textures or vocal delivery would be more difficult to quantify.

All songs appearing on the Billboard Hot 100 chart for the period of January 2014 through December 2015 were included. The hope of the author is that these results are applied in professional practice and disseminated to students of songwriting and production as well. Just as traditional music theory details commonly used techniques by classical composers, the statistical trends and conclusions laid down by this paper should not be used as hard and fast rules, but rather as guidelines.

Working music producers and songwriters hoping to improve or update their craft may also find the results of this research useful. Unsigned bands and artists might use the information to mold and choose songs that have a greater chance of commercial success. Additionally, artist manag-

ers, A&R (artists and repertoire), and radio might use the results of the analysis to determine the viability of their artists' existing songs as hits in the current market. The purpose of the study is to answer the research questions:

1. What common practices in songwriting and production did current hit songs exhibit for the years 2014-2015?
2. Were any related to the song's success on the charts?
3. How were these practices similar or different from those in the past?

Review of Literature

Background

Numerous texts on the craft of songwriting are available. However, many aspects of songcraft are in prose form and harder to quantify. The focus of the following literature review is on the most relevant studies and writings that identified multiple elements of hit songs through some type of statistical analysis, computer-based or otherwise.

The challenge faced by the author lies in the analysis of common factors in the current music industry. Many studies are dated with respect to the most current songwriting and music production techniques. A student hoping to craft a modern popular music hit must study today's contemporary charting music, which is a moving target. Songwriting and production trends change so quickly that something relevant five years ago may not be relevant on the hit song charts today. A good example would be the rise of electronic dance music (EDM) styles in the Billboard Hot 100 over the last five years. The review of literature below is condensed for journal publication. The reader is invited to view the full review of literature at www.davetough.com/songwritingproductionmeiea2018.pdf.

General Studies of Hit Songs in Popular Music

Economist David Giles (2007) analyzed the total time spent in the number-one position for songs on the Billboard Hot 100 from 1955-2003 from a longevity perspective. Giles found the life at the top of a number-one hit was enhanced significantly if it was recorded by a female solo artist, if it was an instrumental piece, or if it was able to bounce back for a second round. The average duration for an instrumental Hot 100 chart-topper was 3.13 weeks, compared with 2.76 weeks for other types of number-

one recordings. Hong (2012) continued the research of Giles, correcting previous errors, updating the dataset to 2008, and adding categories. Hong found that a number-one hit's life at the top was enhanced significantly by the inclusion of an African American performer.

In 2008, François Pachet and Pierre Roy of Sony Computer Science Laboratories published the study, "Hit Song Science is Not Yet a Science." The researchers argued that sustained claims made in the Music Information Retrieval (MIR) community and in the media about the existence of Hit Song Science could not be validated. The researchers analyzed 32,000 songs mined from the HiFind Database using sixteen identifiers that included style, genre, and musical setup; as well as main instruments, variant, dynamics, tempo, era/epoch, metric, country, situation, mood, character, language, rhythm, and popularity. Pachet and Roy concluded that existing features, including tempo used in the study of "Hit Song Science" had no significant statistical relationship with song popularity.

Jay Frank (2009), in *FutureHit.DNA*, provided fifteen factors such as creating shorter intros, creating longer songs, increasing chord changes, manipulating songs with false or incomplete endings, appealing to more than one genre, and hook repetition that spoke to adapting contemporary music productions to interface with modern standards and business models.

Dr. Yizhao Ni, project leader and a senior lecturer in artificial intelligence at the University of Bristol in England, led a team that gathered fifty years of hit song data from the top forty charts in Britain (Ni, McVicar, Santos-Rodríguez, and DeBie 2011). Using the data, they created an equation to rank a song's hit potential. The researchers broke the characteristics of a hit song into twenty-three differentiating factors including tempo, length, harmonic simplicity, mode, relative loudness, inherent energy, danceability, and stability of the song's beat (ScoreAHit 2013). The researchers also used a time-shifting algorithm that learned optimum features of the songs in the dataset through time using release date.

Some of the conclusions reached by the study seemed apparent to students of popular music history, yet became validated by the program's output. The study results included:

- Pop music hits from the 1950s through the early 1970s tended to be harmonically simpler than non-hits

- From the end of the 1970s through the early 1980s, danceability became an important factor in determining a hit song
- From the late 1980s forward, songs at the top of the charts became more harmonically complex than songs at the bottom
- Since the late 1980s, simple binary rhythms have been more successful than complex rhythms
- Slow songs such as ballads were popular in the 1980s and 1990s, while listeners in the new millennium prefer fast songs
- The loudness war is real and can be measured. The dynamic range of music has decreased every decade, resulting in progressively louder songs (Ni et al. 2011)

In 2012, Dr. Alisun Pawley and psychologist, Dr. Daniel Müllensiefen conducted a study on the most popular “singalong” songs. Their research showed songs of this type included long and detailed musical phrases, multi-pitch changes in a song’s hook, male vocalists, and vocalists straining to sing at the top of their registers compelled crowds to sing along. Topping their list of songs that stirred listeners was the classic hit “We Are the Champions” by the band Queen (Pawley and Müllensiefen 2012).

Herremans et al. (2014) analyzed 139 factors including duration of the track in seconds, tempo, time signature, modality, key, loudness, danceability, timbre, and the time difference between subsequent beats. The team found that between 1985 and 2013, a dance song’s average duration had decreased from 300 seconds to 260 seconds, average tempo had increased from 118 beats per minute (bpm) to 121 bpm, average loudness had increased by 4dB, complexity in timbre had increased, song energy had remained the same, and danceability (as calculated by Echonest) had decreased.

The researchers compared the hit dance songs with non-hit material and found that their algorithm could indeed predict with above-average accuracy. Herremans, one of the researchers from the initial study, ran the data again for *Billboard’s* “2015 Hot Dance/Electronic Songs” (M. Neal 2015) and found that the algorithm predicted a 65% or higher probability

of a hit for all of the top ten, and over 70% probability for six out of ten songs.

Ticketbis, a popular online ticket reseller based in the United Kingdom, analyzed eleven years of number-one singles on the U.K. charts from July 3, 2004, to June 6, 2015, to detail common characteristics of the songs (Smith 2015). Of the 330 number-one singles selected for study, 138 songs were performed by a solo artist, 115 songs were performed as a collaboration between two artists, and 75 songs were by bands. The researchers found male artists, or all-male bands or collaborations accounted for 53% of the number-one hits. Female artists, or all-female bands or collaborations accounted for 23% of the number-one hits and 17% of the number-one songs were performed by collaborations that were male-led, such as “Somebody That I Used to Know” by Gotye, featuring Kimbra. Finally, 7% of the number-ones featured a female lead vocal in the context of bands or collaborations, as in the case of “Umbrella” by Rihanna, featuring Jay-Z.

Smith (2015) detailed the trend favoring male artists on the charts. Consumer gender was correlated with Spotify data. The findings showed that male subscribers spent 94% of their time listening to male artists while female subscribers spent 55% of their time listening to male artists and 31% listening to female artists. Conclusions were that music fans preferred the male vocal, an observation supported by the fact that men sang the five longest-running #1 hits of all time. Women were most successful in the area of collaboration. The research team found that male and female solo artists combined lasted an average of 1.77 weeks at number-one and bands lasted an average of 1.53 weeks. Female solo artists averaged 1.96 weeks at number-one and female collaborations such as “Run the World (Girls)” topped the U.K. charts for an average of 2.26 weeks (Smith 2015).

Studies on Song Form

Summach (2011) traced “The Structure, Function, and Genesis of the Pre-chorus” in his formal study of popular music. Summach analyzed a sample group of 700 songs from *Billboard's* top twenty songs for each year from 1955 to 1989. The songs were analyzed and coded according to harmonic, structural, and lyric attributes. Summach detailed how the pre-chorus began to appear in song form in the early 1960s and became standard fare for most popular songs. He stated,

The momentum-building devices deployed in pre-choruses vary widely from song to song. Changes in groove, lyric phrasing, and the length of formal units, as well as dynamic level, register, instrumentation, timbre, harmonic progression, and harmonic rhythm all have the potential to increase forward formal urgency. (Summach 2011, para. 3)

Summach (2012) also examined the overall “Form in Top-20 Rock Music, 1955-89” in his doctoral dissertation at Yale University using the same dataset mentioned above. Although Summach included the use of “rock” in the study’s title, it actually analyzes all genres of popular songs within the top twenty for that given year.

Summach pointed out the evolution of the twentieth-century popular song from the AABA form, to the Strophic and Verse Chorus forms, and then to the modern Verse, Pre-chorus, Chorus forms. More modern developments Summach analyzed included the multi-stage pre-chorus (found in the song “Ballroom Blitz”), post-chorus (found in songs such as “I Just Wanna Be Your Everything” and “Sir Duke”), and the expanded chorus (found in songs such as ELO’s “Telephone Line”). His findings showed how rock songs actually got longer from 1955 to 1989, in contrast to Herremans’ 2014 study referenced earlier. Summach additionally detailed how about ten percent of the songs in his dataset had no intro or a short pickup into the song. He detailed the decline of blues-based form in popular music over the forty-year period. Figure 1 illustrates a summary of Summach’s 2012 research.

Other scholars in the field of popular song form included John Co-vach, Christopher Endrinal, Walter Everett, and Jocelyn Neal (2007, 2015). Over thirty dissertations, articles, and chapters had been devoted to song form in popular music, including a special 2011 issue of *Music Theory Online* (vol. 17, no. 3).

Studies on Song Length

The Whitburn Project is an online group of record collectors who manage an online spreadsheet of 37,000 songs. This spreadsheet details several factors about every popular song since the 1890s. Andy Baio (2008) analyzed the data in the spreadsheet and found that the mode of

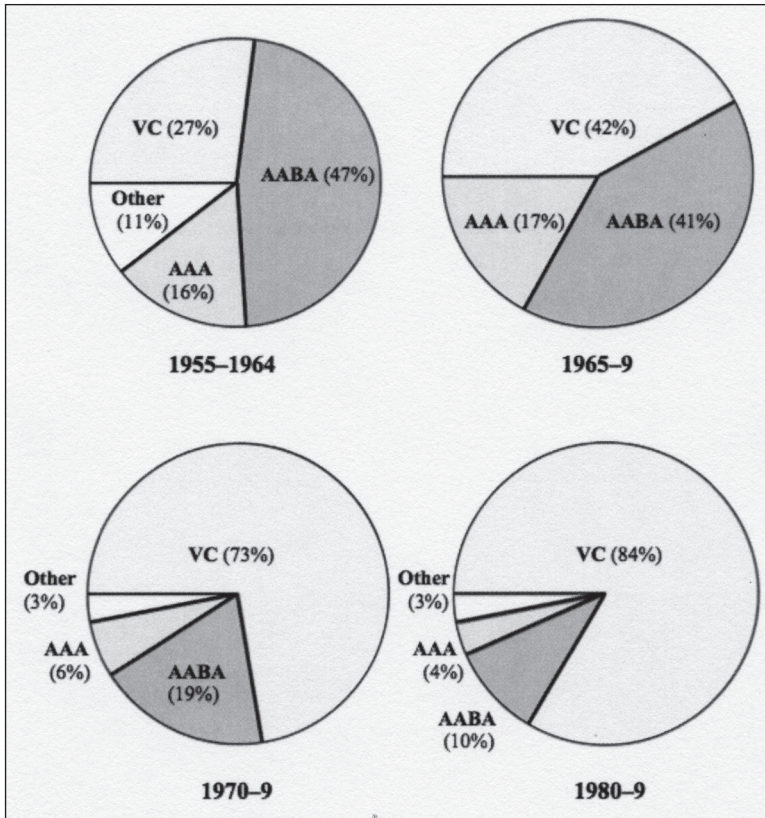


Figure 1. Composition of the *Billboard* annual top-20 charts by song type in four time periods. Adapted from *Form in Top-20 Rock Music, 1955-89*, by Jason Summach (Doctoral dissertation), 2012.

song length for songs in each decade of popular music since 1950, in general, were getting longer (see Figure 2 and Table 1).

Studies on Song Lyrics

Not all attempts at dissecting the makeup of popular song focused on harmonic or audio characteristics. Dhanaraj and Logan's results (2005) indicated that lyric-based analysis along with audio analysis was somewhat more effective than audio-based analysis alone at determining the success of songs.

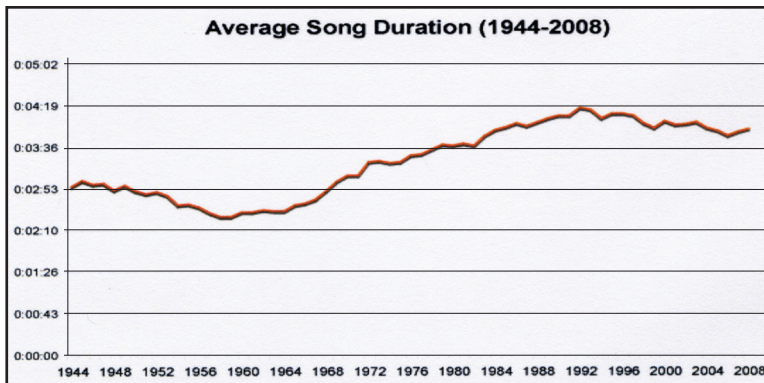


Figure 2. Average song duration, 1944-2008. Adapted from *The Whitburn Project: 120 Years of Music Chart History*, by Andy Baio, 2008. http://waxy.org/2008/05/the_whitburn_project/.

Decade	Song Length Mode Minutes:Seconds
1950s	2:30
1960s	2:30
1970s	3:30
1980s	3:59
1990s	4:00
2000s	3:50

Table 1. Mode of song length by decade. Note: adapted from *The Whitburn Project: 120 Years of Music Chart History*, by Andy Baio, 2008. http://waxy.org/2008/05/the_whitburn_project/.

An archetype is a universally understood pattern of behavior or a prototype from which others are copied, patterned, or emulated. Archetypes are used in myths and storytelling in all cultures. Marc Kushner, a NASA scientist and songwriter, studied over one hundred country songs, identifying some common lyric and storyline archetypes in country music. Kushner (2009) maintained that twelve stock characters continued to reappear in country song lyrics. These archetypes include the Innocent (innocent child), the Outlaw (the rebel), the Sage (giver of wisdom), the

Hero/Warrior, the Lover, the Everyman (regular guy or gal on the street), the Joker, the Explorer (adventurer), the Caregiver, the Wizard (magician), the Creator (Einstein), and the Ruler (the CEO). Examples of these in contemporary film culture are *Star Wars* characters, with Luke Skywalker as the Innocent (naïve and dressed in white), grey-bearded Obi-Wan Kenobi as the Sage, Han Solo as the Outlaw, and Darth Vader as the Ruler. Kuchner was also able to apply these archetypes to music. For example, Tim McGraw's song "Nothin' to Die For" features the narrator as a Sage who gives his wisdom to a drunk driver. In Sugarland's "It Happens," the narrator takes the role of an Innocent in her attitude toward life.

Country music scholar Jimmie N. Rogers (1989) cataloged the dominant themes in the lyrics of country music and found that the overwhelming majority of songs were written with respect to some type of romantic love ("hurtin' love," "cheatin' love," "happy love"). Jocelyn Neal (2007) added to this concept, mentioning that the time shift strategy found in songs (such as the Dixie Chicks' "Long Time Gone,") is a common lyric device found in country songs.

Andrew Powell-Morse (2015) researched song lyrics that had spent more than three weeks at number-one on the *Billboard* charts for Pop, Country, Rock, and R&B/Hip-Hop. Songs from 2004 through 2015 were specifically chosen. Study results indicated that artists in the 2005 era were producing lyrics of a third-grade (Year 4) reading level, while in 2014, the reading level had dropped to second grade (Year 3). Country music came out on top as the most intelligent genre, scoring a 3.3, with pop (2.9), rock (2.9), and hip-hop (2.6) following behind.

Studies on Song Tempo

Eric Strom, a popular music theory blogger, scanned the *Billboard* Hot 100 to determine tempo. Strom (2016) found the slowest song tempo on the 2015 *Billboard* Hot 100 was 70 bpm (beats per minute) and the fastest was 206 bpm. He found that 120 bpm, which he called the "middle C" of tempos, was both the mode and the median for the dataset. Additionally, the mean was 120.55 bpm.

Strom (2016) determined that the average song length of songs on the *Billboard* Hot 100 during 2015 was 3:40. 66% of songs fell between 3:00 and 3:59, 10% of songs were between 2:00 and 2:59, 24% of songs were between 4:00 and 4:59, and 2% of songs were between 5:00 and 5:59. He then tested the song tempo with chart position and found no cor-

relation. He did find a positive correlation between song length and chart dominance. Strom said that three-minute songs were most likely to earn a number-one spot. He stated,

There is a very clear pattern that emerges when comparing song tempo and a song's "Danceability" score given to us by Echo Nest. The data shows us—without doubt—that the most danceable songs are between 95 and 140 bpm. It is undeniable. When analyzing the top 100 songs from 2015, I found that there was a significant correlation between a song's danceability score and its popularity score. Are these songs, which are more danceable, also more popular? The answer is a resounding yes. (Strom 2016, sec. 6)

Dean Olivet (2013) sampled *Rolling Stone's* "500 Greatest Songs of All Time" list accompanied by fifty-three randomized modern pop songs. All tempos were rounded up or down to whole numbers. Songs with two separate tempos were split into two separate songs. Tempo fluctuations within a song were averaged together, such as in the case of the Beatles' "Can't Buy Me Love." Olivet charted each tempo and graphically illustrated that the largest number of songs in the dataset (3.6%) exhibited a tempo of 112 bpm. The next two close contenders were 100 bpm (3.3%) and 120 bpm (3.3%). However, no average or median data was provided.

Schellenberg and von Scheve (2012) found that when analyzing the top 40 Billboard Hot 100 chart recordings for the period 1965-2009, tempos actually slowed down (Table 2). Through correlations of several factors such as major versus minor mode and tempo, the researchers stated:

Our findings confirm that popular recordings became sadder sounding and more emotionally ambiguous since the 1960s. These findings have striking parallels to the evolution of classical music from 1600 to 1900. Throughout the 17th and 18th centuries, cues to emotion based on mode and tempo tended to be consistent, with fast-tempo pieces in major mode and slow-tempo pieces in minor mode (Post and Huron 2009), such that pieces tended to sound unambiguously happy or sad. By the 1800s and the

middle of the Romantic era, tempo and mode cues were more likely to conflict, such that the emotional status of the pieces became more ambiguous. Popular music from 1965 to 2009 shows the same developmental trend over a much shorter time-scale. (Schellenberg and von Scheve 2012, 200)

Years	% Major	Mean Tempo	Mean Duration	% Male
1965-1969	58.0	116.4	176.9	79.0
1975-1979	75.1	103.0	225.3	66.2
1985-1989	78.0	104.2	256.8	63.0
1995-1999	62.7	89.4	248.2	55.5
2005-2009	42.5	99.9	230.2	61.7

Table 2. Song mode, tempo, duration, and gender by decade. Adapted from “Emotional Cues in American Popular Music: Five Decades of the Top 40,” by E. G. Schellenberg and C. von Scheve, 2012, *Psychology of Aesthetics, Creativity, and the Arts* 6, no. 3: 200.

Studies on Other Related Factors

Music Production

In 1987, Gary Burns provided one of the first frameworks of categories in which popular music hooks fall (lyrical, melodic, instrumental, etc.). Within each category (rhythm, melody, harmony, lyrics, instrumentation, tempo, dynamics, improvisation and accident, sound effects, editing, mix, channel balance, and signal distortion), Burns gave examples of popular songs from the 1950s to the 1980s that used each of these hook techniques.

Production Trends

Eric Strom (2014, 2015) detailed reoccurring production trends in the Billboard Hot 100 pop songs that he noticed during the years of 2014 and 2015. These included the following for 2014:

- Rapid pitch jumps in vocals using pitching/shifting programs such as Autotune or Melodyne (“vocal pitch whipping”) as found in Maroon 5’s “Maps.”
- Sparse and spacious drum beats like those found in Rae Sremmurd’s “No Type.”
- Sidechaining kick to music track: a pop technique directly taken from the EDM genre, where the kick drum brings down the volume of the music track or another instrument when it hits. An example is Ariana Grande’s “Love Me Harder.”
- Lack of snare drum in songs such as in Pitbull’s “Fireball.”
- A background vocal “whoop” or “yelp” on the fourth beat of a measure (or the “and” of the 4) as in Nicki Minaj’s “Anaconda.”
- Pitch shifted vocals, either up or down, taken from the “chopped and screwed” technique of hip-hop, now entering pop music.
- Extremely/unnaturally in-tune vocals using pitching-shifting programs such as Autotune or Melodyne, such as in Florida Georgia Line’s “This Is How We Roll.”
- Reintroduction of saxophone back into popular music as evidenced by songs such as Taylor Swift’s “Shake It Off” and Ariana Grande’s “Problem” ft. Iggy Azalea.

Strom (2015) also constructed a “production trends” list for 2015. His observations follow.

- Repeating/chopped vocal samples such as in Justin Bieber’s song “Where Are You Now” and Major Lazer’s “Lean On.”
- Repeating saxophone riff such as the one found in “Worth It,” Fifth Harmony ft. Kid Ink.
- Pitch shifted vocals: either up or down
- 808 style snare as found in songs such as Taylor Swift’s “Blank Space.”
- Intentionally sloppy autotuning.
- Overabundance of sampled claps in songs.

- Minimalist drum beats or no drums in a song.
- Bad songwriting. (On original list, no definition provided.)

Repetition of Hook and Harmony

Concerning repetition in popular music, Richard Middleton (1983) posed the question, “Why do listeners find interest and pleasure in hearing the same things over again?” Middleton proposed that music had endless possibilities for repetition in the lyrical content as well as in the melodic, harmonic, and textural/temporal contexts. The author posited that when one element (melody, harmony, lyric hook, etc.) in a song repeats, another might not. This technique creates a new combination of elements at any given time. Examples might include a melodic sequence with the same rhythm but varying notes, or a constant melodic phrase repeated over a twelve-bar blues (changing chords). Middleton detailed two main types of repetition: a) musematic, the repetition of short units such as a riff or call and response pattern found in African-based music and later in blues and rock music, and b) discursive repetition, the repetition of longer units such as an entire phrase. Musematic repetition is more likely to be prolonged and unvaried. Discursive repetition can be mixed with contrasting units of various types, such as the AABA structure.

Methodology

Background

Billboard is one of the oldest publications in the world devoted to music and the music industry. The Billboard Hot 100 remains the best tool to draw general conclusions about the production and songwriting attributes found in popular commercial songs. The Billboard Hot 100 represents all popular genres and takes popularity rankings from multiple data points. Using data gathered from chart performance also helps researchers keep personal musical experience and preferences in check (Giles 2007). The chart remained a primary foundation in the majority of previous scholarly studies that attempted to draw statistical conclusions about the behavior of popular singles over time (DeWall, Pond, Campbell, and Twenge 2011; Giles 2007; Pettijohn and Sacco 2009; Zullo 1991).

Data Collection

The sample for this study was limited to all songs found on Billboard Hot 100 charts over a two-year period, January 4, 2014, through December 26, 2015. This dataset included just under 1,000 songs: 458 songs that appeared on the Hot 100 in 2014 and 500 songs that appeared on the Hot 100 in 2015. The list of 2015 songs was larger than 2014 as it contained “carry over” songs from 2014. All data were gathered by the author and verified by the research assistant. The research assistant was blind to the study’s primary questions and worked independently. In cases where disagreement emerged, the author and research assistant discussed and came to an agreed-upon conclusion. As with any analysis of artistic material, some factors in this study included a measurable amount of subjectivity. For example, when codifying archetype, the researchers had to rely on their personal interpretations of the song’s meaning. Data collection steps were as follows:

Billboard Hot 100 charts found online at billboard.com and song-database.com were used and cross-verified to input “Artist” and “Song” for each song on the Billboard Hot 100 each week. Information for “Chart Debut,” “Peak Date,” “Peak Position,” “Weeks on Chart,” “Features Another Artist” and “Male/Female” was also gathered from these sources. For songs that had multiple equal peaks, the author and research assistant opted to use the first peak date in the spreadsheet. If a song’s time on the Billboard Hot 100 chart began before January 4, 2014, the data was tracked back to the week that the song first appeared on the chart. This means the total number of weeks on the chart for each song is inclusive of all dates the song appeared.

However, on the 2014 data spreadsheet, all calculations ended with the final 2014 chart date, meaning that for songs that continued to appear into 2015, the final calculation of number of weeks on the chart is found in the 2015 sheet. Additionally, some songs reappear on the charts due to unique events, such as Mariah Carey’s “All I Want for Christmas Is You,” reappearing every year as a Christmas single. The gender of the performing artist was coded as “male” in cases of a male solo performer (e.g., Fetty Wap) or an all-male band (e.g., Twenty One Pilots). If the lead singer of a band was female but other band members male (e.g., No Doubt, Paramore), the song was coded “female.” If the song was a male/female duet or a male artist featuring a female artist, the song was coded as “both.”

“Length,” and “Length (num)” were found using iTunes search. In some cases, multiple song lengths are listed for a single song. This was usually a difference between the “album” version of a song and the “single” version of the song. In most cases, the Hot 100 charts identified and ranked as “single” version was used because it was the version of the song on the radio and otherwise widely available to the public. A one-second discrepancy in song length occasionally exists between original and clean versions of songs, usually hip-hop. This is generally an arbitrary difference caused by the mix-down of a certain version of a song containing a tiny bit of extra empty space. The shorter length of the two versions was used unless an actual, audible change in length could be detected.

Using songbpm.com and audiokeychain.com as references, the “bpm” for each song was calculated. If tempo information between the two sites conflicted, the song was located on Spotify and a bpm tapper was used to manually tap out the beats per minute. If a song sped up in tempo during its duration, the average tempo between song extremes was calculated. If the tempo was strange or varied significantly, it was noted in “Tempo-Other.” A good example of this was Drake’s “0 to 100/The Catch Up;” two seemingly separate songs are contained in one recording.

Genius.com and Google Play Lyrics were used to search for song lyrics. These sources were used to calculate “Number of Times Title Appears in Song” and “Song Hook in Title,” and to analyze “Song Structure.” Some songs started with an alteration of the primary chorus, which could be considered both intro and chorus. In these instances, these were identified as a chorus in the assessment of intro lengths. “Harlem Shake” was the only fully instrumental song to appear on the Hot 100 during this period, so it was excluded from lyrical analysis.

BMI, ASCAP, and SESAC repertory searches were used to fill in the “Songwriters” and “# of Songwriters” columns. The crediting of songwriters was based on official PRO registrations. While the author and research assistant devoted significant time to mark the use of samples, in some instances, sampled artists were both credited and un-credited as co-writers of derivative material, a conflict based on individual arrangements made in the clearing of samples.

YouTube was used to find “Song Link” for the official song version of each song. “Intro Length,” “Synopsis” “Rap Integrated?” and “Archetype” were also gathered from the YouTube source. The archetype field used Kuchner’s (2009) twelve prime archetypes of Innocent, Outlaw,

Sage, Warrior/Hero, Lover, Everyman, Joker, Explorer, Caregiver, Wizard, Creator, and Ruler. The author added a final archetype of “Partier” because so many current popular songs rely on this character role.

WhoSampled.com was used as a primary resource and cross-referenced with PRO registrations to note whether any songs had “Samples Used.” In some instances, artists had sampled their own previous material. This included material from simple vocal lines to full musical selections. The former is true in the case of Juicy J’s song “Bandz a Make Her Dance,” sampling a vocal call from his group Three 6 Mafia’s “Mafia N****z.” The author and research assistant still consider them as samples, even though clearance might not have been necessary.

Yet another qualifier for songs that included a sample were songs produced by certain artists or producers containing sampled “tags” that announced an artist or producer as being involved on the track. A clear example of this was producer DJ Mustard placing a vocal sample, originally spoken by artist YG, saying “Mustard on the beat” in several songs. Again, we considered this a true sample and marked its use as such.

While WhoSampled.com identifies the rerecording of lyrics from another song as a sample, in the present study, this is classified as a cover or musical/lyrical reference (interpolation). A sample must be a recorded sound of some kind being repurposed in a song. We went so far as to listen to and compare each alleged sample to make this judgment personally. WhoSampled.com is the best resource available at this time to find samples within records but cannot be considered comprehensive. If there were other interesting qualities about the song, including common trends, they were included in the “Comments” column of the specific song.

Category Definitions

Please see the full study at www.davetough.com/songwritingproductionmeiea2018.pdf for a full list of definitions and song structure terminology.

Results and Discussion

The study results sorted by category appear in this section. Tabulation, descriptive statistics, and correlation analysis were used to obtain the results.

Introduction Length

The average length of the song introductions for all songs found on the Billboard Hot 100 chart during 2014 and 2015 was 12.29 seconds, with a median of 12 seconds (see Figure 3). Forty-three percent of the song introductions lasted 0 to 10 seconds and 13.2% of the songs had no introductions. These songs generally opened with either the full song (including vocals) or with a cappella vocals followed by the song's full instrumentation entering shortly after.

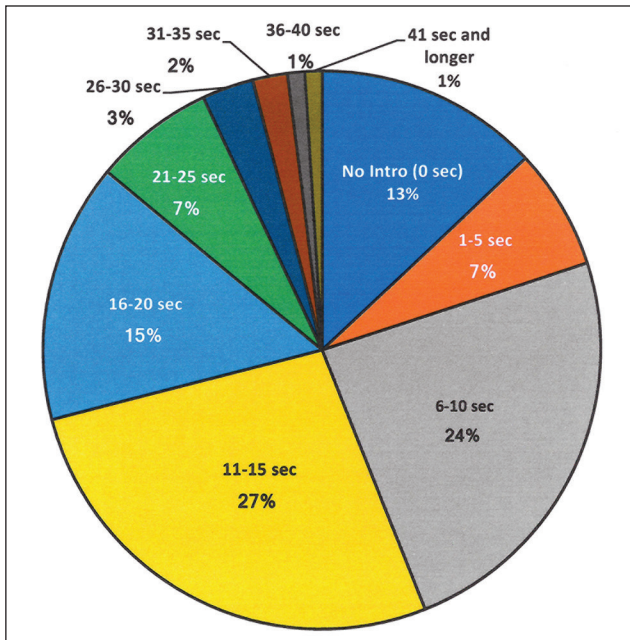


Figure 3. Introduction length of all songs on the Billboard Hot 100 chart, 2014-2015.

Jay Frank (2009) argued that the commercial purpose for a song intro in the past was to give radio DJs talk-over time. With portable and digital technologies, skipping a non-engaging intro is easy for the listener. In today's market, the consumer's attention span is shorter than ever, resulting in the need for the producer and songwriter to employ tight, engaging introductions or sometimes no introductions at all (Frank 2009). A recent study by Edison Research (2016) stated the average American user of AM/FM radio switched the station 22 times during a commute, while those using other platforms switched an average of 9.3 times per commute.

Of the 958 songs in this dataset, 126 (13%) began either with a chorus or a hook. Frank believed that after the first listen, the introduction of a modern song should trigger something unique about it in the first four seconds. If this does not happen, the listeners will not be able to identify the song from their first listen and therefore not be able to purchase it immediately on iTunes (Frank 2009). Murphy (2011) asserted that the producer/songwriter must get the listener involved within the first sixty seconds, or the listener will turn off the song. Songs in the digital streaming format need a minimum of sixty seconds of listening time to count as a play and thus generate royalty income (Frank 2009).

A correlation was calculated to index the strength and direction of the relationship between success, as measured by peak position, and intro length. The correlation indicated a weak positive relationship, $r = .074$.

Song Length

The average length for all songs found on the Billboard Hot 100 during the years 2014 and 2015 was 3:44 (3 minutes and 44 seconds), with a median length of 3:39. The majority (68%) of the 958 songs were 3:00-3:59 (see Figure 4). Twenty-four percent were four minutes or longer. One

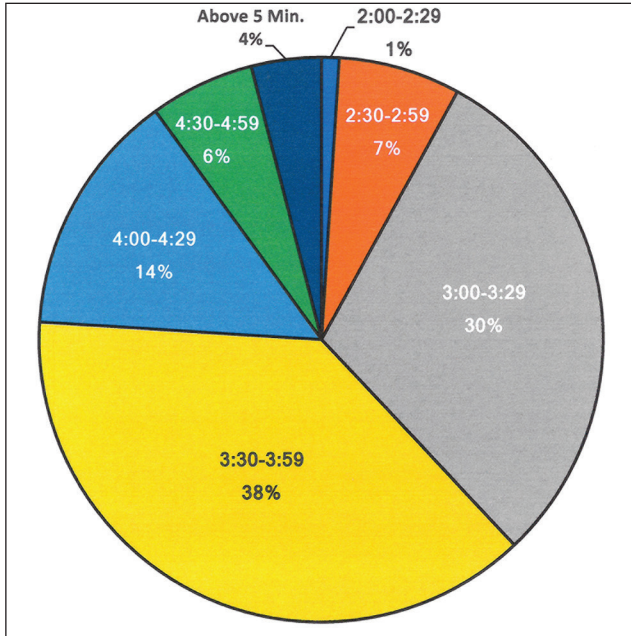


Figure 4. Length of all songs on Billboard Hot 100, 2014-2015.

factor for the increase in average length of a current song from the past standard of the radio hits of the 1960s through 1990s, which was closer to 2:30-3:30, could be the inclusion of “other” data sources into the Billboard Hot 100 (YouTube, streaming sites, etc.) that did not rely on song length as much as traditional radio did.

Song Tempo

Swaminathan Schellenberg (2015) stated,

Fast-tempo music is considered to sound happier than slow-tempo music, just as major and minor modes are happy and sad sounding, respectively. In general, adult listeners give higher liking, pleasantness, or preference ratings to happy over sad sounding music. (192)

Since the end of the 1970s, danceability has become an important factor in determining a hit song. The Echo Nest dataset defined danceability as, “The ease with which a person could dance to a song, over the course of the whole song.” The focus on a song’s danceability was evidenced by the fact that the average tempo for all songs found on the Billboard Hot 100 during the years 2014 and 2015 was 116.65 bpm and the median tempo was 118 bpm. The mode of all tempos was 120 bpm, aligning with Strom’s 2016 findings presented earlier.

Another interesting trend was the sheer amount of faster songs in the Hot 100. Forty-eight percent of the 958 songs in the dataset were 120 bpm or faster and 22% of the songs were 140 bpm or faster (see Figures 5 and 6). The correlation coefficient ($r = .269$) provided evidence for a moderately strong positive relationship between beats per minute and the number of weeks in the Hot 100.

Genre

Pop was the most prevalent genre for all songs found on the Billboard Hot 100 during the years 2014 and 2015. Table 3 shows genre distribution over the two-year period. If *Billboard* categorized a song as belonging to multiple genres (e.g., hip-hop/rock), it was counted once in each category. Note that genres that included only one song among the 958 total songs (folk, holiday, retro) were not included in the table.

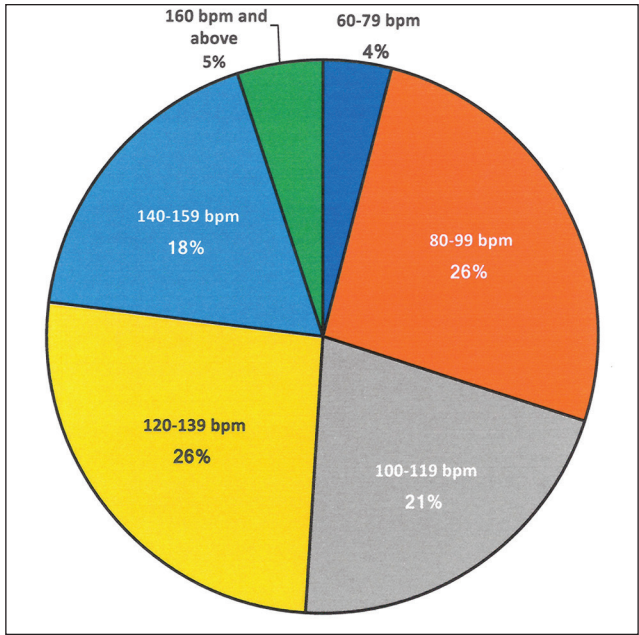


Figure 5. Song tempo of all songs on Billboard Hot 100, 2014-2015.

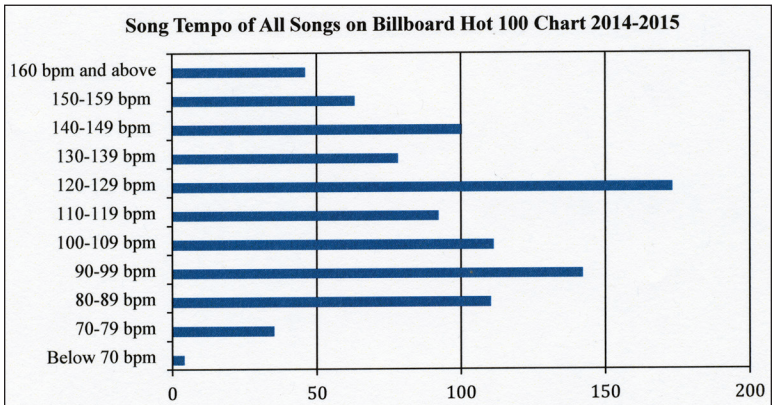


Figure 6. Song tempo of all songs on Billboard Hot 100, 2014-2015.

Genre	<i>f</i>	%
Country	194	20
Hip-Hop	243	25
Latin	5	1
Pop	358	37
R&B	82	9
Religious	5	1
Rock	67	7

Table 3. Genre prevalence of Billboard Hot 100, 2014-2015.

Number-One Charting Songs

Of the 958 songs in the Billboard Hot 100 spreadsheet, only 27 achieved the number-one spot on the Billboard Hot 100 chart. The breakdown by major genre is found in Table 4. Pop holds the top spot by a large margin. This is due in part to the nature of pop music being “popular” music as well as the genre’s large span, ranging from pure pop artists like Katy Perry to more indie rock or indie pop artists like Fun and Echo-smith. Both rock and country genres failed to achieve a number-one song on the Billboard Hot 100 charts for the years studied. The highest position a country song has held was fourth place, which was held by Florida Georgia Line’s “Cruise.” The highest charting rock song was Maroon 5’s “Sugar,” although some believe that Maroon 5 straddles the line between rock and pop.

Genre	<i>f</i>	%
Pop	19	70
Hip-Hop	4	15
R&B	4	15
Rock	0	0
Country	0	0

Table 4. Genre of number-one songs on Billboard Hot 100, 2014-2015.

Song Archetypes/Subject Matter

A good song, just like an effective brand, typically evokes a familiarity, embodied character role, or archetype. When listeners hear a song that

contains an authentic archetype, the song brings meaning to their lives (Kuchner 2009). The Lover archetype was by far the favored narrator role/stock character found in the Billboard Hot 100 during the years 2014 and 2015, appearing in 62% of the songs (see Figure 7 and Table 5). The Lover, as defined by Kuchner, is a character that focuses on matters of the heart. Two other popular character roles for the narrator during the years 2014 and 2015 were Warrior, the hero character that takes responsibility and faces challenges such as in the song “Roar” by Katy Perry, and the Ruler, being the boss, the president, or the CEO, as found in Fifth Harmony’s

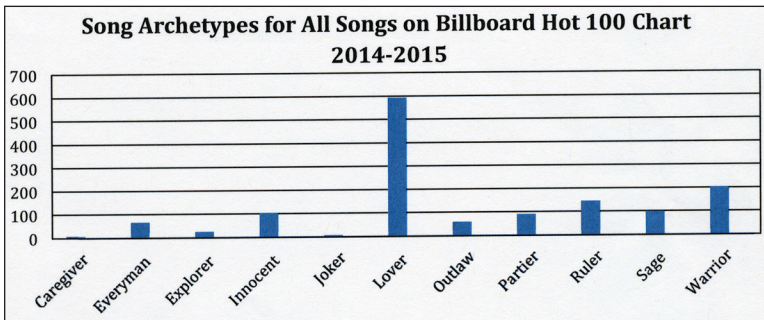


Figure 7. Song archetype of all songs on Billboard Hot 100, 2014-2015.

Archetype/ Stock Character	f	%
Caregiver	7	1
Everyman	66	7
Explorer	25	3
Innocent	104	11
Joker	7	1
Lover	592	62
Outlaw	59	6
Partier	89	9
Ruler	144	15
Sage	100	10
Warrior/Hero	202	21

Table 5. Archetype prevalence of Billboard Hot 100, 2014-2015.

song “Bo\$\$.” As mentioned in the methodology section, the archetype of Partier was added to Kuchner’s original 2009 list to accommodate the growing number of today’s commercial songs using that character role. If the author categorized a song as comprising multiple archetypes (see Table 6), the song was counted once in each category.

Archetype	<i>f</i>	%	Overall Combined Message
Warrior/Ruler	94	10	Character is leader/boss and overcomes the odds
Partier/Innocent	63	7	Character or subject is enjoying life and having fun, typically from a young perspective
Lover/Outlaw	25	3	Character rebels against authority for love

Table 6. Archetype combinations in Billboard Hot 100, 2014-2015.

Use of Title in Song

Jay Frank (2009) believed a song’s title should provide the public instant accessibility for purchase. The more often the title is repeated, the more memorable the song is for purchase. However, too many iterations of the title could be cumbersome. De Clercq (2008) advocated the balance of “variety versus unity” to maintain interest in the song. Sometimes the song’s title is not the hook itself. In the present study, iterations of the title appearing in the lyric sheet were counted. Thirty-five of the 958 songs (4%) found on the Billboard Hot 100 during the years 2014 and 2015 did not include the song title in the song lyrics. Some examples of this are “Cecilia And The Satellite,” “100 Grandkids,” and “The Christmas Song.” On the opposite end of the spectrum, in “My Ni**a” by YG, the song’s title/hook appears 86 times, while in PSY’s “Hangover” the song’s title/hook appears 150 times, counting both the sung repetitions and artificially created repetitions (i.e., delays).

The average number of times the title appeared within a song on the Billboard Hot 100 during the years 2014 and 2015 was 11.75 (12) times, the median was 9 appearances, and the mode was 6 appearances. A correlation was calculated to index the strength and direction of the relationship between success, as measured by peak position, and number of times the title appears in the song. The correlation indicated a weak negative non-

significant relationship, $r = -.086$. A similar correlation was calculated to measure the relationship between success, as measured by weeks on the Hot 100, and number of times the title appears in the song. The correlation indicated a weak non-significant relationship, $r = .054$. A third correlation was calculated to test the strength and direction of the relationship between genre and number of times the title appears in the song. The correlation indicated a weak non-significant relationship, $r = .078$.

Song Form

Recalling the AABA song form, and the get-to-the-chorus-quick mentality, 127 (13%) of the songs started on the chorus/hook with no musical intro and 88 songs (9%) had a brief musical intro but went straight to the chorus. In other words, 21% of the songs started with a chorus, not a verse. When divided by major genre (omitting genres with only a few songs present on the Billboard Hot 100 chart including folk, Latin, holiday, and religious), what might be the most interesting piece of information is that all genres predominately start with a verse except for hip-hop. Hip-hop songs on the Hot 100 start with a chorus at a roughly 2:1 ratio (see Table 7).

Genre	Songs Starting With a Verse	Songs Starting With Something Other Than a Verse (Chorus, Bridge, etc.)
Country	190	4
Hip-Hop	76	165
Rock	308	51
R&B	57	25
Rock	55	12

Table 7. Song starts by genre, Billboard Hot 100, 2014-2015.

Song forms varied widely but two of the most popular were:

- Intro, Verse, Pre-Chorus, Chorus, Verse, Pre-Chorus, Chorus, Bridge, Chorus
- Intro, Verse, Chorus, Verse, Chorus, Bridge, Chorus

Two examples of interesting and inventive song forms were Dillon Francis and DJ Snake's "Get Low" (Hook-8x, Hook 2-28x, Chorus, Hook-8x, Hook 2-28x, Chorus), a song based solely on hooks with no storytelling, and Jennifer Lopez's "I Luh Ya Papi" (Bridge 1, Verse, Bridge 2, Chorus, Bridge 1, Verse, Bridge 2, Chorus, Verse, Verse, Chorus), a song that relied on the heavy presence of a repeated bridge section.

Disappearing Third Verse/Appearance of Post-Chorus

An interesting piece of data to arise from this study was the range of song structures that now exist in modern music. Traditionally a Verse, Chorus, Verse, Chorus, Verse, Chorus structure was standard (with the third verse potentially replaced by a bridge). Currently, especially in the genres of hip-hop and country, structure seems to be changing. In country, a third verse or bridge is still standard, but is no longer a given in every song: look at Eric Church's "Cold One." In hip-hop, unique song structures are more common. Examples include Kanye West's lack of a chorus in "Blood on the Leaves" and the combination of two noticeably separate songs mixed into one track, as in Drake's "Pound Cake/Paris Morton Music 2."

The rise of the post-chorus, detailed by Summach (2012), provides a secondary earworm typically containing the hook added to the end of the traditional chorus. Examples are in Sam Hunt's "House Party" and One Direction's "Steal My Girl." This technique appeared in 40 of the 958 songs (4%) on the Billboard Hot 100 charts during the years 2014 and 2015.

Number of Songwriters Versus Genre

During the period of 2014-2015 country music averaged the least number of songwriters, with fewer than three per song. Both rock and pop averaged slightly less than four songwriters per song, while hip-hop and R&B both averaged just over five. This is interesting for a number of reasons, including the issue of royalty distribution by genre and songwriting/production opportunities for writers of each genre. Co-writer differentials with respect to genre remained steady through both years in review (see Figure 8 and Table 8).

Just 53 of the 958 songs (5.5%) on the Billboard Hot 100 charts during the years 2014 and 2015 were written by a sole writer. The mode for number of co-writers for songs appearing on the Billboard Hot 100 charts

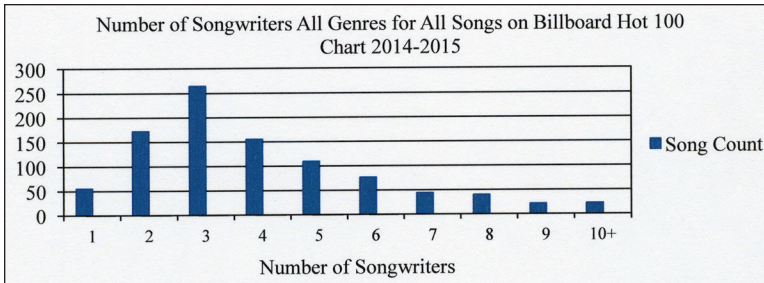


Figure 8. Number of songwriters for all songs on Billboard Hot 100, 2014-2015.

Genre	2014 Writers per Song	2015 Writers per Song
Country	2.88	2.88
Hip-Hop	5.38	5.00
Pop	3.53	4.08
Rock	3.97	3.80
R&B	5.09	5.14

Table 8. Writers per song by genre, Billboard Hot 100, 2014-2015.

during the years 2014 and 2015 in all genres was 3.00 and the average was 4.07 writers per song. Co-writers may have one primary expertise (lyrics or melody) and rely on their counterparts for the other element to draw out each other’s creative strengths. Writing with the producer allows both parties to have creative input into the product and financial incentives in its outcome.

A correlation was calculated to index the strength and direction of the relationship between success, as measured by peak position, and writers per song. The correlation indicated a weak negative non-significant relationship, $r = -.10$. A similar correlation was calculated to measure the relationship between success, as measured by weeks on the Hot 100, and writers per song. The correlation indicated a very weak non-significant relationship, $r = .06$.

Artist Collaborations

Of the 958 songs in the dataset, 317 (33%) featured collaborations between artists, such as Missy Elliott featuring Pharrell Williams in the song “WTF.” The most common type of collaboration was a typical pop song with a rap verse injected into the form. This type of collaboration appeared in 295 (31%) of all songs appearing on the Billboard Hot 100 charts during the years 2014 and 2015.

The analysis showed that choosing two types of artists, especially those from two different genres, to perform on a song widened the song’s appeal and chances for commercial success. A musical reason might also exist for the effectiveness of featuring an artist from another genre. Jay Frank (2009) wrote that to be commercially successful in today’s market, a song cannot rely on a monotonous, sampled groove to be hit-worthy. It must have several textures and style changes. A listener typically hits the boredom mark with a song at around two minutes of play. If something interesting like a fast rap or a developed instrumental section can be inserted into the song, it will keep the listener’s interest. Frank used the Gorillaz’ “Feel Good Inc.” as an example of the constant shift in styles contributing to a song’s popularity (Frank 2009).

Male vocals dominated the charts. Of the songs, 643 (67%) featured a male lead singer, whereas female lead vocals were featured in 213 songs (22%). Only 11% featured both genders singing the lead vocal (i.e., duet performances). See Figure 9.

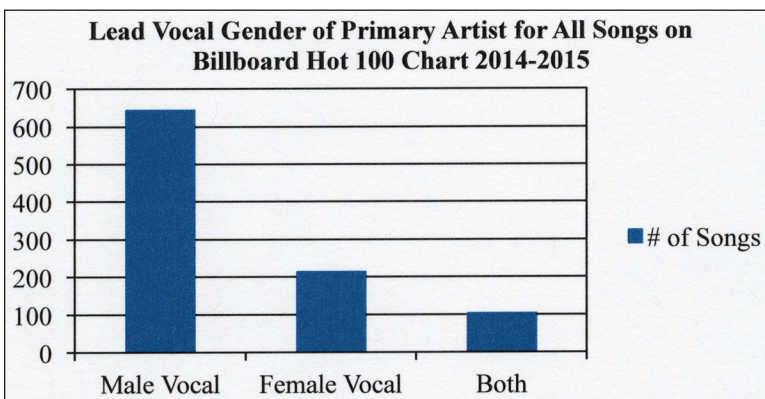


Figure 9. Lead vocal gender of primary artist for all songs on Billboard Hot 100, 2014-2015.

Presence of Hip-Hop/Rap

Hip-Hop/Rap started the process of becoming a commercially viable genre in the 1980s. The prevalence of the genre in modern music grew through the 1990s and 2000s and reached a point where the genre and its influence bled into multiple genres, including pop, rock, and even country. Of the 958 songs in the spreadsheet, 295 of the songs (31%) had a rap integrated somewhere in the song (verse, bridge, or throughout). Most of the time, the rap feature was performed by another artist, as referenced above, but not always. Additionally, the 31% did not include songs that have rap influence in their structure or flow, but rather songs that had at least one actual rap verse. This meant that nearly one third of all songs on the Billboard Hot 100 Chart featured a rapper in some capacity.

Production Trends

Referencing some of the 2014-2015 hit production trends detailed by Strom (2014, 2015, 2016), the author and research assistant analyzed the 500 songs appearing on the Billboard Hot 100 charts during 2015 (Table 9). Using Strom's results and comparing them to our spreadsheet, we found validity in many of Strom's observations.

Production Trend	Number of Songs in 2015	Song Example
Repeating/chopped vocal samples	21	Justin Bieber "We Are"
Repeating saxophone riff	6	Fifth Harmony "Worth It"
Pitch-shifted vocals—either up or down	19	Bryson Tiller "Don't"
808 style snare/trap drum influence	63	Ciara "I Bet"
Intentionally sloppy auto-tuning	31	Big Sean "All Your Fault"
Overabundance of sampled claps	148	Kevin Gates "I Don't Get Tired"

Table 9. Production trend and song example, Billboard Hot 100, 2015.

Other Data Analysis

A Pearson correlation analysis for the combined 2014 and 2015 charts was calculated for any variable that could be analyzed numerically. Additionally a two tailed t-test was performed $df = 854$, $p = .000$. Variables

such as song form could not be quantified for correlation. Correlations were taken as a whole for all genres on the 2014-2015 charts, as well as disaggregated for songs in the country, hip-hop, pop, R&B, and rock genres because the number of songs was sufficient. Highlights of any variables that showed a moderate to strong relationship, either positive or negative, appear in Table 10. A comparison of all the findings from the present study with findings from previous studies appears in Appendix A and full correlation analysis appears in Appendix C of the long version of the study found at www.davetough.com/songwritingproductionmeiea2018.pdf.

Variable	R	Relationship
Number of weeks on the Hot 100 and the peak position	(0.732)	Strong negative
Number of writers and the peak position	(0.129)	Moderately weak negative
Number of times the title appeared in the song and the peak position	(0.086)	Weak negative
Length of the introduction and the peak position	0.074	Weak positive
Number of writers and the number of weeks on the Hot 100 for country songs	0.179	Moderately weak positive
Number of writers and peak position for hip-hop songs	(0.213)	Moderately weak negative
Number times the title appeared in the song and peak position for pop songs	(0.128)	Moderately weak negative
Length of the introduction and peak position for R&B songs	0.31	Moderately strong positive
Number of writers and peak position for rock songs	(0.42)	Moderately strong negative

Table 10. Statistically significant correlations, Billboard Hot 100, 2014-2015.

Conclusion

A hit is a moving target. Even though a set formula for a hit song might never exist, evolving trends can be useful in production and songwriting to help guide students and the music creators to make the most commercial product possible, if that is indeed the goal of their songwriting.

ing and production practice. Students of songwriting need to be aware that the public's taste shifts over time and formulas are constantly changing. The study presented here concentrated on finding common threads among songs that were already deemed current hits by *Billboard*.

The information in this study should serve as general observations of common factors among the *Billboard* Hot 100 rather than songwriting gospel. Because this study primarily provided averages across all genres, due to the nature of the *Billboard* Hot 100, the average values may not represent the qualities of a hit song in one genre. Non-hits were not analyzed in this study, so knowing whether a statistically significant difference exists between hits and non-hits regarding certain factors is difficult. This area would be a good place to start with future research.

As evidenced above, the results showed some significant correlations between the variables in two years' worth of *Billboard* charts. However, one could make the argument that variables not analyzed such as marketing budget or financial support, or radio play, could also be a contributing cause towards success.

A description of successful songs does not necessarily provide a formula for creating new successful songs. To claim that composing a song with certain characteristics would cause that song to be a hit, some manipulation of the factors analyzed through a controlled experiment would have to be tested to establish causality. However, each era of songwriting and music production has common threads including song form, production techniques, common chord progressions, and subject matter. If someone had asked Gershwin what song form to use in the jazz age, his answer would have most likely been AABA! The best use of the information discovered in this study might be to enlighten the reader to techniques used by other hit writers and producers and to provide guidelines for what modern songwriters and producers could use.

We can now return to the original research questions: What common practices in songwriting and production did current hit songs exhibit for the years 2014-2015? Were any related to the song's success on the charts? How were these practices similar or different from those in the past?

The first part of the research question asks, what common practices in songwriting and production did current hit songs exhibit for the years 2014-2015? Based on the data analysis, common practices from the current popular music marketplace could lead to the following hit song prescriptions:

- Do not worry too much about song length, as long as it is less than four minutes.
- Make your intro fifteen seconds or less: 71% of songs on the Billboard Hot 100 did that in 2014 and 2015.
- If writing in the pop genre, or in a genre that combines itself with pop, set your song at a danceable tempo (120 bpm would be a good starting point).
- Write about love and have your song narrator play the “Lover” archetype.
- Use the song’s title as the hook and repeat it multiple times. More than ten times throughout the song would be a good number to shoot for and would increase the chance of the audience remembering it.
- Co-write your song, especially if you are in the pop, R&B, or hip-hop genres.
- Experiment with song form. Hits have no set technique anymore as long as some pattern is present. Experiment with the disappearing third verse, half verse, and post-chorus.
- Feature a male vocal. Don’t be afraid to feature more than one artist on your track, it will most likely help your song’s success.
- Use different textures in the song’s production that draw in listeners from different genres. An example would be using trap beats, claps, and pitched samples in country music.

The second part of the research question, were any variables related to the song’s success on the charts, can be answered with a soft, yes, moderate correlations were found between variables (see Table 10 for significant correlations and Appendix C at www.davetough.com/songwritingproductionmeica2018.pdf for complete data). The third part of the research question, how were these practices similar or different from those in the past, can be answered using the Review of Literature and Appendix A.

Additional Research

Since the correlations were only moderate, additional follow-up studies should include a multivariate analysis and comparison of the test-

ed factors alongside the data presented in the current study to see how external factors such as marketing and radio promotion versus song formula contribute to making a song a hit. Please see the full study at www.davetough.com/songwritingproductionmeiea2018.pdf for a full list of additional research recommendations and appendices.

Appendix A

Comparisons of Past and Current Research		
Study	Findings	Similarities to this Research
Pachet and Roy (2008)	Concluded that style, genre, and musical setup; and main instruments, variant, dynamics, tempo, era/epoch, metric, country, situation, mood, character, language, rhythm and popularity have no significant statistical relationship with song charting.	No, although the current study did not analyze all of the factors indicated in the 2008 study, it showed there was some statistical correlation between several of these factors including genre, tempo, and popularity.
Frank (2009)	<ol style="list-style-type: none"> 1. Impact the listener in first seven seconds. 2. Lengthen the songs. 3. Use of hook repetition. 	<ol style="list-style-type: none"> 1. No. 258 (27%) of the songs had introductions of 7 seconds or less. So only ¼ of the songs in this study are applying this technique. 2. Yes. In a general sense, the mode of all song lengths in this study was 3:51, one second higher than the mode proposed by Baio (2008) for songs in the 2000s. However, when compared to historical data, modern hit songs are indeed longer than those in past decades. 3. Yes, hooks were stated an average of 12 times among all 958 songs.
Summach (2011)	The pre-chorus is now standard in a majority of popular songs.	No. This study found the pre-chorus in a large number of songs, but not a majority. 34% of the songs in this research had defined pre-choruses.
Pawley and Müllensiefen (2012)	Music fans prefer the male vocal.	Yes, 67% of songs in this study's dataset featured male lead vocals.
Schellenberg and von Scheve (2012)	Between 1965-2009, tempos actually slowed down from mean tempo of 116 bpm in 1965 to 99 bpm in 2009.	Not the same dataset. However, it is interesting to note that average tempo has risen again. The average tempo for all songs found on Billboard Hot 100 during the years 2014 and 2015 was 116.65 bpm.
Schellenberg and von Scheve (2012)	Male voices have dominated the chart from 79% in 1965 to 62% in 2009.	Yes, 67% of songs in the current dataset featured male lead vocals.
Summach (2012)	Approximately 10% in his dataset had no intro or a short pickup into the song.	Yes. 13.2% of the songs in this study had no introductions.

Comparisons of Past and Current Research		
Study	Findings	Similarities to this Research
Summach (2012)	The post-chorus is now appearing in popular music.	Yes, 4% of the songs in this study had a well-defined post-chorus section.
Ticketbis (2015)	Music fans prefer the male vocal.	Yes, 67% of songs in this dataset featured male lead vocals.
Ticketbis (2015)	Pop genre has the most staying power as well as the highest volume.	Yes regarding volume. Songs in the pop genre accounted for 37% of the charts. No, with regards to the pop genre having the most staying power on the Hot 100 charts.
Strom (2016)	Analyzed the top 100 songs of the Billboard Hot 100 dataset and found that 120 bpm was both the mode <i>and</i> the median tempo.	No and yes. This study's 2015 dataset was all 500 songs that charted on the Billboard Hot 100 charts in the year of 2015 as opposed to the top 100. For 2015 the author found that average tempo was 117 bpm, median tempo was 114 bpm, and mode tempo was 100 bpm. However taking into account both years of 2014 and 2015 the mode of all tempos was 120 bpm, aligning with Strom's findings.
Strom (2016)	Analyzed the top 100 songs of the Billboard Hot 100 dataset and found that the average song length was 3:40.	Yes. Even though the current data sample was all 500 songs that charted on the Billboard Hot 100 charts in the year of 2015, the author found that the average song length was 3:41.
Strom (2016)	He did however find a positive correlation between song length and chart dominance. Strom says that three-minute songs are most likely to earn a number one spot.	No. This research showed no positive linear relationship between song length and number of weeks on Billboard Hot 100 charts.

References

- Adorno, Theodor W., and George Simpson. "On Popular Music." *Zeitschrift Für Sozialforschung* 9, no. 1 (1941): 17-48. <https://doi.org/10.5840/zfs1941913>.
- Baio, Andy. "The Whitburn Project: 120 Years of Music Chart History." *Waxy.org*. May 15, 2008. http://waxy.org/2008/05/the_whitburn_project/.
- Berns, Gregory S., C. Monica Capra, Sara Moore, and Charles Noussair. "Neural Mechanisms of the Influence of Popularity on Adolescent Ratings of Music." *Neuroimage* 49, no. 3 (2010): 2687-2696. <https://doi.org/10.1016/j.neuroimage.2009.10.070>.
- Billboard*. (2016). <http://www.billboard.com>.
- Billboard Staff. "Billboard to Alter Chart Tracking Week for Global Release Date." *Billboard*, June 24, 2015. <http://www.billboard.com/articles/columns/chart-beat/6605842/billboard-alter-chart-tracking-week-global-release-date>.
- Burgoyne, John Ashley, Jonathan Wild, and Ichiro Fujinaga. "An Expert Ground-truth Set for Audio Chord Recognition and Music Analysis." *Proceedings of the 12th International Society for Music Information Retrieval Conference* (2011): 633-638. <http://ismir2011.ismir.net/papers/OS8-1.pdf>.
- Burns, Gary. "A Typology of 'Hooks' in Popular Records." *Popular Music* 6, no. 1 (1987): 1-20. <https://doi.org/10.1017/S0261143000006577>.
- de Clercq, Trevor. "The Effects of Repetition on Preferences." *Trevor de Clercq: The Science of Songwriting* (blog). June 10, 2008. <http://www.midside.com/2008/06/10/the-effects-of-repetition-on-preferences/>.
- de Clercq, Trevor, and David Temperley. "A Corpus Analysis of Rock Harmony." *Popular Music* 30, no. 1 (2011): 47-70. <https://doi.org/10.1017/S026114301000067X>.
- DeWall, C. Nathan, Richard S. Pond Jr., W. Keith Campbell, and Jean M. Twenge. "Tuning in to Psychological Change: Linguistic Markers of Psychological Traits and Emotions over Time in Popular U.S. Song Lyrics." *Psychology of Aesthetics, Creativity, and the Arts* 5, no. 3 (2011): 200-207. <https://doi.org/10.1037/a0023195>.

- Dhanaraj, Ruth, and Beth Logan. "Automatic prediction of hit songs." Presentation at the International Conference on Music Information Retrieval, London, September 11-15, 2005. <http://www.hpl.hp.com/techreports/2005/HPL-2005-149.pdf>.
- Doll, Christopher. "Rockin' Out: Expressive Modulation in Verse-Chorus Form." *Music Theory Online* 17, no. 3 (2011). <http://www.mtosmt.org/issues/mto.11.17.3/mto.11.17.3.doll.html>.
- Echonest, The*. (2017). <http://the.echonest.com/>.
- "Edison research hacks the commuter code." *Edison Research.com*. April 7, 2016. <http://www.edisonresearch.com/edison-research-hacks-commuter-code-amfm-listeners-switch-22-times-per-commute/>.
- Elberse, Anita, Jehoshua Eliashberg, and Julian Villaneuva. "Polyphonic HMI: Mixing Music and Math." HBS no. 506-009. Boston: Harvard Business School Publishing, August 2005 (Revised September 2006). Available at <https://hbr.org/product/polyphonic-hmi-mixing-music-and-math/an/506009-PDF-ENG>.
- Frank, Jay. *FutureHit.DNA: How The Digital Revolution Is Changing Top 10 Songs*. Nashville: Futurehit, Inc., 2009. <http://www.futurehitdna.com/>.
- Giles, David. "Survival of the Hippest: Life at the Top of the Hot 100." *Applied Economics* 39, no. 15 (2007): 1877-1887. <https://doi.org/10.1080/00036840600707159>.
- Herremans, Dorien, David Martens, and Kenneth Sorensen. "Dance Hit Song Prediction." *Journal of New Music Research* 43, no. 3 (2014): 291-302. <https://doi.org/10.1080/09298215.2014.881888>.
- Hong, Seo Bin. "A Comment on Survival of the Hippest: Life at the Top of the Hot 100." *Applied Economics Letters* 19, no. 11 (2012): 1101-1105. <https://doi.org/10.1080/13504851.2011.615722>.
- "Hot 100: How it Works, The." *Billboard.com*. Accessed 2016. <http://www.billboard.com/charts/hot-100>.
- Jameson, Frederic. *The Political Unconscious: Narrative as Socially Symbolic Act*. Ithaca, New York: Cornell University Press, 1981.
- Kuchner, Marc. "Archetypes in Country Music." *Music Row Magazine*, August 2009. <http://www.musicrow.com/2009/08/>.
- Luboff, Pat, and Pete Luboff. *88 Songwriting Wrongs & How To Right Them: Concrete Ways To Improve Your Songwriting And Make Your Songs More Marketable*. Cincinnati: Writer's Digest Books, 1992.

- Mauch, Matthias, Robert M. Maccallum, Mark Levy, and Armand M. Leroi. "The Evolution of Popular Music: USA 1960-2010." *Royal Society Open Science* 2, no. 5 (2015): 150081. <https://doi.org/10.1098/rsos.150081>.
- McCready, Mike. "Can You Predict A Hit? The 21st Century A&R Answer." *Music Xray* (blog). October 11, 2011. <http://blog.musicxray.com/tag/hit-song-science/>.
- McVicar, Matt. "Results: Performance Overview." *Score A Hit*. November 18, 2011. <http://www.scoreahit.com/Results>.
- Middleton, Richard. "'Play It Again Sam': Some Notes on the Productivity of Repetition in Popular Music." *Popular Music* 3, no. 1 (1983): 235-270. <https://doi.org/10.1017/S0261143000001641>.
- Moore, Allan. "Patterns of Harmony." *Popular Music* 11, no. 1 (1992): 73-106. <https://doi.org/10.1017/S0261143000004852>.
- Moore, Allan. "The So-Called 'Flattened Seventh' in Rock." *Popular Music* 14, no. 2 (1995): 185-201. <https://doi.org/10.1017/S0261143000007431>.
- Moorefield, Virgil. *The Producer as Composer: Shaping the Sounds of Popular Music*. Cambridge, Massachusetts: MIT Press, 2010.
- Morelle, Rebecca. "Pop music marked by three revolutions in 50 years." *BBC News*. May 6, 2015. <http://www.bbc.com/news/science-environment-32599916>.
- Murphy, Ralph. *Murphy's Laws of Songwriting: The Book*. Nashville, Tennessee: Murphy Music Consulting, 2011.
- Neal, Jocelyn R. "Narrative Paradigms, Musical Signifiers, and Form as Function in Country Music." *Music Theory Spectrum* 29, no. 1 (2007): 41-72. <https://doi.org/10.1525/mts.2007.29.1.41>.
- Neal, Meghan. "A machine successfully predicted the hit dance songs of 2015." *Motherboard*. December 17, 2015. http://motherboard.vice.com/en_ca/read/a-machine-successfully-predicted-the-hit-dance-songs-of-2015.
- Ni, Yizhao, Raúl Santos-Rodríguez, Matt McVicar, and Tijl De Bie. "Hit Song Science Once Again a Science? Presentation at the 4th International Workshop on Machine Learning and Music, Sierra Nevada, Spain, 2011.
- Olivet, Dean. "BPMs musicians use most." *YouTube*. October 24, 2013. <https://www.Youtube.com/watch?v=5gzMYI1bMpo>.

- Owsinski, Bobby. *Deconstructed Hits: Modern Pop & Hip-Hop: Uncover the stories & techniques behind 20 iconic songs*. Van Nuys, California: Alfred Music, 2013.
- Pachet, François. "Chapter 10: Hit Song Science." In *Music Data Mining*, edited by Tao Li, Mitsunori Ogihara, and George Tzanetakis, 305-326. Boca Raton, Florida: CRC Press, 2012. <https://www.csl.sony.fr/downloads/papers/2011/pachet-11a.pdf>.
- Pachet, François, and Pierre Roy. "Hit Song Science Is Not Yet a Science." In *Proceedings of the 9th International Conference on Music Information Retrieval*, 355-360. Philadelphia, September 2008.
- Parker, Will. "MRI Scans Predict Pop Music Success." *Sci GoGo*. June 13, 2011. http://www.scienceagogo.com/news/20110513021039data_trunc_sys.shtml.
- Pawley, Alisun, and Daniel Müllensiefen. "The Science of Singing Along: A Quantitative Field Study on Sing-along Behavior in the North of England." *Music Perception* 30, no. 2 (2012): 129-146. <https://doi.org/10.1525/mp.2012.30.2.129>.
- Pettijohn, Terry F., and Donald F. Sacco. "Tough Times, Meaningful Music, Mature Performers: Popular Billboard Songs and Performer Preferences across Social and Economic Conditions in the USA." *Psychology of Music* 37, no. 2 (2009): 155-179. <https://doi.org/10.1177/0305735608094512>.
- Powell-Morse, Andrew. "Lyric Intelligence in Popular Music: A Ten Year Analysis." *SeatSmart* (blog). May 18, 2015. <http://seatsmart.com/blog/lyric-intelligence/>.
- Pudaruth, Sameerchand, Bibi Feenaz Bhaukaurally, and Mohammad Haydar Ally Didorally. "A Semi-Automated Lyrics Generation Tool for Mauritian Sega." *IAES International Journal of Artificial Intelligence* 1, no. 4 (2012): 201-213. <https://doi.org/10.11591/ij-ai.v1i4.801>.
- Rogers, Jimmie N. *The Country Music Message: Revisited*. Fayetteville, Arkansas: University of Arkansas Press, 1989.
- Schellenberg, E. Glenn, and Christian von Scheve. "Emotional Cues in American Popular Music: Five Decades of the Top 40." *Psychology of Aesthetics, Creativity, and the Arts* 6, no. 3 (2012): 196-203. <https://doi.org/10.1037/a0028024>.
- "Score a Hit." Accessed May 18, 2013. <http://www.scoreahit.com/>.

- Smith, T. "By-the-numbers guide to a perfect number one (Part 1)". *Ticketbis* (blog). November 10, 2015. <http://blog.ticketbis.net/numbers-guide-perfect-number-one/>.
- Spicer, Mark. "(Ac)cumulative Form in Pop-Rock Music." *Twentieth-Century Music* 1, no. 1 (2004): 29-64. <https://doi.org/10.1017/s1478572204000052>.
- Strom, Eric. "Music theory trends in pop music for 2014." *Popmusic theory.com* (blog). November 14, 2014. <https://popmusictheory.com/8-trends-pop-music-2014/>.
- Strom, Eric. "Music theory trends in pop music for 2015." *Popmusic theory.com* (blog). December 27, 2015. <https://popmusictheory.com/8-music-theory-trends-pop-2015/>.
- Strom, Eric. "I analyzed the tempo of the top 100 songs of 2015 [Anatomy of a hit song: Tempo]." *Popmusic theory.com* (blog). March 13, 2016. <https://popmusictheory.com/song-tempo/>.
- Summach, Jason. "Form in Top-20 Rock Music, 1955–89." Ph.D. dissertation, Yale University, 2012. <http://search.proquest.com/docview/1038005330>.
- Summach, Jay. "The Structure, Function, and Genesis of the Prechorus." *Music Theory Online* 17, no. 3 (2011). <http://www.mtosmt.org/issues/mto.11.17.3/mto.11.17.3.summach.html>.
- Swaminathan, Swathi, and E. Glenn Schellenberg. "Current Emotion Research in Music Psychology." *Emotion Review* 7, no. 2 (2015): 189-97. <https://doi.org/10.1177/1754073914558282>.
- Temperley, David. "The melodic-harmonic 'divorce' in rock." *Popular Music* 26, no. 2 (2007): 323-342. <https://doi.org/10.1017/S0261143007001249>.
- Temperley, David, Trevor de Clercq, and Adam Waller. "Changes in Rock Melody, 1954-2009." Presentation at the Society for Music Perception and Cognition Conference, Vanderbilt University, Nashville, Tennessee, August 4, 2015. <http://www.midside.com/academics/presentations/>.
- Trust, Gary. "Ask Billboard: How Does The Hot 100 Work?" *Billboard.com*. September 29, 2013. <http://www.billboard.com/articles/columns/ask-billboard/5740625/ask-billboard-how-does-the-hot-100-work>.
- Zullo, Harold. "Pessimistic Rumination in Popular Songs and News-magazines Predict Economic Recession via Decreased Consumer

Optimism and Spending.” *Journal of Economic Psychology* 12, no. 3 (1991): 501-526. [https://doi.org/10.1016/0167-4870\(91\)90029-S](https://doi.org/10.1016/0167-4870(91)90029-S).

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