



Honors College

Honors Thesis

An Honors Thesis Titled

An Analysis of Country Music Trends Utilizing Mathematical Matrix Theory

Submitted in partial fulfillment of the requirements for the Honors Designation to the

Honors College

of

Salisbury University

in the Major Department of

Math & Computer Science

by

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Date and Place of Oral Presentation: SUSRC 4/28/17 Salisbury, MD

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Abstract

During the past four years, many music critics and artists have alleged that country music is becoming more homogeneous, with similar chord progressions and lyrics. The aim of our thesis was to determine whether country songs really have begun to sound the same. To avoid selection bias, we only analyzed songs that won a Grammy every three years, from 1977 to 2016. We plotted the chord progression from each of these songs' chorus into a pair of transition matrices, one of which tracks how often one chord followed another, and the other of which tracks how often one interval on the chromatic scale followed another. We then used MatLab to perform linear algebra operations on the matrices to determine how similar or dissimilar each song's chorus was to its chronological neighbors. Contrary to our expectations, our findings suggested a negative correlation between independent music market share and country music similarity, prompting us to expand our data set to also include annual chart topping songs. Despite this we were unable to find any more significant trends in our results. There were a number of factors to consider when interpreting our research results, most importantly the constraints of the data. The extent of these constraints, such as what part of a song we were looking at or how far apart each pair of songs were written, and the affect they may have had on our results, may necessitate further research into this subject in the future.

Background

The purpose of this thesis was to answer the question “Does all country music really sound similar?” In recent years, music critics have decried the homogenizing of popular music. Music critic Jody Rosen, for example, has derided the band Florida Georgia Line and Luke Bryan for what he perceives as attempts to appeal to the lowest common denominator, which he defines as “the tatted, gym-toned, party-hearty young American white dude”. Rosen has been critical of their song lyrics as well, which he has said lack sophistication and instead focus on girls and pickup trucks (Rosen, J., 2013). After comparing two songs by these artists, we found this assessment to be astoundingly accurate. They had almost the exact same chord progression, and their lyrical themes were indeed very similar. Country music duo Maddie & Tae also criticized these tropes in their 2014 hit single “Girl In A Country Song” (Dalfonzo, G., 2014). Critics and artists alike have derogatively referred to this emerging sub-genre as ‘bro-country’, presumably because the lyrics sound like something written by a college fraternity member. We intended to confirm whether this assessment of country music was accurate or not by mathematically analyzing songs over a forty year span of time. This way, we would be able to see whether country music had recently become more similar or not, and how far back any trends in decreasing diversity had started.

Bro-country, despite its critics, has been tremendously successful, consistently topping the charts. One factor that may help explain this is the number of companies that control the distribution of music. A study conducted in the 1970s found that commercial

music tends to follow a thirty year cycle. First, there is an explosion in musical diversity following some development, such as rock and roll or rap. This coincides with an explosion in the number of record labels. Over time, however, a few record labels come to dominate the industry, and the musical genre begins to stale and sound homogeneous. For example, in the early fifties, record labels would not allow songs to be produced that had anything more than slight allusions to sex. That changed after the advent of rock and roll later in the same decade (Peterson, R.A., & Berger, D.G., 1975). Basically, the fewer companies that control the music industry, the more homogeneous music will tend to sound.

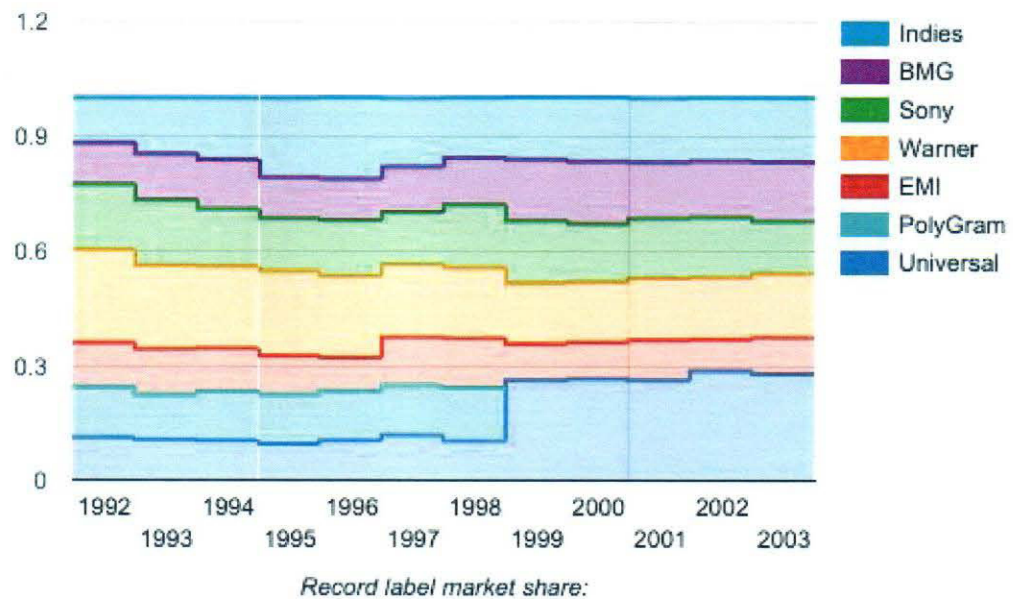
However, this study was conducted almost half a century ago. Back then, record companies had more control over how music was distributed. People could only listen to music whenever they wanted to via physical media such as vinyl records or cassette tapes. In an era where people can instantly download music anywhere, it is much more difficult to control the distribution of music.

Most of the time, though, according to Rossman (2012), people only buy music they have been exposed to via popular media, especially radio (p. 22). Going as far back as the 1950s, record labels have relied on 'payola', in which a station agrees to play a particular song in exchange for cash, intellectual property rights, or even drugs or sex. Congress attempted to put a stop to this in 1960, by making it "a federal offence to give personal bribes to broadcaster employees" (Rossman, p. 27). However, payola has continued to effectively be practiced through consultants known as independent radio promoters, whose involvement helps both record labels and radio stations maintain

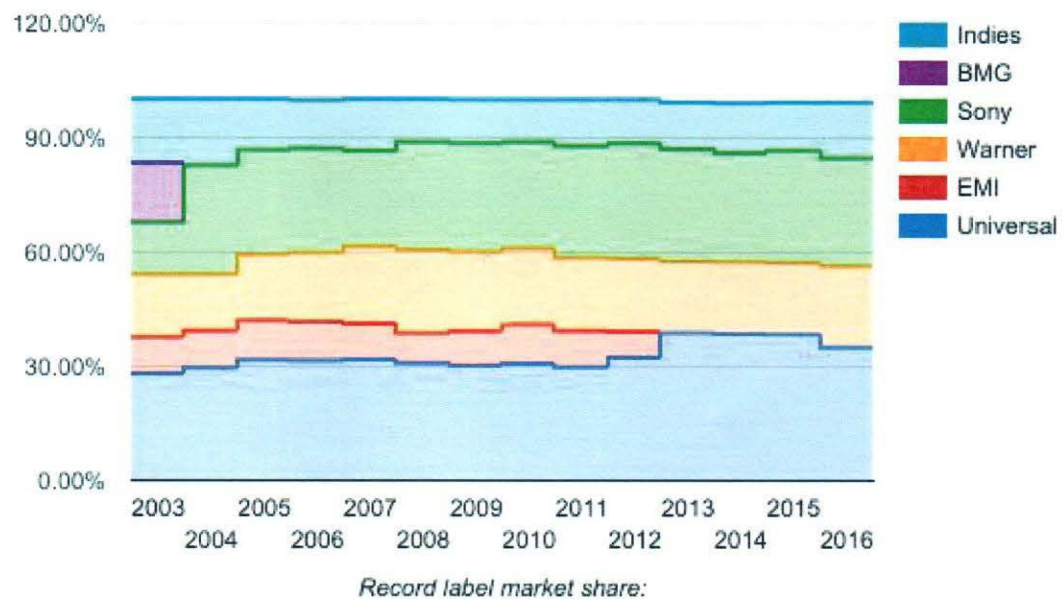
plausible deniability (Rossman, p. 24). In the past, there have been several payola scandals involving ties between these promoters and organized crime (Rossman, p. 27). More recently, however, payola has tended to involve gift exchange, where promoters or labels would give stations concert tickets or hotel rooms in exchange for airplay. Unlike direct cash exchange or drugs, this follows the letter, if not the spirit, of the law (Rossman, p. 32). Other less common tactics include organizing phone-in campaigns requesting certain songs (Rossman, p. 34). This form of Payola came close to being institutionalized in the 2000's when Clear Channel, which owns over 10% of all radio stations in the U.S., planned on signing an exclusive deal with the independent promoter Tri-State. Fortunately, these plans were nixed following the introduction of new legislation regulating radio stations (Rossman, p. 30).

In order to determine how many companies currently control the distribution of music, we researched records for annual market share in the music industry. A resource that was very useful in this task was Soundscan. Soundscan is a database that was created in the late 1980s. Whenever a music album or song is purchased, information about it, such as the genre and record label, is automatically recorded into the database. This data can then be used to determine what music sold the most in a particular year, or what the market shares for the distributors of that music are. These results have been published semi-annually since 1991 (Anand & Peterson, p. 276). This means, however, that we could not use the data to garner any information about record company market shares prior to the early 1990s.

Universal, PolyGram, EMI, Warner, Sony, BMG, Indies



Universal, EMI, Warner, Sony, BMG, Indies



After finding the annual market share reports, we plotted the market share percentages for each music distributor into a spreadsheet, and then used that data to create the above charts, which illustrate the history of the distributor market share in the music industry over the past three decades. In the early 1990s, the market was distributed mostly even between five major distributors. These included the German company Bertelsmann Music Group, abbreviated as BMG, the Dutch company PolyGram, the British multinational EMI, alongside more familiar names such as Sony Music, Warner Music Group, and Universal Music Group, with independent distributors collectively having a roughly equal share. The distributor with the greatest share in this period was Warner Music Group, whose shares in the market have remained mostly the same over the observed twenty year span. A major turning point occurred with the buyout of PolyGram in 1999 by Universal Music Group, effectively doubling their distribution market share. This was followed several years later by the partnering of BMG with Sony Music, who bought them out a few more years later. It was during the 2000s that the majority of music distribution became controlled by Sony, Warner, Universal, and EMI, while independent distributors gradually lost the market share they had gained in the 1990s. By the end of the decade, Universal held the largest distribution market share at roughly 30%, followed closely by Sony. Universal gained even more market share after buying out EMI in late 2012. In the past few years however, independent distributors have been slowly regaining the market share they had in the early 2000s.

Ironically, despite the industry being controlled by a small cabal, sales have been going down for the better part of two decades, as people decide to buy one song instead

of an entire album, or figure out more ways to pirate music. In addition, based on a statistics gathered from Billboard magazine between 2011 and 2016, the majority market share by label ownership has been increasingly held by independent labels. This tells a completely different story than when analyzing market share by distribution. Because we planned on looking at country songs over a forty year time span, we hoped to find a cycle similar to what Peterson & Berger found, which reflects these changes in market share.

Methodology

In our research, we found a senior thesis, *Analysis of Music Note Patterns via Markov Chains*, by Ala'a Wadi (2012). In his thesis, Wadi had discovered a method for measuring how similar songs such as “Under Pressure” and “Ice Ice Baby” are, the latter of which famously copied its bassline from the former. Wadi’s method was to transcribe the songs into a sequence of notes, and then analyze how often they followed each other. He then put this information into what is known as a transition matrix (p. 8-9).

Note	A	C#	E
A	0.1	0.6	0.3
C#	0.25	0.05	0.7
E	0.7	0.3	0

(image retrieved from <http://www.algorithmiccomposer.com/2010/04/openmusic-markov-chains-and-omlea.html>)

In a transition matrix, every row must add up to 1. In this example, the note A has a 10% chance of repeating, a 60% chance of being followed by a C#, and a 30% chance of being followed by an E. Matrices like this one, but more complex, can be created for any song. By measuring the differences between these matrices through matrix subtraction, Wadi was able to determine how similar certain songs were- the lower the difference, the greater the similarity.

For our thesis, we used the same algorithm as Wadi, except on a larger scale. We transcribed the root chords from the choruses of fourteen different Grammy winning

country songs, and later, fourteen different annual chart topping country songs, going back to 1977.

An issue that arises when comparing country songs, however, is that many of them are written in different keys. For example, the chord progressions D-F-C and E-G-A may seem very different, but the first two chords of each progression are actually the same, but in different keys.

Key	1	1 [#]	2	3 ^b	3	4	4 [#]	5	5 [#]	6	7 ^b	7
C	c	c [#]	d	e ^b	e	f	f [#]	g	g [#]	a	b ^b	b
C [#]	c [#]	d	d [#]	e	f	f [#]	g	g [#]	a	a [#]	b	c
D	d	d [#]	e	f	f [#]	g	g [#]	a	b ^b	b	c	c [#]
E ^b	e ^b	e	f	g ^b	g	a ^b	a	b ^b	b	c	d ^b	d
E	e	f	f [#]	g	g [#]	a	a [#]	b	c	c [#]	d	d [#]
F	f	f [#]	g	a ^b	a	b ^b	b	c	c [#]	d	e ^b	e
F [#]	f [#]	g	g [#]	a	a [#]	b	c	c [#]	d	d [#]	e	f
G	g	g [#]	a	b ^b	b	c	c [#]	d	d [#]	e	f	f [#]
G [#]	g [#]	a	a [#]	b	c	c [#]	d	d [#]	e	f	g ^b	g
A	a	b ^b	b	c	c [#]	d	d [#]	e	f	f [#]	g	g [#]
B ^b	b ^b	b	c	c [#]	d	e ^b	e	f	f [#]	g	a ^b	a
B	b	c	c [#]	d	d [#]	e	f	f [#]	g	g [#]	a	a [#]

(image retrieved from http://www.musicad.com/how_to_transpose_music)

Tables like this can be used to shift sequences of notes or chords into different keys.

What key a song is in is indicated at the beginning of the sheet music.

After we had transcribed the chord progressions, we worked out how often each root chord followed another for each song, and plotted those percentages into a 12x12 transition matrix. In 2013, as a parody of the apparent homogeneity in popular country music, a musician calling himself “Sir Mashalot” uploaded a video to their youtube channel playing six then popular country songs remixed together.

2012- "This is How We Roll" by Florida Georgia Line											
%	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11
+1	0	0	0	0	0	0	0	0	0	0	0
+2	0	0	0	0	0	0	0	1	0	0	0
+3	0	0	0	0	0	0	0	0	0	0	0
+4	0	0	0	0	0	0	0	0	0	0	0
+5	0	0	0	0	0	0	0	0	0	0	0
+6	0	0	0	0	0	0	0	0	0	0	0
+7	0	0.143	0	0	0	0	0.571	0	0	0.286	0
+8	0	0	0	0	0	0	1	0	0	0	0
+9	0	0	0	0	0	0	0	0	0	0	0
+10	0	0	0	0	0	0	1	0	0	0	0
+11	0	0	0	0	0	0	0	0	0	0	0

» *BlownAway* = [7 8 9; 3 2 1; 4 5 6]

```

      7  8  9
BlownAway = 3  2  1
             4  5  6

```

» *WhiteHorse* = [11 10 1; 6 9 4; 8 2 5]

```

     11  10  1
WhiteHorse = 6  9  4
             8  2  5

```

» *Difference* = *BlownAway* - *WhiteHorse*

```

      4  2 -8
Difference = 3  7  3
             4 -3 -1

```

» *Transpose* = *Difference*.'

```

      4  3  4
Transpose = 2  7 -3
            -8  3 -1

```

» *Multiple* = *Transpose* * *Difference*

```

     41  17 -27
Multiple = 17  62  8
            -27  8  74

```

» *Diagonal* = *trace*(*Multiple*)

```
Diagonal = 177
```

» *Distance* = *sqrt*(*Diagonal*)

```
Distance = 13.3041
```

Once we finished filling out each transition matrix, we plugged them into the program MatLab, a software designed to assist computer scientists, mathematicians, and engineers in Linear Algebra.

Illustrated to the left are the equations we used in MatLab. In this example, we took the transition matrix for the chorus of the song WhiteHorse, and subtracted it from the transition matrix of the chorus of BlownAway, two songs we actually analyzed in our research. It should be noted that these are merely demonstrative examples, and not representative of the actual

chords or transition matrices for either of these songs. We then found the Transpose of this Difference, which essentially means finding the mirror image reflected across the diagonal. Then we set the matrix Multiple equal to the Transpose and Difference matrices multiplied by each other. After this, we found the trace, or the sum of every element on the main diagonal of the Multiple matrix. The square root of the trace is the mathematical distance between the two songs. The written formula is $(\text{trace}((B-A)^T \cdot (B-A)))^{1/2}$, where B and A represent the initial matrices, and T denotes transposition.

These are the MatLab results for both the 12x12 and 11x11 transition matrices for the Luke Bryan and Florida Georgia Line songs, as well as another two songs used in the same YouTube video by “Sir Mashalot”:

Country Songs being compared:	“Drunk On You” & “This is How We Roll”	“Sure Be Cool if You Did” & “Close Your Eyes”
Distance with 12x12 matrices	0.4387	1.5827
Distance with 11x11 matrices	1.32	2.1485
Average Distance	0.87935	1.8656

Considering how similar the choruses of these two sets of songs are, we can consider these distances as particularly low. Notably, the distance between the 11x11 matrices is considerably higher than the distance for the 12x12 matrices for the same songs.

We planned to transcribe the choruses of fourteen Grammy-award winning country songs into both 12x12 and 11x11 matrices. We chose Grammy-winning songs because we did not want to subconsciously select songs to compare that we knew are similar, like the ones in the example. After plotting each chorus to a matrix we compared it to its

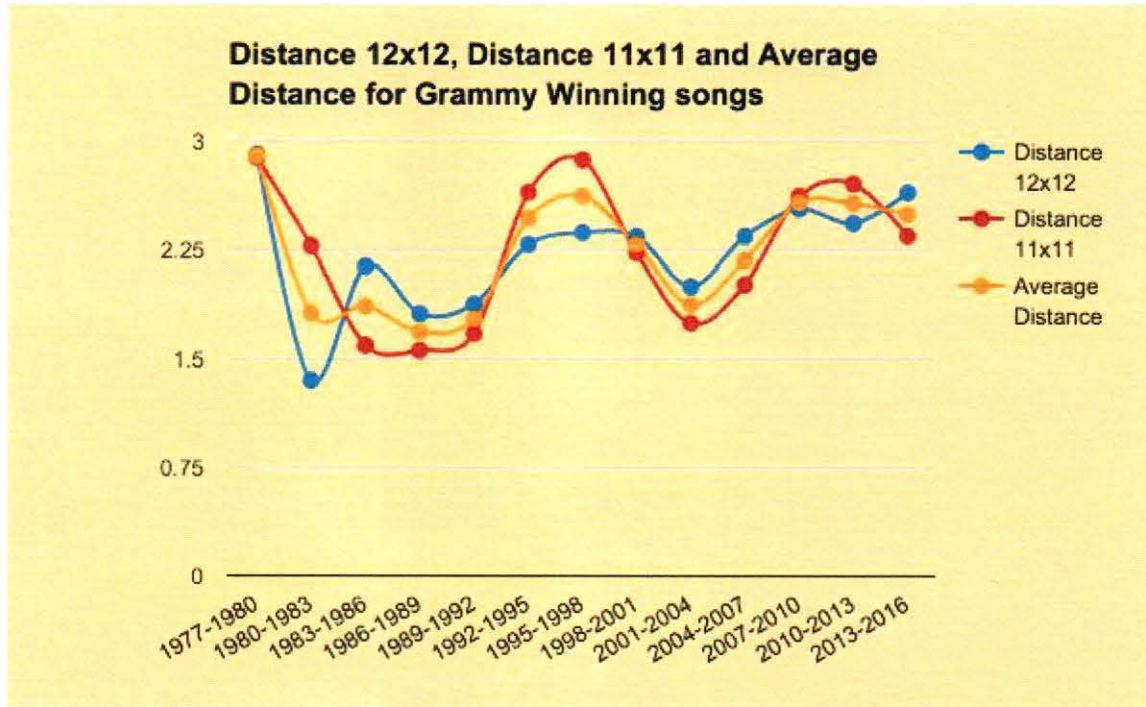
chronological neighbors using the previously described calculations in MatLab. We started with the 1977 Grammy Award winner, and then repeated the process at three-year intervals, ending with the 2016 Grammy Award winner. The songs we analyzed are, by year: 1977 - “Don’t It Make My Brown Eyes Blue” by Crystal Gayle, 1980 - “You Decorated My Life” by Kenny Rogers, 1983 - “Nobody” by Sylvia, 1986 - “40 Hour Work Week” by Alabama¹, 1989 - “Hold Me” by KT Oslin, 1992 - “Love Can Build a Bridge” by The Judds, 1995 - “I Swear” by John Montgomery, 1998 - “Butterfly Kisses” by Bob Carlisle, 2001 - “I Hope You Dance” by Lee Ann Womack, 2004 - “It’s Five O’Clock Somewhere” by Alan Jackson, 2007 - “Jesus Take the Wheel” by Carrie Underwood, 2010 - “White Horse” by Taylor Swift, 2013 - “Blown Away” by Carrie Underwood, and 2016 - “Girl Crush” by Little Big Town.

After some consideration, we also decided to transcribe the choruses of another set of fourteen songs. These songs are also three years apart, and were ranked by Billboard as the U.S. hot country singles in their year end charts. It should be noted that prior to 1991, Billboard did not use the Soundscan database for their charts, so it cannot be guaranteed that the reported hot country single prior to that year is accurate. The additional songs we analyzed are, by year: 1977 - “Luckenbach, Texas” by Waylon Jennings, 1980 - “My Heart” by Ronnie Milsap, 1983 - “Jose Cuervo” by Shelly West, 1986 - “Never Be You” by Rosanne Cash, 1989 - “Better Man” by Clint Black, 1992 - “I Saw the Light” by Wynonna Judd, 1995 - “Sold (The Grundy County Auction Incident)” by John Montgomery, 1998 - “Just To See You Smile” by Tim McGraw,

¹ The actual Grammy winners for 1983 and 1986 were covers of songs written in the 1970’s - to make sure we were actually measuring trends in how music was written, we chose nominees that had been written the year of those awards.

2001 - “Ain’t Nothing ‘Bout You” by Brooks/Dunn, 2004 - “Live Like You Were Dying” by Tim McGraw, 2007 - “Watching You” by Rodney Atkins, 2010 - “Love Like Crazy” by Lee Brice, 2013 - “Cruise” by Florida Georgia Line, and 2016 - “H.O.L.Y.” by Florida Georgia Line.

Results



The above table illustrates the data we were able to collect by comparing the choruses of fourteen songs stretching back forty years. Each point represents the mathematical distance between a set of matrices for two songs written three years apart. The red point is the distance calculated using 11x11 transition matrices, the blue point is the distance calculated using 12x12 matrices, and the orange point is the average of the two.

Earlier, we calculated the distances between two sets of songs that are commonly agreed to sound very similar. We used the greater average distance, 1.8656, as an upper limit that a distance between two similar songs will fall under.

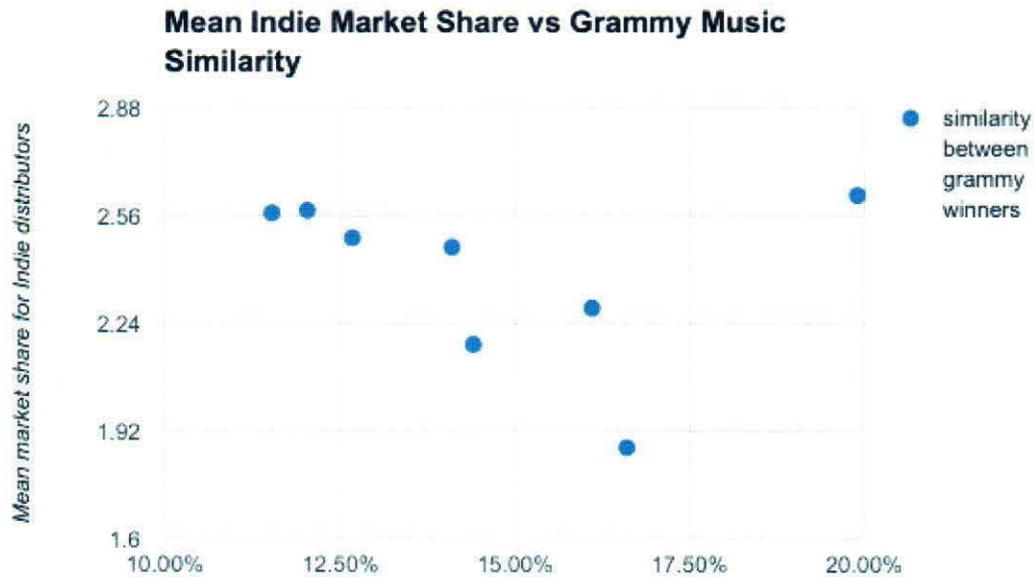
Over the three year period between 1977 and 1980, both distances we calculated were almost equal. Their placement on the chart seemed to indicate that in the late 1970's

at least, most country songs were very distinct and did not reuse the same chord progressions. The choruses of these songs notably have more complex chord progressions than songs from later on.

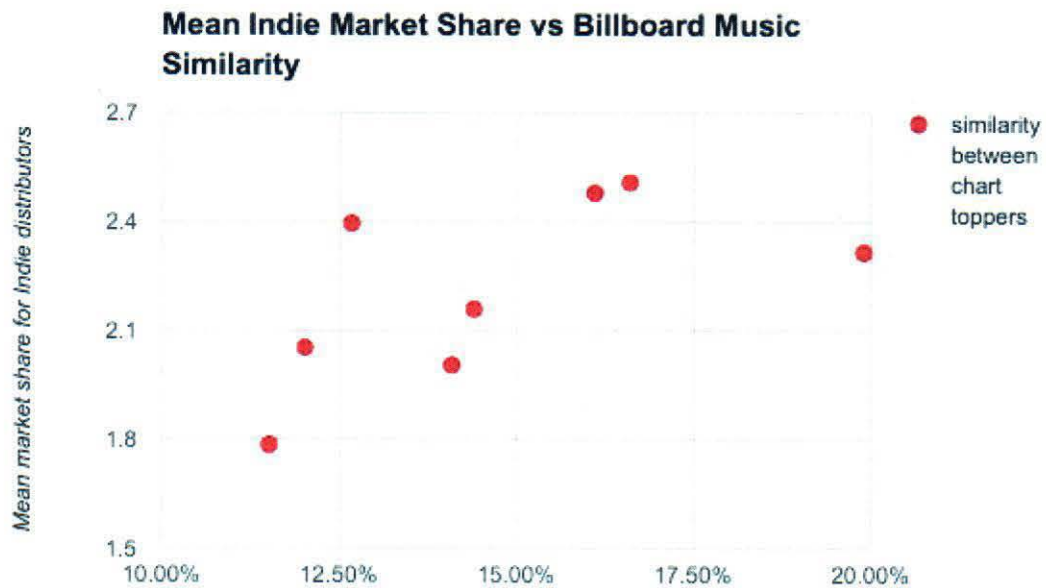
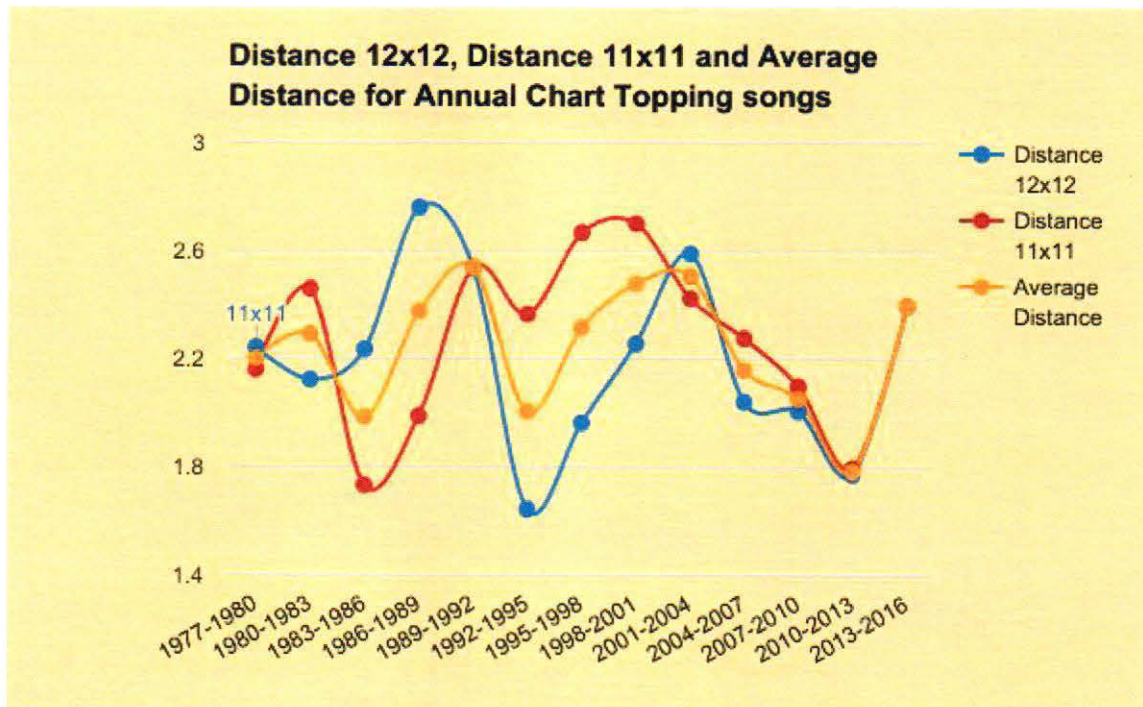
From 1980 to 1992, there seemed to be a sharp dip in the distances between song choruses. Most of these distances fall into the 'similar' range we set before, indicating that for some reason, Grammy winning artists started using more similar chord progressions in their choruses.

After 1992, there was a sudden rise in distance between song choruses. This coincided with what was then known as 'the new country boom'. The reasons for this sudden spike are unclear. Around the same time, the Soundscan database became a popular method of recording music purchases. Mere weeks after having its results published by Billboard, there was a spike in country music sales. It may have been that before Soundscan, sales for country music were underreported. Whatever the case, after this, record labels started funding country artists more, causing an increase in diversity (Anand & Peterson, p. 276-278).

In the early 2000s, there appeared to have been another dip in the distance between country music choruses. This apparent increase in similarity did not last as long as the one in the 1980s, however. By the late 2000s and continuing on to today, the distance between the choruses of Grammy winning country songs returned to a level similar to that in the 1990s.



We created a scatterplot using the data we collected on the history of music distributor market share and our initial set of results. Surprisingly, there seemed to be a negative correlation between the market share of independent music distributors and the diversity of country chorus chord progressions. For the data we had, whenever market share for independent distributors rose, country music tended to become more similar. For some reason, the data for the difference between “I Swear” and “Butterfly Kisses” did not follow this trend. This one outlier significantly raised the p -value, the statistical measurement of the correlation between two sets of data, from 0.012 to 0.568. The lower a p -value, the stronger the correlation. The closer it is to 1, the weaker the correlation is. The fact that it was a lone data point that distorted the correlation prompted us to expand our data set.



We repeated the process using a second set of fourteen songs. This time they were country songs reported by Billboard magazine to have topped the yearly charts, again separated by three years. Unlike the previous fourteen songs whose choruses we compared, there did not seem to be any discernible pattern in how different or similar these songs' choruses were, except in the 2000s and early 2010s, which demonstrated a steady increase in chorus similarity, bottoming out in 2013. This correlated with the period of time in which the 'bro-country' sub-genre began to emerge, but the lack of any pattern outside this period of time confounds whether this interpretation is accurate. In addition, there was a weak positive correlation, with a p -value of 0.110, between independent distributor market share and country song chorus diversity. This is completely contrary to our first data correlation.

Conclusion

We were unable draw any solid conclusion over whether country music really has become more homogeneous in its chord progressions. This was because our results for the second set of songs were vastly different from the results for the first set of songs. Besides a lack of correlation between the two sets, we believe we may have gone too far in constraining our data in trying to avoid selection bias.

The constraints we set on our data included what part of the song we were looking at, how far apart each song was chronologically, and how each song needed to have been ranked the best in different categories, such as topping Billboard charts or winning a Grammy. They were intended to prevent us from cherry-picking data that fit our pre-existing conclusions. For example, we could easily have analyzed songs just like the ones used by “Sir Mashalot” in his remix on YouTube. But without setting any constraints, we could not be sure if these demonstrated a trend, since we would only be comparing songs we knew ahead of time sounded alike.

When we compared the last two song choruses in our second data set, “H.O.L.Y.” and “Cruise”, we got a much larger difference even though both songs had been written by Florida Georgia Line and there had been a steady trend in increasing chorus similarity up to that point. However, these two songs did use similar and even identical chord progressions- they just were not used in the same part of the song. Perhaps if we had analyzed the songs in a different way, we would have yielded different results. We could

have, for example, compared different parts of the songs, or even larger segments. Or we could have analyzed the frequency of certain chords.

Another point that we wish could be corrected in future research is the limited scope of market share data. When we researched the distributor share in the music industry over the past several decades, we were unable to find any data earlier than the “Soundscan Era” which is a term used to refer to the period of time in which music market share data has been recorded into the Nielsen Soundscan database. As stated before, the data recording methods prior to the Soundscan Era were relatively unreliable, as sales data for certain genres was skewed and underreported. Even so, we would still have had a grasp on which entities had the largest shares in the industry. Comparing this to our results from comparing songs’ choruses in the 80’s would have given us a better statistical idea of what correlation, if any, existed between independent music market share and diversity in country music.

These are just a few suggestions on how we could improve upon the research we have already done. As of right now, we cannot state objectively whether country music has become more homogeneous, and why or why not. However, we can assert that country music is more diverse than initially assumed, with multiple sub genres, such as bro-country, country-rock, and Christian country, waxing and waning in popularity over the decades. The evolution of these sub genres is a factor we did not account for in our research, and the disparity between these sub genres may have influenced our data. As a final suggestion, in future research, we should further narrow down the type of music we analyze, not just by genre, but by sub genre as well.

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Appendix 1 : Don't It make My Brown Eyes Blue

Bm7b5 E7 Am C/G D7/F# D7 To Coda

o - ver you, you've found some - one new and
 all night long, say it is - n't true and
 what I had, but hon - ey now I do and

1 F Em7 F G7
 don't it make my brown eyes blue.

2 F F/G C Am Em7
 don't it make my brown eyes blue. Tell me no se - crets,

F C Am Em7
 tell me some lies, give me no rea - sons, give me

The musical score is written for guitar and voice. It features a key signature of one flat (B-flat major or D minor) and a 4/4 time signature. The score is divided into three systems. The first system includes the chorus and a 'To Coda' instruction. The second system is the first line of the verse, marked with a '1' and a repeat sign. The third system is the second line of the verse, marked with a '2' and a repeat sign. Chord diagrams are provided for each measure. The guitar part includes a bass line and a treble line. The vocal line is written in a single staff with lyrics underneath. The score ends with a Coda symbol.

al - i - bis. Tell me you love me and don't let me cry.

The first system of the musical score consists of two staves. The top staff is a vocal line with lyrics: "al - i - bis. Tell me you love me and don't let me cry." Above the staff are six chord diagrams: F, C, Am, Em7, F, and C. The bottom staff is a piano accompaniment. It begins with a treble clef and a key signature of one flat (B-flat). The melody is written in eighth and quarter notes, with some triplets indicated by a '3' over the notes. The bass line is written in eighth and quarter notes, also with some triplets.

say an - y - thing but don't say good - bye.

D.S. al Coda

The second system of the musical score also consists of two staves. The top staff is a vocal line with lyrics: "say an - y - thing but don't say good - bye." Above the staff are four chord diagrams: Dm7, Em, F, and F/G. The bottom staff is a piano accompaniment. It continues the melody from the first system, with a treble clef and a key signature of one flat. The bass line includes a triplet of eighth notes. The system concludes with the instruction "D.S. al Coda" at the end of the vocal line.

Appendix 2: You Decorated My Life

The musical score is written for guitar and piano. It consists of four systems of music, each with a vocal line and a piano accompaniment. The key signature is one sharp (F#), and the time signature is 4/4.

System 1: The vocal line begins with the lyrics "And you" followed by a long note, then "dec - o - rat - ed my". The piano accompaniment starts with a series of chords: D, C, D, G, Gmaj9, and C. The piano part includes a melody in the right hand and a bass line in the left hand, marked *mf*.

System 2: The vocal line continues with "life;" followed by "cre - at - ed a world". The piano accompaniment continues with chords: G, Gmaj9, C, Bm7, and Em. The piano part maintains the same melodic and bass line structure.

System 3: The vocal line has "where dreams are a part." followed by a long note, then "And ...". The piano accompaniment uses chords: Em/D, Am7, and D7. The piano part continues with the same melodic and bass line structure.

System 4: The vocal line concludes with "you" followed by a long note, then "dec - o - rat - ed my" and "life". The piano accompaniment uses chords: G, Gmaj9, C, G, and Gmaj9. The piano part continues with the same melodic and bass line structure.

C Bm7 Em Em/D

by paint - ing your love _____ all o - ver my heart. —

Am7 D7 G

— You dec - o - rat - ed my — life. —

B/F# B 1 D/C C D/C C

Like a

decresc. *mp*

2 D/C C D/C C Gmaj7

Appendix 3

NOBODY

Words and Music by RHONDA J. FLEMING
and DENNIS MORGAN

Moderately

mf

Dm/C C Dm/C C Bdim/A Am

Bdim/A Am C

1. Sit - tin' in a res - tau - rant; she walked by. I
2-4. (See additional lyrics)

Am7 Dm

seem to re - call that cer - tain look in your eye. I said, "Who's that?" You

G G/F 1.3. G/E G/D

said with a smile. "Oh, it's no - bod - y. ah, no - bod - y."

2

2/4.

G/E

G/D

Dm

G

bod - y." Well, your no - bod - y called ___ to - day. ___

C

Em/B

Am7

Dm

She hung up ___ when I asked ___ her name. - Well, I won - der, does she think ___

G

C

Dm/C

C

Dm/C

C

___ she's ___ be - ing clev - er? You ___

Dm

G

C

Em/B

say no - bod - y's af - ter you. ___ The fact is, what you say ___

Am7 Dm 3

is true, but I can love you like no - bod - y can,

G C Dm/C C 1. Dm/C C

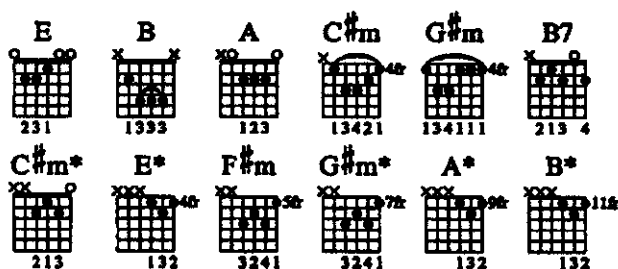
e - ven bet - ter.

Appendix 4

Forty Hour Week

(For a Livin')

Words and Music by Dave Loggins,
Don Schlitz and Lisa Silver



Intro | E | | | |

Chorus 1

A	E	A	E
Hello De - troit auto worker, let me thank you for your time.			
A	E	B	E
You work a forty hour week for a livin' just to send it on down the line.			
A	E	A	E
Hello Pitts - burgh steel mill worker, let me thank you for your time.			
A	E	B	E
You work a forty hour week for a livin' just to send it on down the line.			

Appendix 5: Love Can Build A Bridge

G7sus G7 C F

let me show you what love means. } Love can build a
all be - gins with you and me. }

G7 Dm G7/B

bridge be - tween your heart and

C F G C C/E

mine. Love can build a

F To Coda C/G G7

bridge, don't you think it's time? Don't you think it's time?

Appendix 6: Hold Me

1 2

C C Dm/C C

to you. you. Come here and hold me

Fmaj9 F6 C/G G7 C/G G7

tight - er. Tell me to - mor - row - will be

Dm/C C Dm/C C

bright - er. Kiss me.

Detailed description: The image shows a musical score for the song 'Hold Me'. It consists of three systems of music. Each system has a vocal line (treble clef) and a piano accompaniment (grand staff). The first system includes a first and second ending bracket. Chord symbols are placed above the vocal line: C, C, Dm/C, and C. The lyrics are 'to you. you. Come here and hold me'. The second system has chord symbols Fmaj9, F6, C/G, G7, C/G, and G7. The lyrics are 'tight - er. Tell me to - mor - row - will be'. The third system has chord symbols Dm/C and C. The lyrics are 'bright - er. Kiss me.'.

Kiss me a lit - tle hard - er.

Fmaj9 F6

Don't kiss me — like we're mar - ried. Kiss me like we're lov - ers.

G7 Dm/C C

We looked at each oth - er — and we start - ed to —

F F+

— grin. — This morn - ing it was o - ver,

F6 F+ G7

Appendix 7: I Swear

D/F# Gsus G C

I'll nev - er break your heart. } I swear by the moon _
 love won't age at all. }

Am7 Em7 F G

— and the stars in the sky, — I'll be there. — I swear, —

C Am7 Em7

— like a shad - ow that's by your side, — I'll be there. —

F G Dm7 Gsus G

For bet - ter or worse, — till death do us part, — I'll

Dm7 To Coda Gsus G

love you with ev - er - y beat — of my heart, — I swear. —

Appendix 8: Butterfly Kisses

The musical score is written for voice and piano. It features a melody line with lyrics and a piano accompaniment. The key signature has one sharp (F#), and the time signature is 4/4. The score is divided into four systems. The first system includes guitar chords G7sus, Csus(add2), and C. The second system includes Csus(add2), C, Csus(add2), C, and Csus(add2). The third system includes Am, G, and F. The fourth system includes C/E and F. The lyrics are:

Oh, but most of all, for but - ter - fly kiss - es af - ter
 But I re - mem - ber but - ter - fly kiss - es af - ter
 Then she leaned o - ver, gave me but - ter - fly kiss - es with her

bed - time prayer, stick - in' lit - tle white flow - ers all up in her
 bed - time prayer, stick - in' lit - tle white flow - ers all up in her
 mom - ma there, stick - in' lit - tle white flow - ers all up in her

hair. "Walk be - side the po - ny, Dad - dy, it's
 hair. "You know how much I love you, Dad - dy, but if
 hair. "Walk me down the aisle, Dad - dy, it's

my first ride. I know the cake looks fun - ny, Dad - dy, but
 you don't mind, I'm on - ly goin' to kiss you on the
 just a - bout time. Does my wed - ding gown look pret - ty, Dad - dy? Dad -

C/E F/A G/B

I sure tried." — } Oh, with all that I've — done wrong, — I must have done
 cheek this time." — }
 dy, don't cry." — }

C D7sus D7

some - thing right — to de - serve { a
 her

rit.

F To Coda G5 Csus(add2) C

hug }
 love } ev-'ry morn - ing and but - ter - fly kiss - es — at night. —
 love }

a tempo

Appendix 9: It's Five O'Clock Somewhere

Pour _____ me some-thin' tall and strong, - } make it a hur - ri - cane be - fore I _____
 (D.S.) pour _____ me some-thin' tall and strong, - }

_____ go in - sane. It's on - ly half past twelve, _____ but I don't care. _____

_____ It's five _____ o' - clock some - where.

Well, it's five _____ o' - clock some - where.

Appendix 10: I Hope You Dance

To Coda Φ

sit it out or dance, I hope you dance. _

1 Gm Eb Bb F/A

I hope _ you dance. _

2 Gm Eb

Time is a wheel in con - stant

I hope _ you

The musical score is written for voice and piano. It begins with a 'To Coda' symbol. The first system shows the vocal line with lyrics 'sit it out or dance, I hope you dance. _' and piano accompaniment. The second system is a piano solo with chords Gm, Eb, Bb, and F/A. The third system continues the vocal line with 'I hope _ you dance. _'. The fourth system shows a double bar line, followed by a second system with lyrics 'Time is a wheel in con - stant' and 'I hope _ you'.

Appendix 11: Jesus Take The Wheel

1

Bm7 A Gsus2

faith and gas - o - line. It'd been a long hard year. She had a

2

Bm7 A Gsus2

she did - n't e - ven have time to cry. She was so scared. She threw her

D N.C. Dsus D

hands up in the air: "Je - sus, take the wheel; -

8 A E Bm A/C#

take it from my hands, 'cause I can't do this on my own.

The musical score is written for guitar and piano. It consists of four systems of music. The first system (labeled '1') has a key signature of two sharps (F# and C#) and a 4/4 time signature. It features a vocal line with lyrics 'faith and gas - o - line. It'd been a long hard year. She had a' and a piano accompaniment. Chords Bm7, A, and Gsus2 are indicated above the vocal line. The second system (labeled '2') continues the vocal line with 'she did - n't e - ven have time to cry. She was so scared. She threw her' and the piano accompaniment. Chords Bm7, A, and Gsus2 are indicated. The third system continues with 'hands up in the air: "Je - sus, take the wheel; -' and includes a 'N.C.' (No Chords) section. Chords D, Dsus, and D are indicated. The fourth system concludes with 'take it from my hands, 'cause I can't do this on my own.' and includes a repeat sign. Chords A, E, Bm, and A/C# are indicated. The piano accompaniment consists of a right-hand melody and a left-hand bass line.

The image displays a musical score for guitar and voice, consisting of two systems. The key signature is D major (two sharps) and the time signature is 4/4.

First System:

- Guitar:** The first staff shows a melody with a D major chord at the start and an A major chord at the end of the first phrase.
- Voice:** The lyrics are "I'm a - let - ting go; _____ so give me one _ more chance, _".
- Piano:** The second staff provides a harmonic accompaniment.

Second System:

- Guitar:** The first staff shows a melody with chords E, Bm, A/C#, D, and Dsus. A "To Coda" symbol is placed above the D chord.
- Voice:** The lyrics are "save me from _ this road _____ I'm on. _____".
- Piano:** The second staff provides a harmonic accompaniment.

Appendix 12

WHITE HORSE

203

Words and Music by TAYLOR SWIFT
and LIZ ROSE

Moderately

mp

C5 F#sus2 Am7

F#sus2 C5 F#sus2/A

Am7 F#sus2 C5

Say you're sor - ry, that face -

F#sus2 Am7 F#sus2

— of an an - gel comes out — just when you need it to

C5 F#sus2 Am7

as I paced back and forth — all this time — 'cause I hon - est - ly be - lieved in

F#sus2 Am7 F#sus2

you. Hold - ing on, the days — drag on. Stu - pid girl, ..

G#sus G

— I should've known, — I should've known — that I'm not a prin -

C Am7 F#sus2

- cess, this ain't a fair - y tale. I'm not the one — you'll sweep off her feet, lead

Chords: Gsus, C

her up the stair - well. This ain't Hol - ly - wood, _ this is a small _

Chords: Am7, F#sus2, G

_ town. I was a dream - er be - fore you went and let me down. _ Now it's too _

Chords: Am7, G/B, F

_ late for you _ and your white _ horse to come a - round. _

To Coda

Chord: C5

May-be I was na - ive, _

Appendix 13: Blown Away

Chorus:

Am C G G/B G Am

Shat-ter ev-ery win-dow 'til it's all blown a - way. Ev-ery brick, ev-ery board, ev-ery

f

Blown Away - 7 - 2
40570

C G G/B G Am C

slam-ming door, blown a - way 'til there's noth-ing left stand-ing, noth-ing left of yes - ter-day.

G G/B G Am C G

Ev-ery tear-soaked whis-key mem-o - ry blown a - way,

G/B G Am C G G/B G

blown a-way, blown a-way.

mp

Appendix 14: Girl Crush

The musical score for "Girl Crush" is presented in three systems. Each system consists of a vocal melody line, a piano accompaniment (left and right hands), and guitar chords indicated by chord diagrams above the staff.

System 1:

- Chords:** F (first measure), G (second measure).
- Vocal Melody:** mid - night laugh — she's giv - in' you now. — I wan - na
- Lyrics:** mid - night laugh — she's giv - in' you now. — I wan - na
- Lyrics:** tried. — I can't get her off my — mind. — }

System 2:

- Chords:** Am (first measure), F (second measure).
- Vocal Melody:** taste her lips, yeah, 'cause they taste like you. I wan - na
- Lyrics:** taste her lips, yeah, 'cause they taste like you. I wan - na

System 3:

- Chords:** C (first measure), G (second measure).
- Vocal Melody:** drown my - self — in a bot - tle of her per - fume. I want her
- Lyrics:** drown my - self — in a bot - tle of her per - fume. I want her

Am F

long, blonde hair. I want her mag - ic touch. Yeah, 'cause

C G

may - be then - you'd want me just as much. I got a

1

Am F C G

girl - crush. I got a

Am F C G

girl - crush. I don't

Appendix 15

JOSÉ CUERVO

1

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Words and Music by
CINDY JORDAN

Moderate Country beat

Well, it's Sun - day morn - ing and the sun is shin - in' in my and
Now wait a min - ute... things don't look too fa - mil - iar, and
eye that is o - pened, and my head sleep - in' is be - spin - nin'... was the life of the par -
who is this cow - boy who's be - side me? He's aw - ful cute -
- ty, how'd I can't stop grin - nin'... I had too much Te - qui - la last night. I
but how'd I get his shirt on? I had too much Te - qui - la last night. I
Jo - sé Cuer - vo, you are a friend of mine. I like to drink -
- you with a lit - tle salt and lime. Did I kiss all the cow - boys? Did I
shoot out the lights? Did I dance on the bar? Did I start an - y fights? -
(Instrumental)
All those lit - tle shoot - ers, how I love to drink them down.
Come on, bar - tend - er, let's have an - oth - er round. Well, the mu - sic is play - ing and my
spir - its are high. To - mor - row might be pain - ful, but to - night we're gon - na fly.
Jo - sé Cuer - vo, you are a friend of mine. I like to drink -

Appendix 16: Watching You

D/F# Em7 D/F#

I said, "Son, — now where'd you learn — to talk like —
I said, "Son, — now where'd you learn — to pray like —

G A D

— that?" } He said, "I've been a - watch - in' you, — Dad. Ain't —
— that?" }

A

— that cool? — I'm your buck - a - roo, — I wan - na be like you — and eat all —

G A

— my food — and grow as tall — as you — are.

Appendix 17: Love Like Crazy

He'll say, "Pull up a seat, It - 'll on - ly take a min - ute
He'll tell you faith and sweat, and the heart of a faith - ful wom - an

to tell you ev - 'ry - thing. _ } Be a best friend _ and tell the truth, _
who nev - er let him for - get. _ }

and o - ver - use "I ____ love you." _ Go to work and do your best. _

Gm Eb Cm Gm

Don't out-smart your com-mon sense. Nev-er let your pray-in' knees get

la-zy and love like cra-

zy.

Chords and guitar diagrams shown above the vocal line:

- Gm (Guitar diagram: 3rd fret, 1st string)
- Eb (Guitar diagram: 3rd fret, 1st string)
- Cm (Guitar diagram: 3rd fret, 1st string)
- Gm (Guitar diagram: 3rd fret, 1st string)
- 1 Eb (Guitar diagram: 3rd fret, 1st string)
- F/Bb (Guitar diagram: 3rd fret, 1st string)
- 1 Eb(add9)/Bb (Guitar diagram: 3rd fret, 1st string)
- F/Bb (Guitar diagram: 3rd fret, 1st string)
- Bb (Guitar diagram: 3rd fret, 1st string)
- F/Bb (Guitar diagram: 3rd fret, 1st string)

Appendix 18: Sold

Chorus.
A

(1,3.) "Hey, pret - ty la - dy, won't you give me a sign... I'd give an - y - thing to make you
2. See additional lyrics

f

D G A

mine all mine... I'll do your bid-din' and be at your beck and call."





A

Yeah, I nev - er seen an - y - one look - in' so fine... man...




D

I got - ta have her, she's a one - of - a - kind... I'm go - in' once...






Appendix 19: Just To See You Smile




— you looked at me. Just to see you
 I'd lie a - gain. (D.S.) smile

smile, I'd do an - y - thing — that you

4 





want - ed me to. When all is said and done, I

nev - er count the cost It's worth all that's lost

To Coda ☺

1. ^{1.} D7

G B C G

Just to see you smile.

D F# E m G D C

Appendix 20: 12 x 12 Transition Matrices

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Appendix 21: 11x11 Matrices

[illegible]

%	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11
+1	0	0	0	0	0	0	0	0	0	0	0
+2	0	0	0	0	0	1	0	0	0	0	0
+3	0	0	0	0	0	0	0	0	0	0	0
+4	0	0	0	0	0	1	0	0	0	0	0
+5	0	0	0	0.154	0.615	0	0.154	0	0	0	0.077
+6	0	0	0	0	0	0	0	0	0	0	0
+7	0	0	0	0	1	0	0	0	0	0	0
+8	0	0	0	0	0	0	0	0	0	0	0
+9	0	0	0	0	0	0	0	0	0	0	0
+10	0	1	0	0	0	0	0	0	0	0	0
+11	0	0	0	0	1	0	0	0	0	0	0

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%	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11
+1	0	0	0	0	0	0	0	0	0	0	0
+2	0	0	0	0	0	0	0	0	0	0	0
+3	0	0	0	0	0	0	0	0	0	0	0
+4	0	0	0	0	0	0	1	0	0	0	0
+5	0	0	0	0	0	0	0	0	0	0	0
+6	0	0	0	0	0	0	0	0	0	0	0
+7	0	0	0	0	0	0	0.66	0	0	0	0.33
+8	0	0	0	0	0	0	0	0	0	0	0
+9	0	0	0	0	0	0	0	0	0	0	0
+10	0	0	0	0	0	0	0	0	0	0	0
+11	0	0	0	1	0	0	0	0	0	0	0

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