

Recurring patterns in popular music

Business



Music has been a part of human culture since the pre-historic times. It budded through singing, and then progressed to drums and rhythms, steadily becoming what we recognize today as ‘music’. What is music? According to Webster’s II: New Riverside University Dictionary, music is “the art of arranging tones in an orderly sequence so as to produce a unified and continuous composition.

” Is that really all there is to music? Of course that isn’t. Like almost everything in the world, there’s a little bit of math behind music too. Songs contain certain key components. The first is ‘notes’. Notes contain a different pitch. Each pitch vibrates at a certain frequency, like a ‘C’ will vibrate about 261.

63 times a second. Each of these pitches is named with the letters of the alphabet up to ‘B’. This is where we get our melodies. In Ancient Greece, the renowned mathematician Pythagoras came up with a musical system where all the notes were fractions of each other. For example ‘D’ would be considered $\frac{9}{8}$ of ‘C’; ‘E’ would be considered $\frac{5}{4}$ of ‘C’, and so on.

These ratios are startlingly accurate; showing how the math behind music was beginning to surface. There are thirteen notes in total, which can be shown using a scale wheel. (Fig. 1, Johnston, “The Note Wheel”). Two or more of these notes can be grouped together in ‘chords’.

Each chord has a root, which is the single note that it’s based off of. Using the Nashville Number System, you can find the chord ‘number’, bringing music back to math. Depending on what key you are in, each note has a designated number. “ In tonal music, keys have a single note that

<https://assignbuster.com/recurring-patterns-in-popular-music/>

establishes a harmonic center, a sort of “home base”, which is determined by the relationships of pitches. A piece is said to be “in” a certain key – “C major” or “A minor”. (Pittsburg Symphony Orchestra, “Definition of Terms”).

“Combinations of notes are known as “chords”. The progression of different chords is known as a “chord progression”, or in music theory, “harmony”.” (Armstrong, “Chord Progressions in Tonal Music”). The harmony is what makes the song. It’s the tune you remember, and it can also be boiled down into simple numbers.

Since each chord has a root number that means that chord progressions can be read as a group of these numbers, according to a nifty trick called ‘The Nashville Method’. This method gives a number value to the chord being played in any given measure. “The Nashville Number System uses major scales to figure out which chords to play in a given key. This is useful in two ways. In application you can use the number system to figure out a chord progression as you are playing the song.

” (Stover Music, “Chord Progressions”). For instance, the most commonly found chord progression in music is the I-IV-V progression, the numbers relating to their appropriate scale, according to the Nashville Method. (Fig. A1. Sutcliffe, “Three Chord Trick”). In the key of ‘C major’, the progression would read as C-F-G, since C is the first chord in the key of C major, ‘F’ is the fourth, and ‘G’ is the fifth.

These chords are often called ‘the three primary chords of ‘C’ major’.

These chords are used because of certain important properties and

<https://assignbuster.com/recurring-patterns-in-popular-music/>

relationships between them: In a major key, all three chords are major chords (made of a root, major 3rd and perfect 5th) and are the only major chords in the major key (excluding chromatic chords). The three chords are related by roots that are a 5th apart. G is a 5th higher than C and F is a 5th lower than C. The 5th relationship is important in chord progressions as will be seen in other parts of this paper. The three chords, in combination, contain all the notes of the major scale, in fact they are the means of defining the major scale and of calculating the pitches of the notes in the natural ‘just tempered’ major scale.

These chords are sufficient to harmonize any note of the major scale.” (Sutcliffe, “The Three Chord Trick”). This is why the I-IV-V chord progression is so popular, especially in modern Pop music. Music doesn’t stop there. Songs aren’t just composed of chords and chord progressions.

Another important fact is the beats per measure, also known as the time signature. This can influence the feeling of a song. “The most common time signature is 4/4. In fact it is so common that it is also referred to as common time. But what does 4/4 time mean? It means that there are four measures, and four beats in a measure. The number on top is the number of measures, and the number on the bottom can be thought of as a fraction.

In this case it equals 1/4 notes.” (pianolessons.com, “Basic Piano Time Signatures”). Other time signatures include ‘3/4’, ‘6/8’, and ‘2/4’. It’s all these elements combined that create music, but that still doesn’t quite encompass a certain question: What makes certain pop songs considered more popular than others? Sure, the artist and how well they’re known

contributes to their popularity, but what about one-hit-wonders? Those amazing anonymous songs that find themselves on the radio? How did they become so popular? The answer may not lay with lyrics, or even the instruments, but deep down into the core of the music. The chord progressions.

A song is composed of chord progressions, whether it is I-IV-V, or I-VI-IV-II, and that is what lies beneath all of the synthesizers and the voices. Studies show that trends in chord progressions may be the leading cause in the popularity of music. Research done by a website called 'uPlaya.com' further supports this explanation. On uPlaya, an artist can upload their songs to see if they can score a potential chart-topper.

“ The technology mathematically analyzes the underlying patterns in a track, including harmony, chord progression and lyrics. The computer then compares the song’s mathematical characteristics against past successful recordings from multiple genres and languages and maps the data on a multidimensional grid.” (Lamb, “ Algorithm Judges Hit Music Potential”). The mathematical characteristics are the chord progression numbers, so theoretically, it graphs the probability in which a song is to become popular by comparing its chord progressions to past successful songs. There are other, simpler ways to analyze popular music, though. A program called 'Band-in-a-Box' dissects music, rendering it to its basic chords.

The program allows a musician to adjust or tweak the song as needed, but it can also serve the purpose of finding chord progressions within songs. To test if there was a recurrence in the chord progressions of popular music, a

<https://assignbuster.com/recurring-patterns-in-popular-music/>

sample of sixty songs was taken. The sixty songs belong to one of three genres, 'Pop', 'Rock', and 'Country', which are widely acknowledged as the most popular genres, omitting sub-genres. For each genre, the 20 most popular songs of the decade 2000 were chosen. These songs were gathered from a website called Billboard, which analyzes airwave stats and tracks music sales to generate its 'Top Charts'. The Band-in-a-Box program cannot analyze mp3 files, so each of the sixty songs was found online in the raw MIDI format.

“ MIDI stands for Musical Instrument Digital Interface.

MIDI is a communications protocol that allows electronic musical instruments to interact with each other.” (Lipscomb, “ MIDI Basics”). The advantage to the MIDI format over tape, CD, or mp3 format is the music can be broken down into individual tracks and voices. This allows for the ability to modify the individual tracks and voices of the recording. More importantly for the purposes of the research, the MIDI file of a song can be shown in a letter of number, or alpha numeric, format corresponding to the chords of the song being played. After all these songs were found in the MIDI format, they were downloaded onto Band-in-a-Box.

Once in Band-in-a-Box, the songs were displayed in a chord chart. (Fig 2, Band-in-a-Box Screen Shot). A chord chart shows the placement of the chord and on which measure it should be played. It's easier to examine songs this way because unlike sheet music, chord charts display the alpha numeric letter corresponding to each appropriate chord. Once all of the songs were formatted, they were all cut down to the first thirty-two measures, a

statistically significant sample size that relayed the general chord progression within those measures.

With the songs cut, they were then transposed to another key, which is another use of the Nashville Method called ‘transposing’. “Another way to use the number system is to figure out how to play a song in a different key. This is called transposing a song.” (Stover Music, “Chord Progressions”). Transposing music does not mean that the chord progression itself changes, it just means that the chord to which the number is tied to changes. You still get the same tune.

Let’s go back to the I-IV-V chord progressions. If you are originally in the key of ‘C’, then your chords would be ‘CMaj’, ‘FMaj’, and ‘GMaj’. If you wanted to transpose the song to the key of ‘G’, then all of a sudden, your chords would be switched around, with ‘G’ becoming I, and ‘C’ becoming IV and so on. (Fig. 4, Stover, “Chord Progressions”).

1 2 3 4 5 6 7 8 G A B C D E F# G Fig. 4 All of the songs were transposed to the key of ‘C’ to take away any differences. Then, the Nashville Method was used to find the numerical value of each chord shown. To easier compare the songs, they were each graphed on their own individual line graph, with the first thirty-two measures on the x-axis and the numerical value of each chord on the y-axis. (Fig.

5. Generated By Researcher, “Apologize-OneRepublic Graph”). The graph shown is the number 1 song on the Pop charts for the 2000-2010 decade, with a VI-IV-I-III chord progression. Some songs shared similar chord progressions, like ‘Yeah’ by Usher and ‘Hot n’ Cold’ by Katy Perry, they both
<https://assignbuster.com/recurring-patterns-in-popular-music/>

had VI-II-V chord progression. Even though they had the same chord progression, the same could not be said for all of the other songs.

For each genre, there was not a specific trend between the chord progressions, though it was noticed that in the ‘Pop’ genre, there was a certain level of activity on the graphs in every fifth measure. To explore this possible trend, a histogram was created to view the frequency in which the chord ‘6’ was played in each measure (Fig. 6. Generated By Researcher, “Chord 6 Pop”). In all, there was a slight pattern between the frequencies.

The amount of times that chord ‘6’ was played in each measure escalated every fifth measure. The same process was carried out with the two other genres, but with much less satisfactory results. Results from this experiment showed that the chord progressions of a song do not necessarily determine its spot on the charts, as much as the research seemed to say. Each song, with few exceptions, seemed to have their own, unique chord progression. This doesn’t necessarily mean that there is not a trend between chart-topping songs, and it also doesn’t mean that it has nothing to do with chord progressions. The graph in Fig.

6 shows that there still might be a trend lurking out there in the math hidden in music. There are other yet countless facets of music to explore, including sine waves, rhythms, and even possibly other genres of music. Recurrences in music can also be tested for in classical music. There are several periods, like the baroque, or the romantic period, and there may be a certain trend in the pieces that signaled its time period. There are no limitations to music,

and where it can expand, it will stay intertwined with human culture as it always has.